Site: Land North of East Street, Rusper
Prepared by: Phil Allen MCIWEM C.WEM
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Date: 21 February 2025

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1.0 Introduction

1.1 This Water Neutrality Statement (WNS) has been produced by Motion on behalf of their client, Devine Homes PLC. It supports the planning application for 18 residential dwellings on the Land North of East Street, Rusper, West Sussex. The layout and location of the proposed development can be seen in Appendix A and Appendix B, respectively.

1.2 Following the issue of Natural England's (NE's) Position Statement on water neutrality within the Sussex North Water Supply Zone (SNWSZ), all new, reserved matters and Section 73 planning applications for development within Horsham District are required to demonstrate that they can be water neutral. NE's Position Statement can be found in full within Appendix C.

1.3 The SNWSZ covers part of the Horsham District, as well as parts of the neighbouring Chichester, Arun and Crawley Districts. A plan showing the SNWSZ area can be found in Appendix D.

1.4 This WNS will set out the following:

- The existing site's water demand;
- The changes in water demand as a result of the proposed residential development;
- Possible water use reduction measures, such as water efficient fixtures and fittings;
- Measures required to offset any remaining deficit following the above, and;
- Whether water neutrality has been achieved within the SNWSZ.

2.0 Baseline Mains Water Usage

2.1 The proposed development site is located to the north of East Street, Rusper, West Sussex. Rusper is a rural village positioned approximately 3.9km northeast of Horsham and 3.7km west of Crawley.

2.2 The site is currently undeveloped grassland, with mature trees and hedges on the East Street frontage. The north and east boundary is marked by post and rail fencing that separates it from surrounding land.

2.3 Because the site is greenfield and has no agricultural or other formal land use associated with it that consumes mains water, the baseline water usage for the site is zero.

3.0 Development Proposals and Population

3.1 The proposed development is for 18 residential dwellings plus parking, access and landscaping. The proposed development will include a mix of two-bed, three-bed and four-bed dwellings, with a mix of affordable and open-market units. The housing mix is as per the accommodation schedule in Appendix E, but is also summarised in Table 3.1, below.

Table 3.1 - Proposed Housing Mix

Open Market	
Unit Type	No. of Units
2-Bed	2
3-Bed	6
4-Bed	2
Total:	10
Affordable	
Unit Type	No. of Units
2-Bed	6
3-Bed	2
Total:	8
Grand Total:	18

3.2 The occupancy levels for the development have been drawn from 2011 local census data (as recommended by HDC in their water neutrality methodology guidance) and this is summarised in Table 3.2, below.

Table 3.2 – Average district occupancy levels per dwelling size

Housing Type	One-bed	Two-bed	Three-bed	Four-bed
Census Occupancy	1.32	1.88	2.47	2.86

3.3 The housing mix of the development, with the population of the units applied to the housing mix, can be seen in Table 3.3, below, to understand what the total census-based population of the development will be.

Table 3.3 – Development Housing Mix and Population

Houses (all types, open market and affordable)			
Bedrooms	No. of Units	Census-Based Population Per Unit	Development Population
Two-Bed	8	1.88	15.04
Three-Bed	8	2.47	19.76
Four-Bed	2	2.86	5.72
Total:	18	N/A	40.52

4.0 Additional Demand

4.1 The development proposals and development population outlined above have been assessed to determine the total water consumption and increase in water demand that the development will represent.

4.2 Building Regulations Part G sets out that *'Reasonable provision must be made by the installation of fittings and fixed appliances that use water efficiently for the prevention of undue consumption of water'.* Part G of the current Building Regulations recommends that all developments achieve a 'water efficient' consumption of 125 litres per person per day.

4.3 However, Strategic Policy 9 (Water Neutrality) of HDC's Regulation 19 Local Plan lists the emerging plans and policies concerning new developments. It is stated within the Regulation 19 Local Plan that sites within the SNWSZ should adopt a water efficiency target of 85 litres of mains supplied water per person per day.

4.4 Therefore, it is proposed that the new dwellings will achieve a water efficiency of less than 85 litres per person per day of mains water to be in accordance with HDC's Regulation 19 Local Plan. This will be achieved using water efficient fixtures and fittings that reduce the overall consumption of wholesome water.

4.5 A water calculation in accordance with Buildings Regulations Part G has been carried out, which confirms that the proposed development can achieve a water consumption of 84.85 litres per person per day, which includes an allowance of five litres per person per day for external water usage.

4.6 A copy of the Part G calculation is summarised in Table 4.1, below.

Table 4.1 – Part G Calculation of Proposed Water Usage Per Person

Fixture/Fitting	Capacity/ Flow Rate	Units	Total Water Usage (l/p/day)
WC (full flush)	4	litres	5.84
WC (part flush)	2	litres	5.92
Taps (Excluding Kitchen)	2.7	litres/second	5.85
Bath	130	litres	14.30
Shower	6	litres/second	26.22
Kitchen Taps	4	litres/second	12.12
Washing Machine	6.43	litres/kg	13.50
Dishwasher	0.99	litres/place setting	3.56
		Total	87.31
		Normalisation Factor	0.91
		Total	79.45
		External Water Use	5
		Total	84.45

4.7 Using the Part G water consumption figure of 84.45 litres per person per day and the development population of 40.52 it is estimated that the overall domestic water usage of the proposed development will be 3,421.91 litres/day.

4.8 A copy of the indicative fixtures and fittings that can achieve the above water consumption can be found in Appendix F. Details of the final specification of fixtures and fittings installed on the development can be secured by condition.

5.0 Offsetting Measures

5.1 To ensure the development can demonstrate water neutrality in accordance with the NE Position Statement a total of 3,421.91 litres/day must be offset.

5.2 The proposal is to offset the development's water demand against a scheme at Slade Farm, Rogate (near Petersfield). Slade Farm is in the Districts of Chichester and the South Downs National Park and details of the offsetting scheme is explained below.

Slade Farm Offsetting Scheme

5.3 The client is proposing to offset the water demand of the development against Slade Farm, which has historically drawn mains water from the SNWSZ.

5.4 Slade farm is a mix of arable farming, as well as the production of vegetables and beef (livestock) farming. The mains (wholesome) water use on Slade Farm is currently for the farmhouse, plus drinking water for livestock and the spraying of crops

5.5 It is proposed to install a borehole at Slade Farm to reduce mains water use. Water from the borehole will be used to replace mains water currently used for wash down of machinery, spraying of crops and other agricultural activities. In addition, with appropriate treatment, the water could be used for animal drinking water.

5.6 Meter readings have been supplied for Slade Farm. The meter readings supplied are for one of several meters across the Farm/property, which also has a number of un-metered supplies, thus the total water use on the farm is much greater than the supplied meter readings portray. However, for now, this WNS will focus on the recorded and metred water use on Slade Farm.

5.7 The meter readings can be seen in Appendix G, but the mains water use they indicate are summarized in Table 5.1, below

Reading No.	Start Date	End Date	Start Read	End Read	Total Use
1	08/2022	08/2023	2,705m^3	4,410m^3	1,705m^3
2	08/2023	08/2024	4,410m^3	8,267m^3	3,857m^3
	Total Days:	730		Total Use:	5,562m^3

5.8 The total mains (wholesome) water use on Slade Farm is 5,562m^3 over a two-year (730-day) period. This equates to 7.62m^3/day, or 7,619 litres/day.

5.9 A water-supplying borehole was drilled on Slade Farm, and this was completed in January 2025. Details of this borehole and the description of strata encountered can be found in the BGS borehole log in Appendix H. Water arising from this borehole will be used to supplant wholesome water currently used for the farm's operational activities, which were discussed above, which will return at least 7.62m^3/day, or 7,619 litres/day back to the SNWSZ.

5.10 This mains water saving is being allocated as a system of credits for the use of developments that represent an increase in mains water demand within the SNWSZ so that they can be 'water neutral' within the SNWSZ.

5.11 The proposed development's mains water requirement of 3,421.91 litres/day has been allocated against the mains water saving in the SNWSZ of 7,619 litres/day made by the borehole on Slade Farm, thus making the development water neutral.

5.12 The borehole's abstraction is to be limited to 20m^3, or 20,000-litres a day.

5.13 A Groundwater Prognosis Report has been completed to confirm that the abstraction of water from the borehole will not take water from the Arun Valley habitat sites, or otherwise impact on their integrity, even very indirectly, including from any river catchment that serves the Arun Valley basin.

5.14 The Groundwater Prognosis Report, produced by RPS, can be seen in Appendix I and Paragraph 1.6.17 of the report states the following:

"There is no mechanism for the Slade Farm abstraction to have a direct groundwater impact on the Hardham Basin or Arun Valley Protected Sites, given the distance from those sites and their hydraulic separation by the Sandgate Formation. Thus, the abstraction borehole will not take water directly from the Arun Valley habitat sites.

The proposed abstraction will not have a measurable effect on water levels or flow within the upper reaches of the River Rother, given the small size of the abstraction, the storage capacity of the Hythe Formation, hydraulic separation afforded by the Sandgate Formation and position of the borehole within the catchment. Thus, the abstraction borehole will not take water indirectly from the Arun Valley habitat sites, via flow reduction or reduced level within the Rother itself."

5.15 To further investigate the long-term viability of a borehole at Slade Farm, a borehole pumping test and analysis was provided by B. A. Hydro Solutions on 3rd February 2025. The pumping test and analysis report can be found in Appendix J of this report, which states that the pump test demonstrated:

- There was a very small drawdown with a consistent sustainable flow rate of 3m^3/hour.
- The abstraction rates were maintained very close to a constant rate throughout the pump test.
- The water levels within the borehole reached equilibrium, and steady state conditions were achieved.
- The test showed there to be no signs of interference from other abstractors.
- The Transmissivity of the ground penetrated by the borehole is high, as reflected by the small drawdown during test pumping.
- The water quality is good and in line with what would be expected from the aquifer locally.
- The borehole represents a reliable and sustainable source of potable quality groundwater.

Offsetting the Proposed Development

5.16 The applicant has an agreement with Slade Farm to be able to use water savings arising from implementation of the borehole to offset against mains water demand from its forthcoming developments. The total credits available are 7,619, as per the currently metred water consumption at Slade Farm, as proved by the water bills in Appendix G. As described above, the actual water use at Slade Farm far exceeds the level indicated by this one metered supply. Through further evidence demonstrating the agricultural water usage and demand on the farm, it is expected that the number of credits available will increase up to 20,000 litres/day, which is the proposed yield of the borehole. As further metered reading of water use come forward from Slade Farm, it will be possible to expand the full number of credits up to 20,000 litres/day, which is the maximum proposed yield of the borehole.

5.17 The proposed development will have an average daily water requirement of 3,421.91 litres, which requires 3422 credits to offset.

5.18 The availability of the current credit allocation is shown in Table 5.1, below. As can be seen, the development at East Street, Rusper, is currently the only scheme with credits allocated against the borehole at Slade Farm.

Table 5.1 - Credits Available to Devine Homes and Allocation to Date

Development	Litres/Credits
East Street, Rusper	3,422
TBC	TBC
TBC	TBC
Total Credits Currently Allocated:	3,422
Total Credits Currently Available:	7,619
Credits Remaining	4,197

5.19 Therefore, the proposed development can be fully offset using the proposed offsetting solution at Slade Farm and no further offsetting measures are needed. This allows the proposed development on the Land North of

East Street, Rusper, to fully achieve water neutrality and satisfy NE's requirements, as well as those of HDC's Regulation 19 Local Plan.

6.0 Summary and Conclusions

6.1 This Technical Note sets out the water usage strategy for the proposed development at Land North East Street, Rusper. The proposal is to incorporate water efficient fixtures and fittings to the proposed dwellings to minimise the mains water demand of the proposed development. This allows the water use per person, per day, to be less than 85 litres, which is in accordance with the requirements of HDC's Regulation 19 Local Plan.

6.2 Following the incorporation of the water efficient fixtures and fittings, the proposed development represents an increase in water demand over the existing situation by 3,421.91 litres/day.

6.3 The increase in mains water consumption within the SNWSZ will be offset against a borehole scheme at Slade Farm. Through meter readings, it is proven that at least 7,619 litres/day of mains water is used by Slade Farm. This quantity of mains water will be supplanted with borehole-fed water, thus this returning 7,619 litres of water per day to the SNWSZ. This water saving has been made available as a system of credits (with one credit being equal to one litre). The proposed development has been offered 3,422 credits to fully offset its mains water use of 3,421.91 litres/day.

6.4 As the amount of water available for offset from Slade Farm is much greater than that required by the proposed development, it confirms that the proposed development can be made fully water neutral through this offsetting scheme. This strategy will ensure that the development does not increase water demand within the SNWSZ and satisfies NE's requirements.

6.5 As noted above, as further records of metred water use come forward from Slade Farm, which can be supplanted by the borehole water supply, the amount of mains water that can be offset within the SNWSZ will increase up to the maximum proposed yield from the borehole of 20,000 litres/day.

Appendix A

Proposed Development Layout

CDM 2015 Health & Safety Information:

This information relates only to 'Significant Hazards' identified on this drawing and is to be read in conjunction with the Designer's Hazard Register.

Accommodation Schedule

SITE (outlined in RED) - 0.9Ha

Affordable	Approx. Area		6 dwellings
4 no. 2Bed	79.0m²	(850ft²)	2-Bedroom House
1 no. 2Bed	79.6m²	(857ft²)	2-Bedroom House
1 no. 3Bed	98.2m²	(1057ft²)	3-Bedroom House
Open Market	**Approx. Area**		**12 dwellings**
2 no. 2Bed	79.0m²	(850ft²)	2-Bedroom House
1 no. 2Bed	79.6m²	(857ft²	2-Bedroom House
1 no. 3Bed	98.0m²	(1055ft²)	3-Bedroom House
1 no. 3Bed	98.2m²	(1057ft²)	3-Bedroom House
1 no. 3Bed	100.4m²	(1,081ft²)	3-Bedroom House
4 no. 3Bed	112.6m²	(1,212ft²)	3-Bedroom House
2 no. 4Bed	137.1m²	(1,476ft²)	4-Bedroom House
Grand Total:	**1753m²**	**(18, 865ft²)**	**18 Dwellings**

KEY

	Site Boundary
Cbf	1.8m Close board fence
Bw	1.8m Brick wall
Pf	Existing post & rail fence
	Trees to be removed
	RPAs

Car Parking;	2 spaces per 2 bedroom dwelling 2 spaces per semi-detached 3 bedroom dwelling 2 spaces plus a garage per detached 3 bedroom dwelling 3 spaces plus a garage per 4 bedroom dwelling 4 visitor spaces
Cycle Parking;	2 spaces per dwelling within garages, or rear garden stores
Refuse Storage;	Within rear gardens to be brought to property fronts on collection days only

Client's Name: Devine Homes

Job Title: East Street, Rusper

Drawing Title: Site Layout

Scale: 1:500 @ A3 (metres 5 10 15 20)

Drawn	Checked	Date
GP	PA	26.11.24

Job No	Drawing No	Rev
7522	PL-03	B

Status: PRELIMINARY

Rev	Date	Revision Details	Dr	Ch
B	30.01.25	Updated to include consultant input	GP	PA
A	08.01.25	Updated to client's comments	GP	PA

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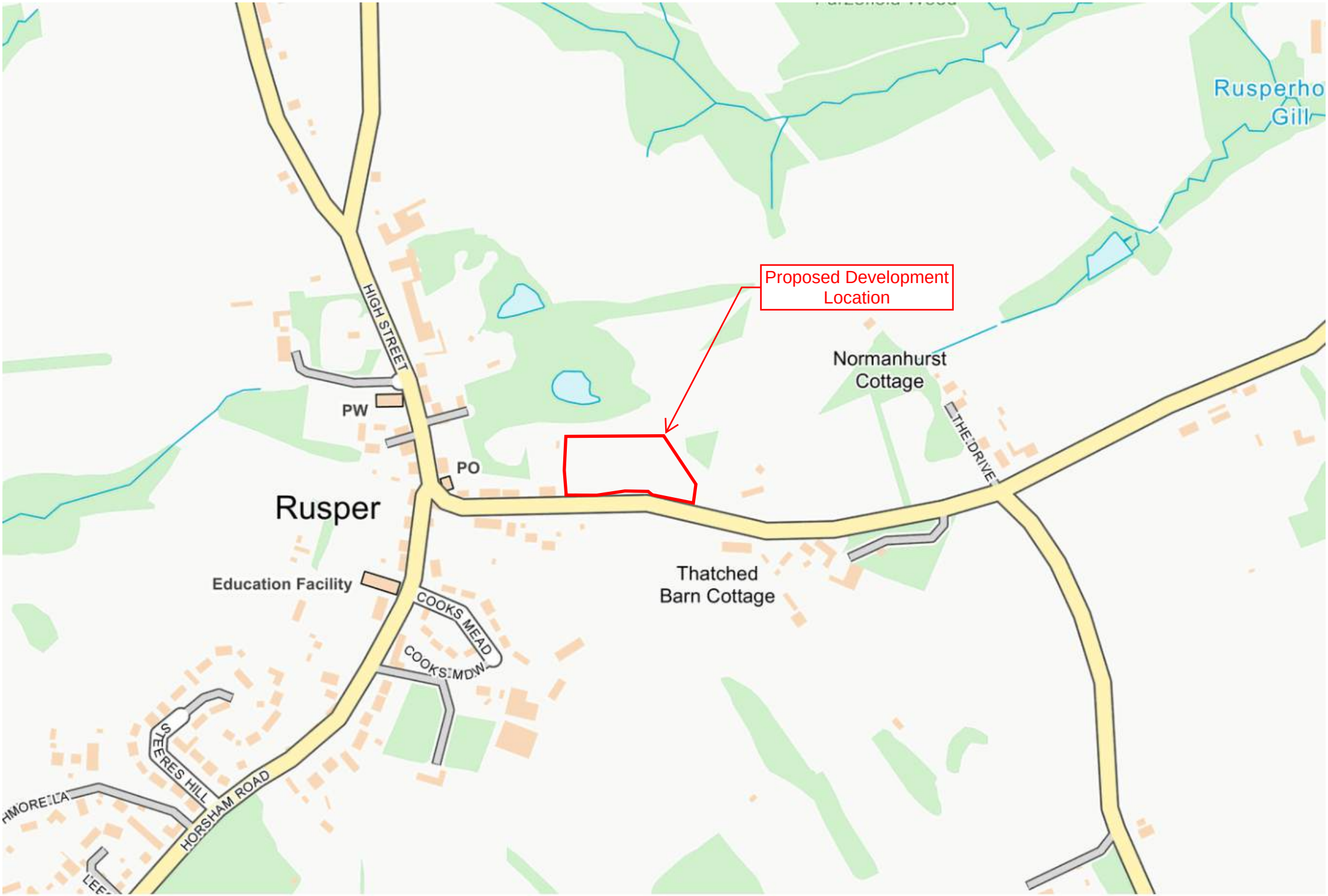
CAD Plot date: 4/02/2025 - 09:32:48 — 7522 - site layout.dwg

Appendix B

Site Location Plan


Proposed Development Location
HIGH STREET
PW
PO
Rusper
Education Facility
COOKS MEAD
COOKS MDW
STEERES HILL
HORSHAM ROAD
Normanhurst Cottage
THE DRIVE
Thatched Barn Cottage
Rusperho
Gill

Appendix C

Natural England's Position Statement

Natural England's Position Statement for Applications within the Sussex North Water Supply Zone

September 2021 – Interim Approach

Please take the following as Natural England's substantive advice for all applications which fall within Sussex North's Water Supply Zone.

Sussex North Water Supply Zone

Arun Valley SPA, SAC and Ramsar Site- Sussex North Water Supply Zone

The Sussex North Water Supply Zone includes supplies from a groundwater abstraction which cannot, with certainty, conclude no adverse effect on the integrity of;

- Arun Valley Special Area Conservation (SAC)
- Arun Valley Special Protection Area (SPA)
- Arun Valley Ramsar Site.

As it cannot be concluded that the existing abstraction within Sussex North Water Supply Zone is not having an impact on the Arun Valley site, we advise that developments within this zone must not add to this impact. This is required by recent caselaw, Case C-323/17 People over wind and Sweetman. Ruling of CJEU (often referred to as sweetman II) and Coöperatie Mobilisation for the Environment and Vereniging Leefmilieu Case C-293/17 (often referred to as the Dutch Nitrogen cases).

Between them these cases require Plans and Projects affecting sites where an existing adverse effect is known (i.e. the site is failing its conservation objectives), to demonstrate certainty that they will not contribute further to the existing adverse effect or go through to the latter stages of the Regulations (no alternatives IROPI etc).

Developments within Sussex North must therefore must not add to this impact and one way of achieving this is to demonstrate water neutrality.

In addition, the Gatwick Sub regional Water Cycle Study concluded that water neutrality is required for Sussex North to enable sufficient water to be available to the region.

The definition of water neutrality is the use of water in the supply area before the development is the same or lower after the development is in place.

Strategic approach

Natural England has advised that this matter should be resolved in partnership through Local Plans across the affected authorities, where policy and assessment can be agreed and secured to ensure water use is offset for all new developments within Sussex North. To achieve this Natural England is working in partnership with all the relevant authorities to secure water neutrality collectively through a water neutrality strategy.

Whilst the strategy is evolving, Natural England advises that decisions on planning applications should await its completion. However, if there are applications which a planning authority deems critical to proceed in the absence of the strategy, then Natural England advises that any application needs to demonstrate water neutrality. We have provided the following agreed interim approach for demonstrating water neutrality;

Minimising water use of new builds.

- Complete a water budget (based on occupancy)
- All new builds to demonstrate that they can achieve strict water targets (e.g., 85L/pp/day*)

  This can be achieved by measures such as:

- Grey water recycling (advantage of being reliable in hot dry weather);
- Rainwater harvesting;
- Water efficient fixings (such as shower aerators) to demonstrably reduce demand-this would need to be suitably certain.

In addition, water offsetting is required

- One way to achieve this is retrofitting of council owned properties/commercial buildings-located within Sussex North. Examples include:

- Grey water recycling- (for example there are clear opportunities for commercial properties).
- Rainwater harvesting of commercial settings;
- Installation of water reduction fittings in Council-owned buildings.

These measures need to be implemented until such time as a more sustainable water supply has been secured.

It will also need to be ensured that measures are not already proposed (for example in Southern Water's Management Plan) to avoid double-counting.

Any mitigation must be suitably certain in order to comply with the Habitats Regulations and Caselaw.

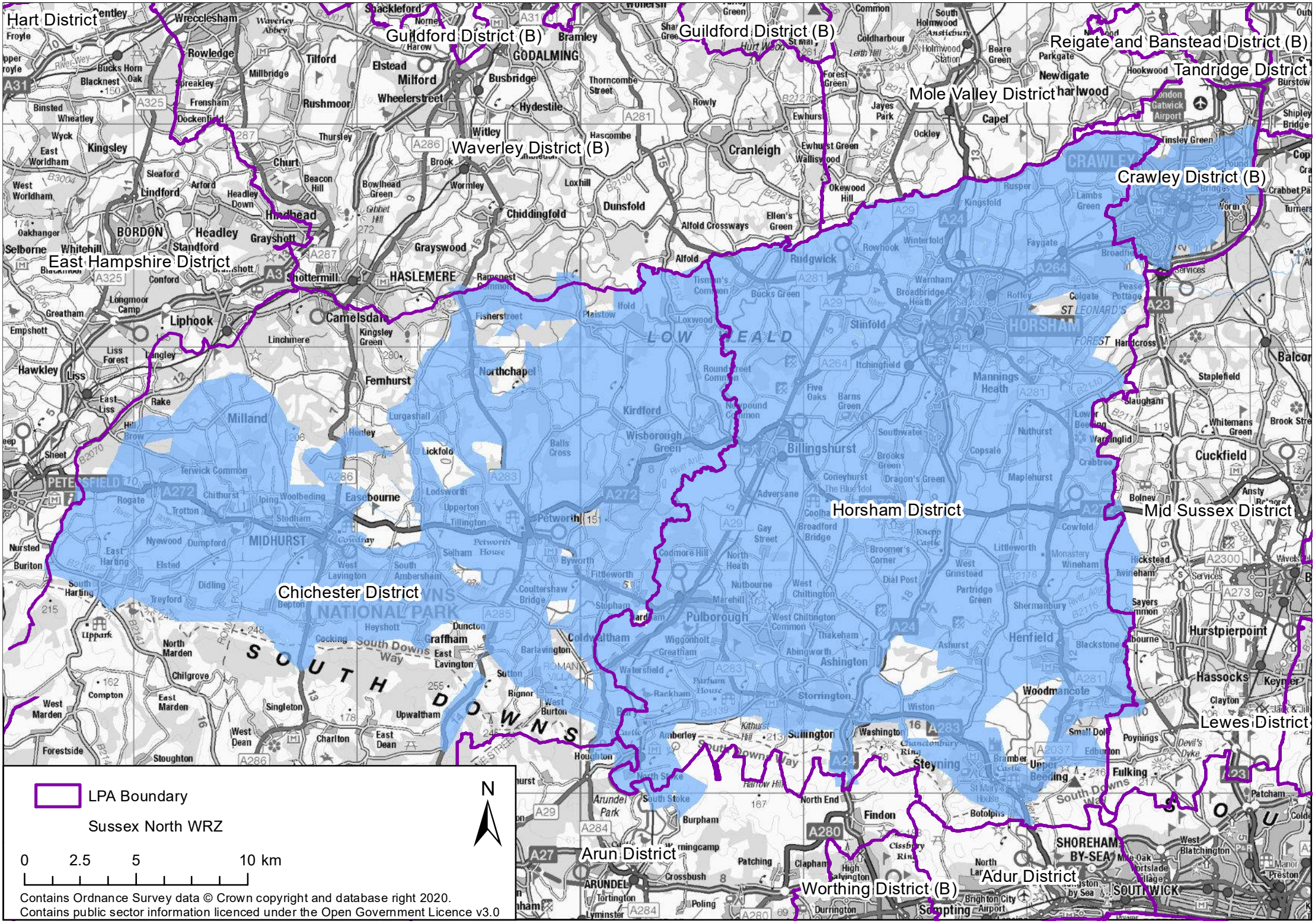
If the application cannot demonstrate, through an appropriate assessment, the required water neutrality, we advise that it is either revised to achieve this in line with the above or awaits completion of the strategic approach.

The securing of water neutrality is a matter which needs to be resolved at a strategic level and Natural England is working with the relevant authorities and the water company to achieve this. In light of this, Natural England will not be engaging with individual planning applications whilst the strategy is evolving.

***This this is the reasonably achievable figure with the above measures based on the early data from the strategic solution and may be subject to change as the strategic solution evolves.**

Appendix D

Sussex North Water Supply Zone Map



Appendix E

Accommodation Schedule

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East Street, Rusper
Schedule of Accommodation

7522 - D.01 -Schedule of Accommodation
Rev
Accompanies drawing **PL03**

Summary

Affordable									
House Type	**Bedrooms**	**GIA (m2)**	**Net (sqft)**	**Units**	**Total Area (sqft)**	**Total GIA (m2)**	**Storeys**	**Garage**	**M4(2) Compliant**
2 Bed House	2	79	850	4	3,401	316.0	2.0	No	Yes
2 Bed House	2	79.6	857	2	1,714	159.2	2.0	No	Yes
3 Bed House	3	98.2	1057	2	2,114	196.4	2.0	No	Yes
Totals				8	7,229	671.6			

Affordable		
Bedrooms	**Number**	**%**
2B	6	75%
3B	2	25%
Total	8	100%

Open Market									
House Type	**Bedrooms**	**GIA (m2)**	**Net (sqft)**	**Units**	**Total Area (sqft)**	**Total GIA (m2)**	**Storeys**	**Garage**	**M4(2) Compliant**
2 Bed House	2	79	850	2	1,701	158.0	2.0	No	Yes
3 Bed House	3	98	1055	1	1,055	98.0	2.0	Yes	Yes
3 Bed House	3	100.4	1081	1	1,081	100.4	2.0	Yes	Yes
3 Bed House	3	112.6	1212	4	4,848	450.4	2.0	Yes	Yes
4 Bed House	4	137.1	1476	2	2,951	274.2	2.0	Yes	Yes
Totals				10	11,636	1,081.0			

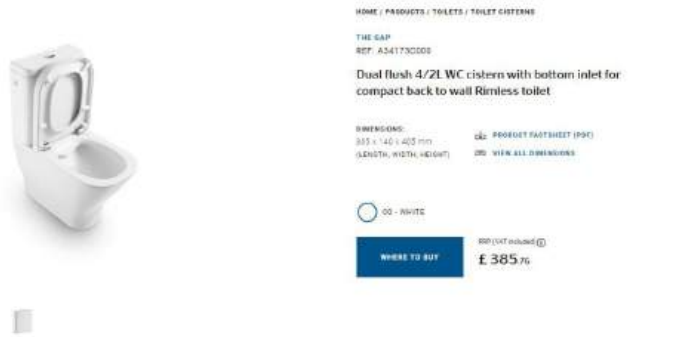
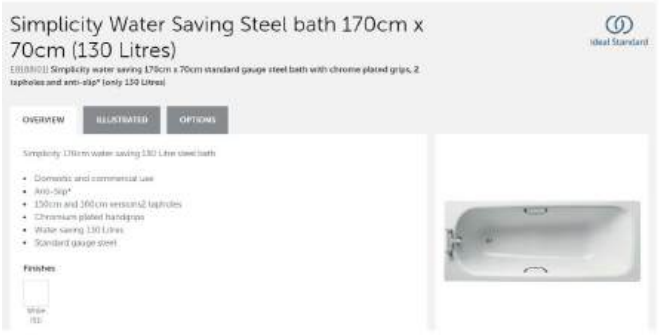
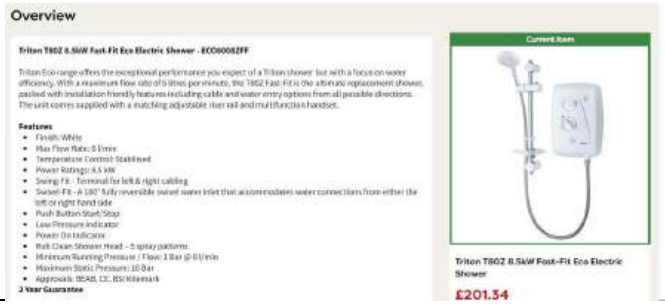
Grand Total				18	18,865	1,753

Sales		
Bedrooms	**Number**	**%**
2B	2	20%
3B	6	60%
4B	2	20%
Total	10	100%

Appendix F

Proposed Fixtures and Fittings

Fixtures and Fittings - Part G Specifications

Item	Capacity/Flow rate	Overview
Toilet (Dual Flush)	4/2 litres	The Gap 
Basin Tap	2.7 litres/minute	Joseph Miles 
Bath	130 litres	Ideal Standard 
Shower	6 litres/minute	Triton 

Kitchen Sink	4 litres/minute	Tap with flow regulator - Affinity by Moores  Utility Chrome utility lever sink mixer tap Tap Height: 380mm Order code: 805 56 Flow Regulator:  • Tap tail type flow limiters are suitable for most Bristan basin, pillar taps, basin and sink mixers. • Operating pressure range – Min. 1.0 bar Max. 5.0 bar. • All flow limiters accurate +/– 10%. • Flow limiting flow straighteners aerates the water for a softer non-splashing flow. • Flow limiting flow straighteners can be easily retro fitted in tap spout (dependent on tap/mixer model). Colour / Flow Rate limited to: / Order Code Pink / 1 litre per minute / 806 37 Olive / 2 litres per minute / 806 38 Brown / 3 litres per minute / 806 39 Grey / 4 litres per minute / 806 40 Yellow / 5 litres per minute / 806 41 Black / 6 litres per minute / 806 42

Appendix G

Water Bills from Slade Farm

business stream
A SCOTTISH WATER COMPANY

business-stream.co.uk
0330 123 2000 8255
If you have an emergency, please contact your:
Water wholesaler: Southern Water
Visit **business-stream.co.uk/wholesaler**

BSM-NEW | 000402 | Page 1 of 2 | BILLS | 000402

W A DAVEY & SONS LTD
SLADE FARM
ROGATE
PETERSFIELD
GU31 5BN

Customer reference / invoice no
2745828 / 31

Invoice / tax point date: 17 August 2022

Supply address: SLADE FARM, SLADE LANE, PETERSFIELD, GU31 5BN

Supply point ID: 301942772XW1X

Our VAT number: 945 8508 85

Your water services invoice

23 May - 15 August 2022 (84 days, average £10.20 per day)

YOUR ACCOUNT SUMMARY

Your previous balance	£403.37	
Payments received	£403.37	CREDIT
Your balance brought forward	**£0.00**	

YOUR CHARGES THIS PERIOD (see page 2 for details)

Water services charges	£857.00
VAT	£0.00
Total charges this period	**£857.00**

We look forward to receiving your payment of £857.00

For ways to pay see page 3

paid BACS 31/8/22

2022/23 charges

You can find more information on our charges and ways to save water and money on our website.

Visit business-stream.co.uk

How much water are you using?

If you'd like to reduce the volume of water you're using, check out our water saving tips on our website. You'll also be able to find advice on our website **business-stream.co.uk**

Actual meter read

This invoice is based on an actual read. To ensure the accuracy of future bills, you can submit your own readings, as long as it's safe to access your meter, on **business-stream.co.uk/meter-reading**. If your water is not provided by us, we will receive reads from your other supplier.

22922L00 BSM-NEW | 000402 | Page 1 of 4 | BILLS

Your charges in detail

Meter number / meter size: 9314562 / 15mm

Water charges		Units	Rate	VAT	Charge
Fixed water charge					
Yearly fee £121.11	24 Jul 23 - 14 Sep 23	53 days	0.330902	Z	£17.54

This is a fe
pipes and
premises.

Volumetric water charge					
Actual reading	23 Aug 23	4410			
Estimated reading	24 Jul 23	4053			
= volume used this period		357 m³			
Customer reading	15 Sep 23	4504			
Actual reading	23 Aug 23	4410			
= volume used this period		94 m³			
Charges	24 Jul 23 - 22 Aug 23	357 m³	1.8248	Z	£651.45
Charges	23 Aug 23 - 14 Sep 23	94 m³	1.8248	Z	£171.53
Total water charges					**£840.52**

This is a ch
you've use
meter. The
based on
consumpt
business-
useful-inf

Subtotal	**£840.52**
VAT	£0.00
Total charges this period	**£840.52**

Most of o
some are

Customer reference / invoice number: 2745828 / 6289543 **Invoice / tax point date:** 26 October 2024

Your charges in detail

Meter number / meter size: 9314562 / 15mm

Water charges			Units	Rate	VAT	Charge
Fixed water charge						
Yearly fee £80.37	24 Jul 24 - 25 Oct 24		94 days	0.220192	Z	£20.70
Volumetric water charge						
Actual reading	29 Aug 24	8267				
Estimated reading	24 Jul 24	5901				
= volume used this period			2366 m³			
Estimated reading	26 Oct 24	8484				
Actual reading	29 Aug 24	8267				
= volume used this period			217 m³			
Charges	24 Jul 24 - 28 Aug 24		2366 m³	2.0995	Z	£4,967.42
Charges	29 Aug 24 - 25 Oct 24		217 m³	2.0995	Z	£455.59
Total water charges						**£5,443.71**

This is a fee for the upkeep o pipes and pumps that supply premises.

This is a charge for the amou you've used, as recorded by meter. The rate you are charg based on your location and y consumption.

Subtotal	**£5,443.71**
Total charges this period	**£5,443.71**

reference / invoice no: 2745828 / 31

Invoice / tax point date: 17 August 202

Your charges in detail

Bas
con
on

Meter number / meter size: 9314562 ARAD 15mm

Water charges			Units	Rate	VAT	Charge
Fixed water charge						
Yearly fee £51.61	23 May 22 - 14 Aug 22		84 days	0.141397	Z	£11.88
Volumetric water charge						
Actual reading	15 Aug 22	2705				
Estimated reading	23 May 22	2158				
=Volume used this period			547.00 m³			
Charges	23 May 22 - 15 Aug 22		547.00 m³	1.545000	Z	£845.12
Total water charges						**£857.00**

A yearly fee
pumps that

The charge f
used, measu

Subtotal	**£857.00**
VAT	£0.00
Total charges this period	**£857.00**

VAT on our c
Most of our se
standard rate
See **business-**

Appendix H

BGS Borehole Record

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 _____ m^3/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 ☐

D Strata log

Geological classification (BGS only)	Description of strata	Thickness m	Depth (to base of strata) m
	(continue on separate page if necessary)		
	Other comments (for example, gas encountered, saline water intercepted)		

E Completing this form

How long did it take you to fill in this form? ⌊_____⌋

For Official use only

Date received (DD/MM/YYYY)	File	Consent number	BGS reference number
⌊_____⌋	⌊_____⌋	⌊_____⌋	⌊_____⌋
Accession number	**Wellmaster number**	**SOBI number**	**NGR**
⌊_____⌋	⌊_____⌋	⌊_____⌋	⌊_____⌋
LIC NO	**Purpose**		**EA reference number**
⌊_____⌋	⌊_____⌋		⌊_____⌋
Copy number	**Entered by**		
⌊_____⌋	⌊_____⌋		

F The Data Protection Act 1998

The Environment Agency will process the information you provide so that we can:

- deal with your application;
- make sure you keep to the conditions of any consent; and
- process renewals.

The Environment Agency will pass the information provided on this form to the British Geological Survey, in accordance with Section 198 of the Water Resources Act 1991, which states that any person drilling a well or borehole more than fifty feet below the surface, shall notify the British Geological Survey of this and provide them with the information as requested on this form.

We may also process or release the information to:

- offer you documents or services relating to environmental matters;
- consult the public, public organisations and other organisations (for example, the Health and Safety Executive, local authorities, the emergency services, the Department for Environment, Food and Rural Affairs) on environmental issues;
- carry out research and development work on environmental issues;
- prevent anyone from breaking environmental law, investigate cases where environmental law may have been broken, and take any action that is needed;
- assess whether customers are satisfied with our service, and to improve our service; and
- respond to requests for information under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004 (if the Data Protection Act allows).

We may pass the information on to our agents or representatives to do these things for us.

The British Geological Survey will use the information you provide to assist in its geological mapping programme and other research activities.

The British Geological Survey will process, or release, the information to:

- offer you documents or services relating to environmental matters;
- consult the public, public organisations and other organisations (for example, the Health and Safety Executive, local authorities, the emergency services, the Department for Environment, Food and Rural Affairs) on environmental issues;
- carry out research and development work on environmental issues;
- assess whether customers are satisfied with our service, and to improve our service; and
- respond to requests for information under the Freedom of Information Act 2000 and the Environmental Information Regulations 2004 (if the Data Protection Act allows).

We may pass the information on to our agents or representatives to do these things for us.

- We will also publish the information on our website; and
- provide the technical details of the borehole (for example, the depth, geology and water levels) to others. This will not include information about ownership of the borehole.

Appendix I

Borehole Prognosis Report

MAKING COMPLEX EASY

A TETRA TECH COMPANY

GROUNDWATER PROGNOSIS REPORT

Slade Farm, Petersfield

ENV20987
V1R2

22 April 2023

rpsgroup.com

Document status

Version	Revision	Authored by	Reviewed by	Approved by	Review date
V1	R1	Bryn Kearsey	Adrian Green		[Date]
V1	R2	Bryn Kearsey & Evie Skevington	Adrian Green	Adrian Green	02/05/24

Approval for issue

Dr Adrian Green	BSc, PhD, FGS	2 May 2024

File Name

240502 794-ENV-GDE-20987 Slade Farm Borehole Prognosis_v1r2 issue

Prepared by:

RPS

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Prepared for:

Devine Homes

Contents

Tables

Appendices

1 GROUNDWATER PROGNOSIS

1.1 Introduction

1.1.1 RPS have been commissioned by Devine Homes to undertake a desk-based feasibility assessment for a proposed groundwater source at Slade Farm, Slade Lane, Petersfield (hereinafter referred to as the Site). A supply of 7-20m^3 per day potable water is being sought for the purposes of livestock watering and washing down. That new groundwater source of supply is required to meet the requirements of Water Neutrality that is being applied in the Southern Waters Northern Supply Zone given the perceived impact of their groundwater abstraction on various protected sites situated in the lower reaches of the river Arun, near Pulborough.

1.1.2 The groundwater supply borehole can be located anywhere with the landownership boundary od Slade Farm shown in *Figure 1*. However, it would be preferable for the borehole to be situated in the immediate area surrounding the main farm buildings shown in yellow in *Figure 1*.

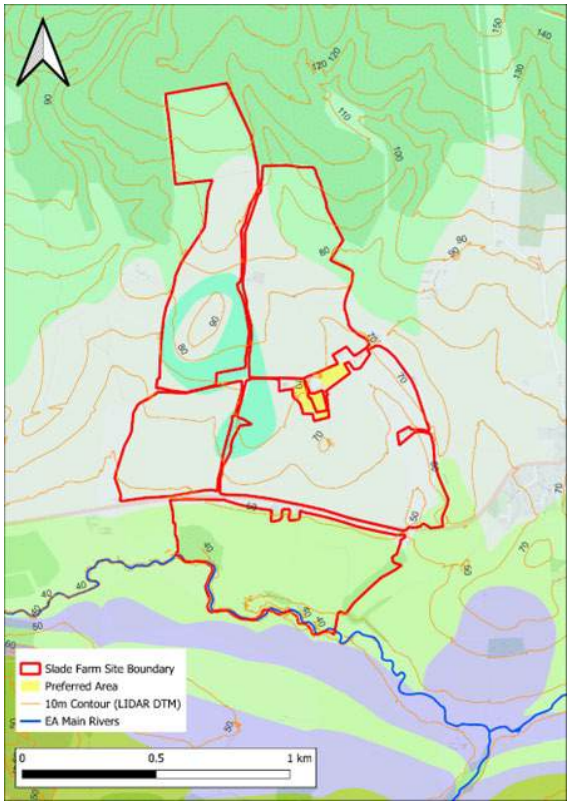


Figure 1. Site boundary, topography and hydrology

1.1.3 This groundwater prognosis shall evaluate the feasibility of a groundwater solution for the proposed development, given the ownership boundary of the Site; the local hydrogeological setting of the Site and EA abstraction licensing policy for the catchment.

1.1.4 The Slade Farm borehole is being proposed as a part of a water offsetting exercise to meet water neutrality for another development within the Northern Supply Zone that requires planning authorisation. This report shall thefore consider the consider the policy of the Local Authority with respect to borehole solution for meeting water neutrality. Whilst Slade Farm is located within the bounds of Chichester District Council (CDC), the tied development is located within the catchment of Horsham District Council (HDC) and it is therefore the policy of HDC that has been used for this review. It is noted that of all the LA affected by water neutrality, HDC provide the most comprehensive guidance with regards to hydrogeological assessment in relation to borehole solutions.

1.2 Methodology

1.2.1 This groundwater prognosis is principally a desk-based assessment, that has considered the following data sources:

- British Geological Society (BGS) online Geology Viewer.
- BGS 1:50,000 Map Series:
  - Sheet 300: Alresford – Solid and Drift (BGS, 1999).
  - Sheet 301: Haslemere – Solid and Drift (BGS, 1981).
  - Sheet 316: Fareham – Solid and Drift (BGS, 1998).
  - Sheet 317 & 332: - Chichester and Bognor – Solid and Drift (BGS, 1996).
- The BGS Lexicon of Named Rock Units.
- The physical properties of major aquifers in England and Wales. British Geological Survey Hydrogeology Group Technical Report WD/97/34. Environment Agency R&D Publication 8. (Allen et al. 1997).
- The physical properties of minor aquifers in England and Wales. British Geological Survey Hydrogeology Group, Technical Report WD/00/04 (Jones et al., 2000).
- BGS Hydrogeological Map 6: South Downs and Adjacent Parts of The Weald (1:100,000 Scale).
- Baseline groundwater chemistry: the Lower Greensand aquifer of South East England, BGS Open Report OR/21/011 (Mallin, D. and Smedley, P.L. 2021)
- Defra Magic Map online platform.
- Arun and Western Streams Abstraction Licensing Strategy (Environment Agency, 2022)

1.3 Hydrology and topography

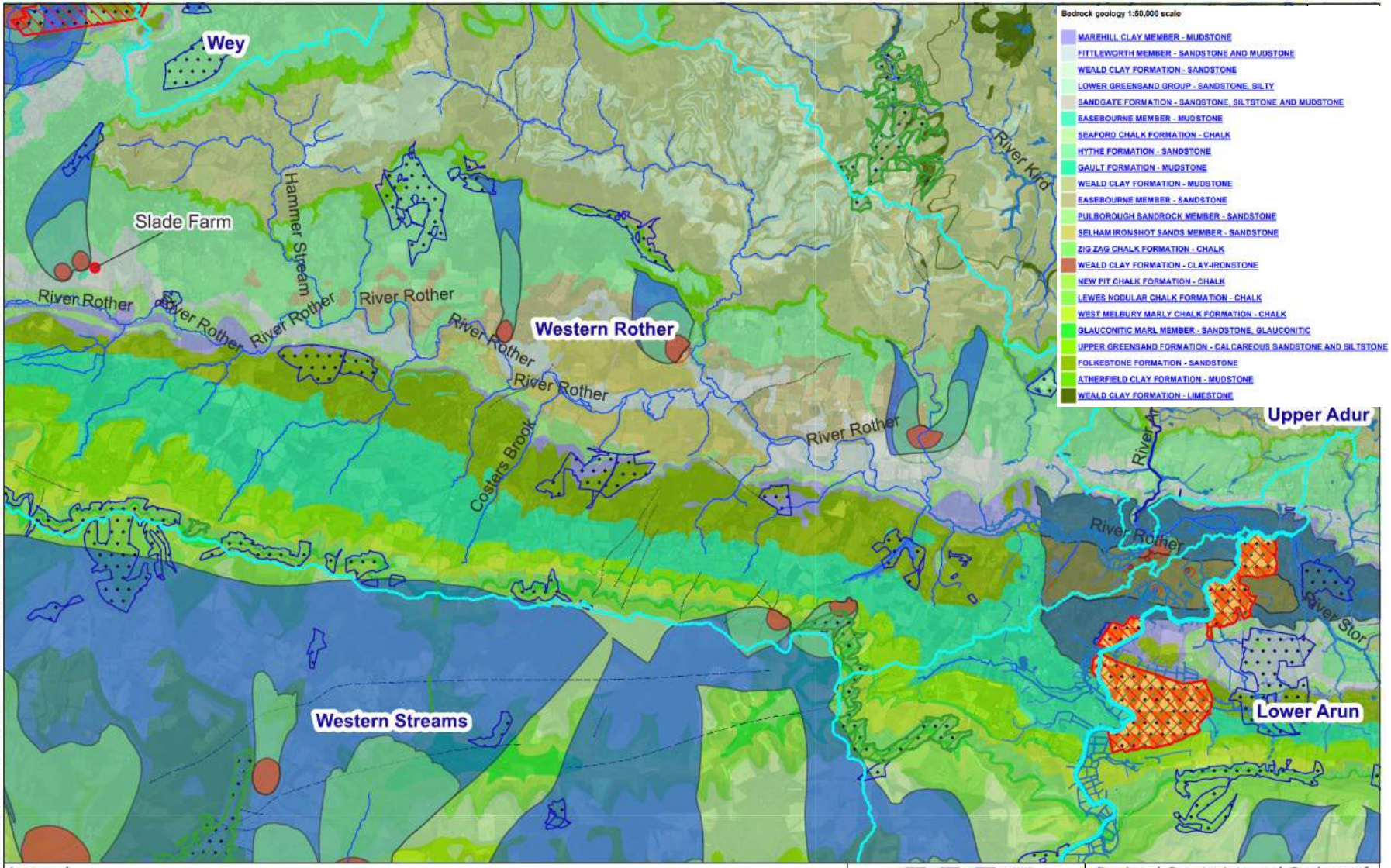
1.3.1 The farm buildings sit in the centre of the site at an elevation of c. 70 meters Above Ordnance Datum (mAOD). The wider site boundary stretches from the river Rother to the south at c. 40 mAOD rising to c. 126 mAOD in the north, on the southern side of Combe Hill.

1.3.2 The site is situated in the catchment of the river Rother, which flows from west to east along the southern boundary of the Site. No other surface water features are recorded across the majority of the site other than a small area of springs and ponds near the banks of the Rother. Surface water features at the site form part of the Western Rother Durford Water Framework Directive (WFD) Water Body (WFD Ref. GB107041012800), which is recorded as having **moderate** WFD ecological status.

1.4 Geology and Hydrogeology

Geological setting

1.4.1 The geological setting for the Site has been determined from a review of BGS data and is summarised in *Table 1* and shown in *Figure 2*.



rps MAKING COMPLEX EASY
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Regional Constraints and Geology of the Slade Farm Site

DRWN	Evie Skevington
DATE	22/04/2024

Figure 2

File Path: Q:\1 -Team Folders\WATER SCIENCES\02. Business Development & Marketing\11. Water Neutrality\Sussex North Water Supply Zone GIS\Sussex North Water Supply Zone.qgz

Table 1. Geological Sequence and Aquifer Status

Period	Group	Formation	Lithological Description	Thickness (m)	EA Aquifer Designation
QUATERNARY	Superficial Deposits	Head	Poorly sorted, poorly stratified, angular rock debris and/or clayey hillwash and soil creep, that mantle hillslopes.	0 to 2m	Secondary Undifferentiated
		Peat	An unlithified heterogeneous mixture of a wide range of plant debris.		Secondary A
		Alluvium	Unconsolidated clay, silt, sand and gravel deposited by a river, stream or other body of running water.		Secondary A
		River Terrace Deposits	Alluvium forming one of a series of level surfaces in a stream or river valley, produced as the dissected remnants of earlier abandoned floodplains. Sand and gravel, locally with lenses of silt, clay or peat.		Secondary A
CRETACEOUS (Bedrock)	Lower Greensand Group	Folkstone Formation	Medium to coarse grained, well sorted sandstones with cross bedding.	0.5-80m	Principal
		Sandgate Formation	Fine sands, silts and silty clays, commonly glauconitic; some sands limonitic or calcareous; some soft sandstones.	50 to 100m	Secondary A
		Hythe Formation	Mainly fine- to medium-grained, sparsely glauconitic sands, sandstones and silts, locally pebbly, with calcareous or siliceous cement in beds or lenses in some areas. Some clay interbeds, including Fuller's Earth.	10 to 92 m	Principal
		Atherfield Clay Formation	Generally massive yellowish brown to pale grey sandy mudstone throughout most of its outcrop, with an impersistent phosphatic pebble bed with vertebrate bones, gritty sandstone or very shelly sandy mudstone with glauconite, at the base.	10 to 22m	Unproductive Strata
	Wealden Group	Weald Clay Formation	Dark grey thinly-bedded mudstones (shales) and mudstones with subordinate siltstones, fine- to medium-grained sandstones, including calcareous sandstone.	47+ m	Unproductive Strata

**Geological formations shaded grey are within the local sequence but are not present at the site. The Atherfield Clay and Weald Clay formations may be present at depth and the Folkstone Formation may be found to overly these deposits or be found in close proximity to the Site.*

1.4.2 The geology in the vicinity of the Site is dominated by Cretaceous bedrock and overlying Quaternary superficial deposits.

1.4.3 Head deposits, consisting of poorly sorted angular debris are present across the site, particularly in valleys. Towards the southern end of the site, below 50 mAOD, superficial deposits include alluvium and corresponding river terrace deposits with a small area of peat near the riverbank at 40 mAOD.

1.4.4 Bedrock geology across the Site consists of calcareous sands of the Lower Greensand Group that dip to the south, as part of the southern limb of the Wealden Anticline. The sands, silts and clays of the Sandgate Formation is the dominant unit across the site. The sands and sandstones of the Hythe Formation Sandstone, part of the Hythe Formation, underly the Sandgate Formation and outcrop at the far northern end of the site above 80 mAOD. Bedrock at the site dips consistently to the south at 4 degrees. The Atherfield Clay Formation is located at depth and underlies the Hythe Formation.

1.5 Hydrogeology

Aquifer units & WFD groundwater bodies

1.5.1 The superficial deposits identified are not considered to be viable aquifer units given their limited extent and mixed nature across the Site.

1.5.2 The Sandgate Formation is designated as a Secondary A aquifer by the EA. Secondary A aquifers comprise permeable layers that can support local water supplies and may provide a source of baseflow to local rivers and watercourses. However, the permeability of the Sandgate Formation is often low, with the Rogate Beds which cover most of the site generally considered an aquitard. The Pulborough Rock, which outcrops towards the southern end of the site can act as a locally important aquifer. The Sandgate Formation is typically considered to be a low productivity geological unit that separates the more productive aquifer units of the underlying Hythe Formation and overlying Folkstone Formation.

1.5.3 The Sandgate Formation on the Site is underlain by sands and sandstones of the Hythe Formation which are designated a Principal aquifer. Principal aquifers are of national importance in terms of water supply, that are important for supporting river flow and water dependent wetlands. Groundwater flow in the Hythe Formation is through both intergranular porosity and fractures. Permeability in the Hythe Formation generally decreases with depth as grain size decreases towards the underlying low permeability clays of the Atherfield Clay Formation. Designation as a principal aquifer suggests that significant yields should be achievable from a borehole installed in the Hythe Formation.

1.5.4 The clays of the underlying Atherfield Clay Formation and Weald Clay Formation are designated ‘unproductive strata’ (i.e. non-aquifers) that form the base to the overlying aquifer units.

1.5.5 The Site is located on the Lower Greensand Arun & Western Streams Water Body WFD Groundwater Body (WFD Ref. GB40701G503100) which is recorded as having a **poor** overall status in relation to diffuse source nutrient impacts from agriculture and rural land management.

Local hydrogeological setting

1.5.6 The Hythe Formation Principal aquifer is recharged by rainfall that infiltrates into the ground, principally where it is exposed at the ground surface to the north of the Site. Where the Hythe Formation aquifer is concealed beneath the Sandgate Formation vertical recharge from above will be reduced, given the low permeability of that unit which will likely act as a confining layer.

1.5.7 Rest water levels in nearby boreholes completed in the Hythe Formation imply that groundwater in the Hythe Formation is confined by the Sandgate Formation, with water levels sitting a few meters above the contact with the Sandgate Formation. The potential for generating artesian groundwater pressures (i.e. groundwater level above ground level) within the Hythe Formation is therefore a possibility.

Local borehole records

1.5.8 The location of BGS Geoindex Onshore borehole records that have been reviewed are summarised in *Figure 3*, with their corresponding geological logs provided in *Appendix A*.

1.5.9 The location of a decommissioned abstraction borehole owned by Southern Water has been supplied by the client and is also shown in *Figure 3*. It is understood that Southern Water are considering recommissioning the borehole for abstraction, presumably to reduce the demand on the Hardham boreholes that are resulting in the perceived impact on the Arun Valley protected sites and driving the move to water neutrality. The presence of former production borehole of Southern Water, attest to the high productivity of the Hythe Formation on the Site.

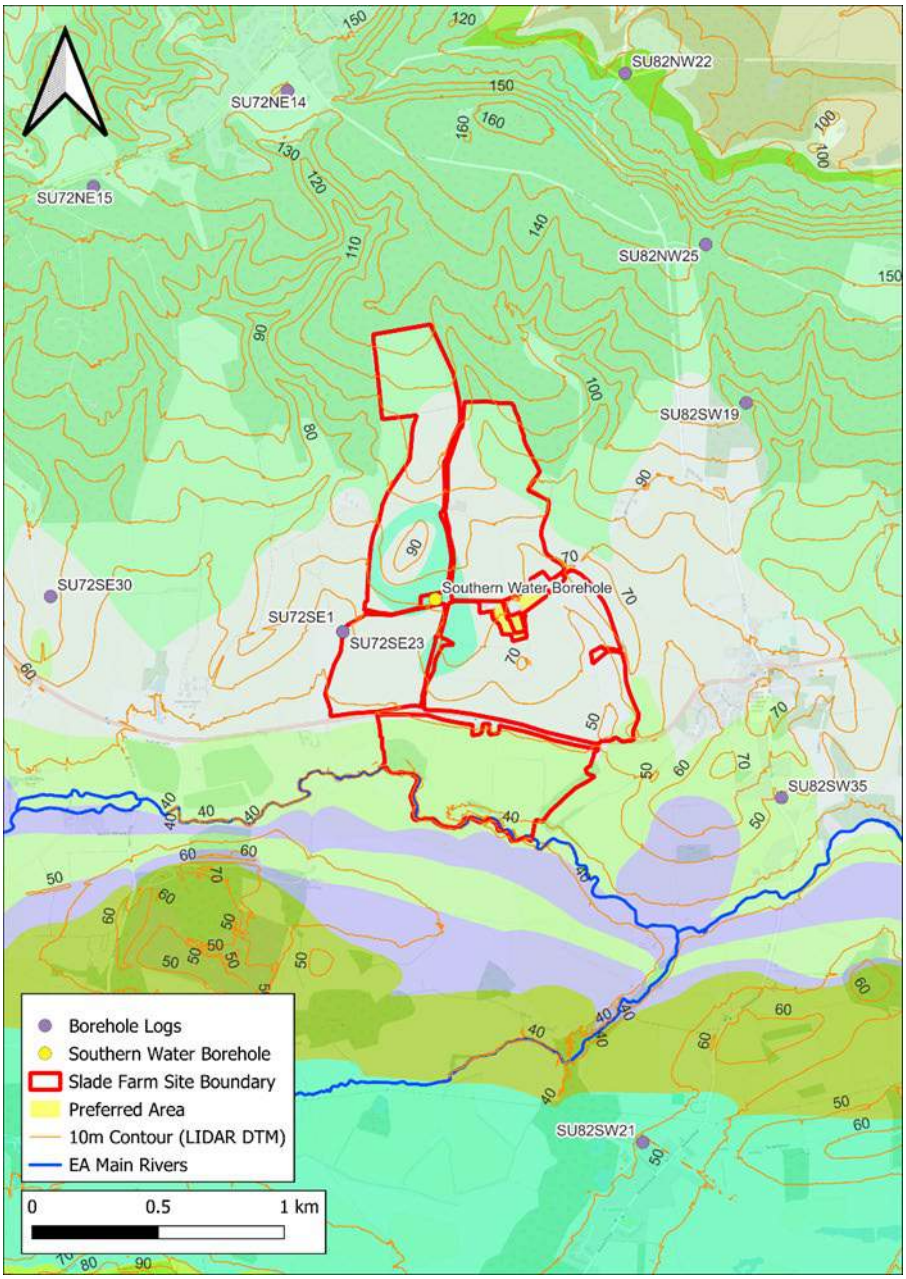


Figure 3. Local borehole records (taken from BGS Geoindex Onshore)

1.5.10 The borehole records confirm that abstraction boreholes have been successfully drilled into the Hythe Formation aquifer in the local area:

- SU72SE1 was drilled to a depth of 96.01 mBGL in 1972 with an accompanying observation well (SU72SE23) drilled to 59.74 mBGL.
  - The Hythe Formation is inferred to have been encountered at a depth of 15.24 mBGL.
  - Rest groundwater level is recorded as 5.26 mBGL (54.48 mAOD), 9.37 meters above the top of the Hythe Formation.

1.5.11 A pumping test was conducted with a pumping rate of 35 l/s for a period of 14 hours, although more detailed records of this test were not found.

1.5.12 The location of the Southern Water abstraction borehole is not included in the BGS Geoindex and no borehole records for that groundwater source were found.

Source protection zones

1.5.13 Groundwater source protection zones (SPZs) are defined to protect strategically important groundwater supply sources. SPZs have been defined for the decommissioned Southern Water abstraction borehole and for SU71SE1/SE23 to the west of the site, as shown in *Figure 4*. It is noted that the preferred area for a borehole at Slade Farm sits just outside of the identified SPZs. Given the sensitivity of public water abstraction boreholes and the potential for significant pumping induced drawdowns to occur, it is recommended that any borehole on Slade Farm is situated outside of the SPZ with greatest lateral separation (i.e. to the east) should Southern Water recommission the borehole.

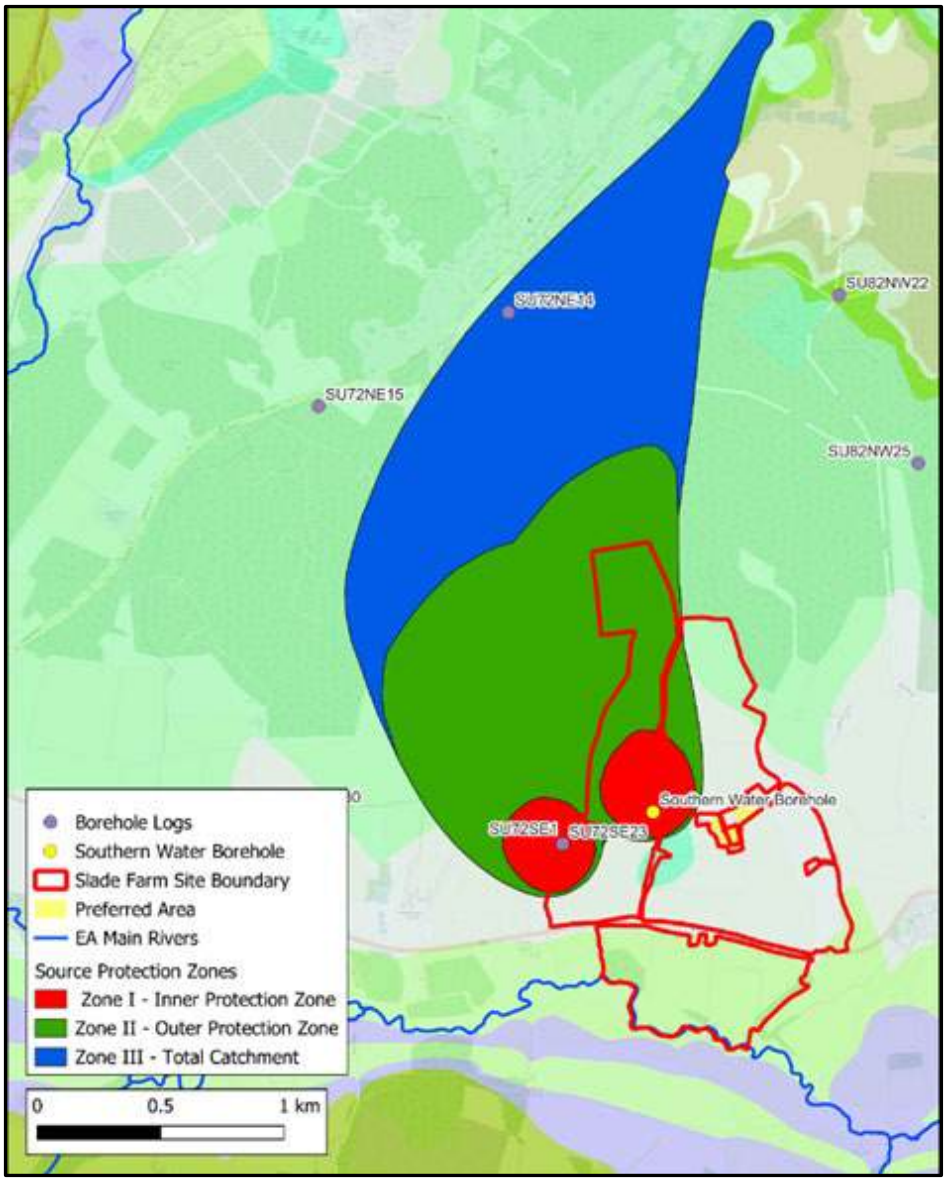


Figure 4. Source Protection Zones near Slade Farm

1.6 Regulatory framework

Abstraction licensing

Proposed groundwater abstraction below 20 m^3/day

1.6.1 It is understood that no more than 20 m^3/day of water is required from the borehole to be constructed at Slade Farm. If the forecasted demand for any proposed abstraction borehole is below 20 m^3/day an abstraction licence is **not** required from the Environment Agency (EA), nor is a Groundwater Investigation Consent (GIC) required to investigate the aquifer suitability as a source of supply.

1.6.2 A borehole drilled for general agricultural purpose at Slade Farm, would not require planning permission.

1.6.3 If multiple boreholes were proposed as an offset to the proposed Development, the EA are likely to seek assurances that these abstractions do not in effect represent a single combined abstraction that exceeds 20 m^3/day which would require licensing.

Proposed groundwater abstraction above 20 m^3/day

1.6.4 An abstraction that exceeds 20 m^3/day (single abstraction point or combined) would require an abstraction licence from the EA.

1.6.5 As shown in *Figure 5*, the groundwater availability status for the Lower Greensand Arun and Western Streams groundwater body is 'restricted water available for licensing' in the Arun and Wester Streams Abstraction Licensing Strategy (ALS) (EA, 2022). This availability status means that the groundwater unit balance undertaken by the EA shows that more water is currently licensed than the calculated amount available. However, the situation is sustainable because either: recent actual abstractions are lower than the amount available; or management options are in place to deal with the known impacts,

1.6.6 In restricted groundwater units no new consumptive licences will be granted, although there is the possibility the EA is investigating possibilities for reducing fully licensed risks. Water may be available if you can 'buy' the entitlement to abstract water from an existing licence holder. This is known as licence trading. This position was confirmed through consultation by Alison Mathews of the EA, who drafted the Abstraction Licensing Strategy (ALS).

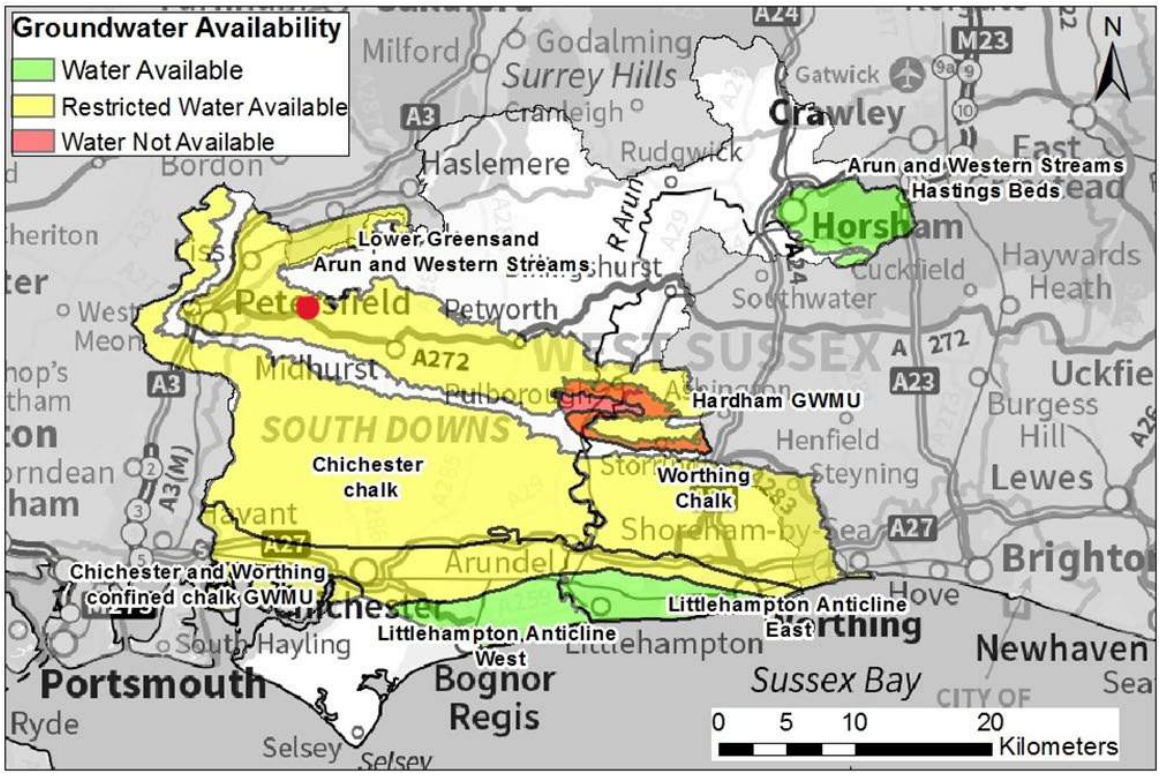


Figure 5. Groundwater resource status of aquifer groundwater bodies defined in the Arun and Western Streams Abstraction Licensing Strategy (ALS) (Red dot represents the location of the Proposed Development Site)

Requirements of water neutrality in relation to groundwater and boreholes

1.6.7 For the purpose of water offsetting, a borehole solution must meet the policy of the relevant Local Authority, which in turn is driven by the guidance of Natural England.

1.6.8 The proposed development seeking offset its own water demand using water reclaimed by the new borehole at Slade Farm is located within the HDC administrative area. HDC policy guidance has therefore been reviewed. This assumes that that the daily volume reduction of Mains water supply at Slade Farm, can be shown to the satisfaction of the LPA that it meets the demand required for offsetting at the proposed development.

Chichester District Council guidance

1.6.9 Whilst the Slade Farm borehole is located within the jurisdiction of Chichester District Council (CDC), CDC do not provide specific guidance on navigating water neutrality and only refer to the position statement and guidance from Natural England. To date, HDC are the only local authority to publish detailed borehole specific guidance in the context of water neutrality and water demand offsetting As this guidance is still likely to apply within other authorities within the Sussex North Water Resource Zone, it has been included in this report.

Horsham District Council guidance

1.6.10 HDC has recently provided more robust guidance with respect to groundwater (borehole) solutions for meeting water neutrality in relation to planning applications. An excerpt of the key HDC guidance

pertaining to groundwater solutions for offsetting water demands is given overleaf. It should be noted that this guidance would appear to have been written from the perspective of using an borehole private borehole constructed on or near the a proposed development rather than boreholes on untied properties or businesses which, as in this case, can be located a significant distance from both the new development **and** the Aran valley protected sites.

“Will the Council accept boreholes as a means of achieving water neutrality?

Private boreholes are capable of providing a suitable source of water (potable and non-potable) to achieve water neutrality, however a significant level of survey work will be required to support any proposal, both before any planning permission is granted and before first occupation of any property. This is because any measures proposed to achieve water neutrality must be certain and secure to avoid any risk of impact on the designated sites. The following guidance has been prepared in consultation with the Environment Agency and Natural England:

- For applications proposing a borehole to abstract more than 20m3 per day to serve a development, an abstraction licence from the EA will be required (Apply for a water abstraction or impounding licence - GOV.UK (www.gov.uk)). Before an application for an abstraction licence is made, any developer must apply to the EA for a Groundwater Investigation Consent (Apply for consent to investigate a groundwater source - GOV.UK (www.gov.uk))
- Evidence of an approved abstraction licence, or a valid licence application, must be provided with the planning application. It can take up to a year to go through the Groundwater Investigation Consent and Abstraction Licensing process and so early interaction with EA for large developments proposing to use a borehole is important.
- For applications proposing a borehole that would abstract less than 20m3 per day, an abstraction licence is not needed from the EA. In such cases the information below must be submitted with the planning application.

In all cases, planning applications that propose a borehole will need to provide a Hydrogeology Report (or equivalent) prepared by a suitably qualified professional (eg a qualified Hydrogeologist (M.SC level)). The Report will need to clearly cover the following matters:

Groundwater Resources

1. The location of the proposed borehole and the aquifer into which it is to be sunk. NB EA advice presumes against abstraction within the Hardham Basin (Folkstone Beds) and Chichester and Worthing Chalk, and where a borehole into the Lower Greensand Arun and Western Streams could reduce flows in the River Rother (click here to see map or view the EA’s Arun and Western Streams abstraction licensing strategy (ALS) on GOV.UK
2. Whether any geological links exists from the borehole location and the Arun Valley basin, ie confirm that the abstraction of water from the borehole will not also take water from the Arun Valley habitat sites, or otherwise impact on their integrity, even very indirectly, including from any river catchment that serves the Arun Valley basin
3. Whether the borehole location will impact on any nearby SSSI’s and their impact zones, or any other ecological features
4. A hydrogeological assessment of water yield from the borehole is necessary in all cases, commenting on risk of dry periods to ensure continuous year-round supply. Given locational variations in yield supply even in productive aquifers, evidence must be from a test borehole sunk onsite to demonstrate that the site can yield sufficient water in the driest months of the year (June to September), and that this yield will be reliable year-on-year. EA advice is that there is limited evidence that Weald Clay is capable of providing reliable yields, albeit some limestone and sandstone bands may be capable of supplying sufficient water for smaller schemes. Boreholes sunk into the Weald Clay will likely therefore not be supported unless there is clear evidence of a reliable year-on-year yield sufficient to serve the development proposal.” (Horsham District Council, 2023)

1.6.12 The two key issues that require addressing are points 1 & 2 given in the Groundwater Resources section above.

1.6.13 Point 1 is indicates there is a presumption against an "*abstraction within the Hardham Basin (Folkstone Beds)*" and "*where a borehole into the Lower Greensand Arun and Western Streams could reduce flows in the River Rother*". However, it must be noted that this position is based on "*EA advice*" which appears to reflect the local EA licensing position for abstractions above 20m^3/day (as shown in Figure 5) as opposed to specific position with respect to borehole solutions for Water Neutrality. Nevertheless that position has been considered further.

1.6.14 Point 2 states that an applicant must "*confirm that the abstraction of water from the borehole will not also take water from the Arun Valley habitat sites, or otherwise impact on their integrity, even very indirectly, including from any river catchment that serves the Arun Valley basin*".

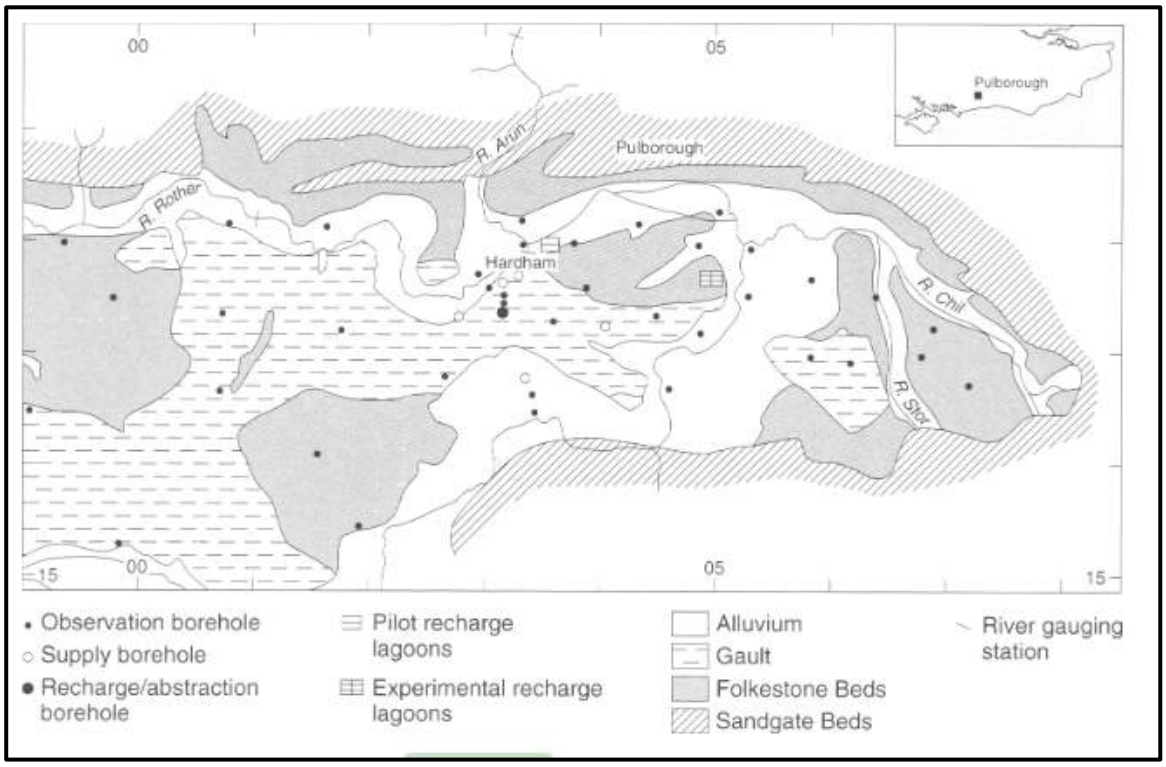


Figure 6. Location and geology of the Hardham Basin (taken from Headworth, 2004)

1.6.15 Within the EA's Arun and Western Streams ALS, the Hardham Groundwater Management Unit GWMU is stated to comprise "*the area of the Hardham Basin where the Folkestone Beds aquifer is at the surface. It also includes the area where the Folkestone Beds are buried by overlying deposits*". The extent of the Hardham basin is presented in Figure 6 and includes the EA's (GWMU) shown in Figure 5.

1.6.16 From a preliminary hydrogeological review, the following observation can be made:

- The proposed borehole at Slade Farm is situated in the upper reaches of the Rother Catchment, near Petersfield, more than 24km upstream of the from the Arun Valley Protected Sites.
- The proposed borehole is located a significant distance outside of the Hardham Basin and **will not** abstract groundwater directly from the Folkstone Formation that directly support the Arun Valley Protected Sites in the Hardham Basin.

- The proposed borehole at Slade Farm would draw groundwater from the Hythe Formation and that aquifer unit is **hydraulically separated** from both overlying Folkstone Formation Principal aquifer **and** the River Rother (& its tributaries) by the significant thickness of the Sandgate Formation aquitard present in the area around Slade Farm.
- The small size of the proposed abstraction and significant storage capacity expected for the Hythe Formation, will minimise direct impacts at distance around the Slade Farm borehole.

1.6.17 Based on these observations it is can reasonably be concluded:

- There is no mechanism for the Slade Farm abstraction to have a direct groundwater impact on the Hardham Basin or Arun Valley Protected Sites, given the distance from those sites and their hydraulic separation by the Sandgate Formation. Thus, the abstraction borehole will not take water directly from the Arun Valley habitat sites.
- The proposed abstraction will not have a measurable effect on water levels or flow within the upper reaches of the River Rother, given the small size of the abstraction, the storage capacity of the Hythe Formation, hydraulic separation afforded by the Sandgate Formation and position of the borehole within the catchment. Thus, the abstraction borehole will not take water indirectly from the Arun Valley habitat sites, via flow reduction or reduced level within the Rother itself.
- By reducing the Mains water usage at Slade Farm, situated more than 24km from the Arun Valley Protected Sites, a net benefit will result for those protected sites and offsetting will meet the objectives of water neutrality.

1.6.18 Point 4 requires a hydrogeological assessment of long-term groundwater yield. Given the abstraction would intercept groundwater in the Hythe Formation aquifer that has historically been utilised for public water supply abstraction (as indicated by the definition of SPZs), yields and yield reliability is not considered an issue at this location given the small size of the proposed abtraction. This is evidenced by the neighbouring Southern Water Borehole's 0.7km to the west.

1.6.19 Guidance provided by HDC on groundwater quality for groundwater supply sources is given below. This guidance is written assuming the borehole will provide the potable water supply to the proposed development affected by water neutrality.

“Groundwater quality

The quality and safety of private water supplies is controlled by in England by the Private Water Supplies (England) Regulations 2016 (as amended), and is regulated by the Council’s Environmental Health team.

The risks of pollution to a drinking water supply vary with the properties of the underlying soils and rock. The Environment Agency use source protection zones (SPZs) to identify areas close to drinking water sources to apply controls on some activities which could cause pollution. For large supplies, such as water company abstractions, these SPZs are created on a bespoke basis using groundwater modelling. However, all groundwater sources used for human consumption without a bespoke SPZ have at least a 50m radius SPZ centred on the borehole.

When considering the potential creation of a new SPZ it is important to understand the implications for existing activities which may fall within the zone. Further information on SPZs and relevant activities is available in The Environment Agency’s approach to groundwater protection.

To support your planning application you will need to provide:

1. A water quality assessment from the test borehole detailing the quality of the water abstracted and the measures to ensure potable water quality will be secured, including:
2. Detail on what type of treatment will be installed on the supply with information clearly indicating that it is appropriate for the amount of water being used and the contaminants found.
3. Detail on the proposed sampling and testing regime, undertaken in accordance with Private Water Supplies (England) Regulations 2016 (as amended) (or subsequent superseding equivalent), and taking into account the likely contaminants, as detailed above, along with detail on how any failure of any samples will be investigated and managed.
4. Detail on the maintenance, servicing and cleaning of the tanks, water treatment equipment, pumps, all pipework etc for the lifetime of the development along with regularity of servicing/maintenance and clarification what steps will be taken in the event of equipment failure to ensure continuity of supply.
5. Arrangements for keeping written records of all sampling, results of analysis, inspection, cleaning, and maintenance.
6. A list of all properties, including their land uses and activities, that fall within 50m of your borehole(s) and which could have the potential to cause pollution, a list of all the activities that would need to be restricted within the zone, and how occupiers will be notified of these restrictions in the event permission is granted. Please annotate the affected properties on a map of the local area alongside the location of your new borehole(s) and the extent of the SPZ.

Please be aware that conditions to secure long-term management, maintenance and monitoring of the private water supply will be required if planning permission is granted.” (Horsham District Council, 2023)

1.6.21 Although water quality within the Hythe formation aquifer can be expected to be good, the Slade Farm borehole would only be seeking to use the abstracted groundwater for stock watering and general agricultural purposes. As such, the water will not be used for human consumption and no detailed water quality assessment should be required at this stage. However, water quality testing and screening would be required to show it is fit for purpose and any prior treatment systems designed.

1.7 Further borehole considerations

Abstraction source design

1.7.1 The Hythe Formation aquifer should be targeted by any borehole constructed on Slade Farm to maximise borehole yield and yield reliability.

1.7.2 Based on nearby borehole records it is likely that the contact between the Sandgate Formation aquitard and Hythe Formation aquifer is at c. 41 mAOD. A borehole should be drilled around the farm buildings would be more than 30 meters deep to intercept that aquifer unit. Given the potential reinstatement of the nearby Southern Water borehole, a deeper installation into the Hythe Formation is recommended to mitigate for any potential future pumping related drawdown. A borehole of between 50 to 75m depth is therefore recommended. The Sandgate Formation should be cased out using solid casing, with a long section of slotted well casing installed across the Hythe Formation.

1.7.3 It may be possible to obtain records from Southern Water on their nearby decommissioned abstraction borehole to better understand local groundwater levels in the Hythe Formation and inform local borehole design.

Impacts on other groundwater users and source protection zones

1.7.4 Proximity to the Southern Water borehole that may be reinstated and its SPZ does present some issues for a groundwater abstraction at Slade Farm. Most notably

- It is recommended that the distance between the Slade Farm borehole and defined SPZs is be maximised when selecting the final location of the borehole.
- The location of the Slade Form borehole must be outside the defined SPZs, preferably to the east thereof, towards the eastern site boundary.

  If Southern Water do intend to recommission their boreholes, the Slade Farm borehole could be affected by pumping induced drawdowns resulting from that large public water supply abstraction. A deeper borehole, that provides scope to lower the pump should therefore be considered. Calculations should be undertaken to inform borehole depth and pump installation depth if pumping test data and the desired pumping rate of Southern Water can be determined.
- Prior liaison with Southern Water is therefore prudent.

1.7.5 It is also recommended that a water features survey is undertaken to identify all groundwater users within c. 1km of the proposed Slade Farm borehole. These pre-exiting abstractors represent protected rights that should not be adversely impacted by any new abstraction at Slade Farm.

1.8 Conclusions

1.8.1 A desk-based assessment of likely viability of a proposed groundwater solution to Water Neutrality “offsetting” borehole at Slade Farm, Petersfield has been undertaken. Based upon this assessment the following conclusions have been drawn:

- A groundwater source at Slade Farm for meeting the water usage requirements of 7-20m^3 per day of the dairy business would be feasible.
- The Hythe Formation aquifer should be targeted.
- The proposed solution aligns with the environmental regulations and local authority policies; as the total abstraction volume will not exceed 20m^3 per day, an abstraction licence will not be required from the Environment Agency.
- Hydrogeological interpretation of the geological site setting indicates the potential for impact on groundwater in the Folkstone Formation aquifer and baseflow to the upper reaches of the River Rother by an abstraction in the Hythe beds at Slade Farm would be negligible. Subsequently the abstraction poses negligible risk to the Arun Valley Protected Sites.
- Technical specifications of the groundwater supply should permit an optimal drilling depth of the screened section of 50-75m BGL to intercept the Hythe Formation. This future-proofs the supply against potential pumping related drawdowns associated with the recommissioning of the Southern Water boreholes to the West. Additionally, the borehole design must consider the protected water rights of the preexisting abstractions and associated source protection zones to the west.
- Further collaboration and communication with stakeholders including Southern Water and local authorities is recommended to address concerns relating to viability of the proposed abstraction as a water offset to development.
- Further hydrogeological investigation of the borehole may be required following installation to identify potential impacts on existing groundwater users and sensitive receptors.

1.8.2 In summary, the groundwater prognosis report concludes that establishing a borehole at Slade Farm represents a viable and environmentally responsible solution to meet the needs of a proposed development requiring water offset whilst ensuring regulatory compliance and minimising impacts on the hydrogeological environment.

Appendix A
BGS BOREHOLE RECORDS

NGRC

BOREHOLE RECORDS

ADJUSTMENT FORM

QUARTER SHEET SU 72 SE

BH REGISTRATION NUMBER 23 - 34

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

N.N.

GEORGE STOW CO. LTD.

SU72/468

Waterworks Engineers 300/427 B

READING ROAD – HENLEY-on-THAMES. OXON.

RECORD OF WELL (SHAFT OR BOREHOLE)

SU 7906 2396 DATE COMPLETED 17.8.73

SU. 72 SE.

All depths to be measured below Ground Level

Work carried out for Sussex River Authority

Locality (Exact Site) Rogate G.R. ~~TQ 799243~~ SU 7906 2396 County Sussex 20 NE/E

Level of Ground Surface above Sea Level (O.D.) c. 185 ft.

Depth of Shaft ..... ft. ..... ins. Diameter..... ft. ..... ins.

Depth of Bore 60 metres (196ft). ins. Diameter: At Top 6 (152.4 mm) ins. At Bottom 6 ins.

Details of Permanent Lining Tubes

Diameter	Length Inserted		Top At
(304.8 mm) 12 ins.	151m ft.	Plain – ft. Slotted.	ft. 1m ins. above/below Ground Level
(152.4 mm) 6 "	"	" 60m "	" " " ground level
"	"	" " "	" " " "
"	"	" " "	" " " "
"	"	" " "	" " " "
"	"	" " "	" " " "

Water Struck at depth of (in ft.)

Rest Level of Water below/above Ground Level ..... ft. ..... ins.

Yield on ..... Hours/Days test. Pumping ..... Gallons per ..... Date .....

Pump Water level ..... ft. ..... ins. below Ground Level.

Time of Recovery .....

Headings. Depth below Ground Level

Directions and Lengths

Remarks Observation borehole only – no test

Sited by O on Sussex 20 NE/E

See back for Strata Record.

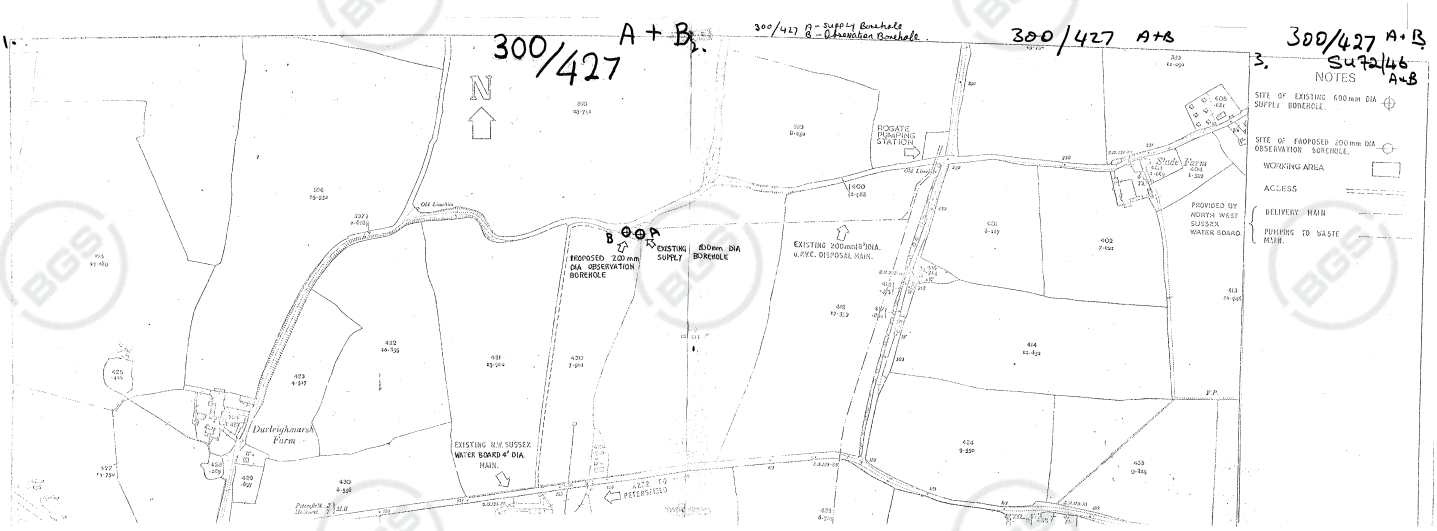
300/427

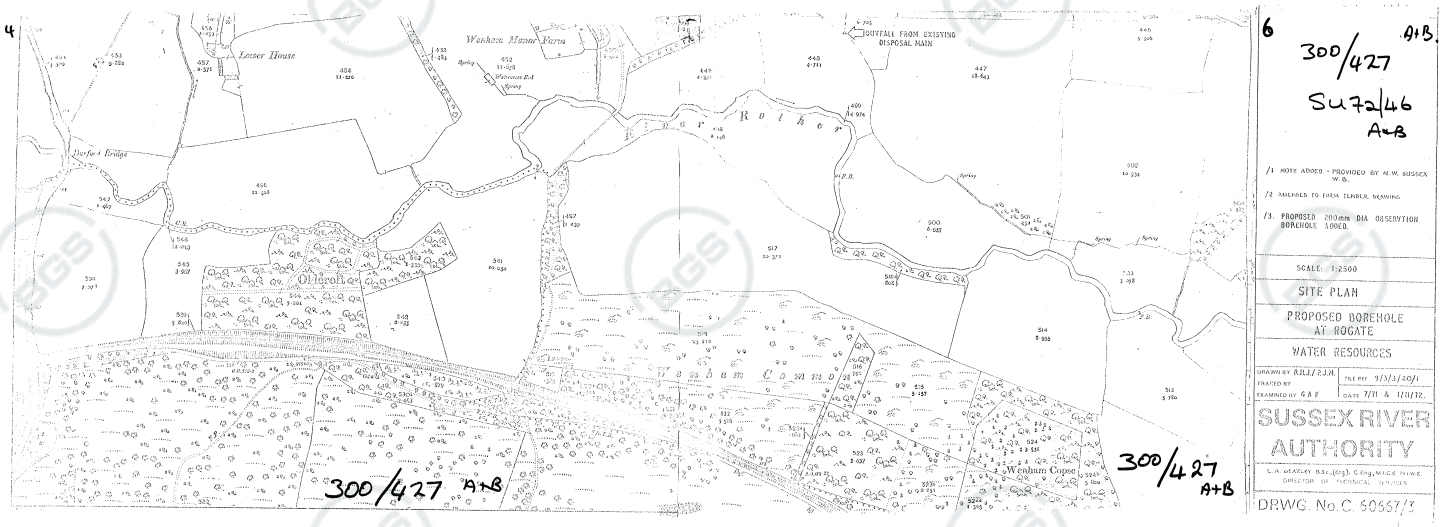
DETAILS OF STRATA

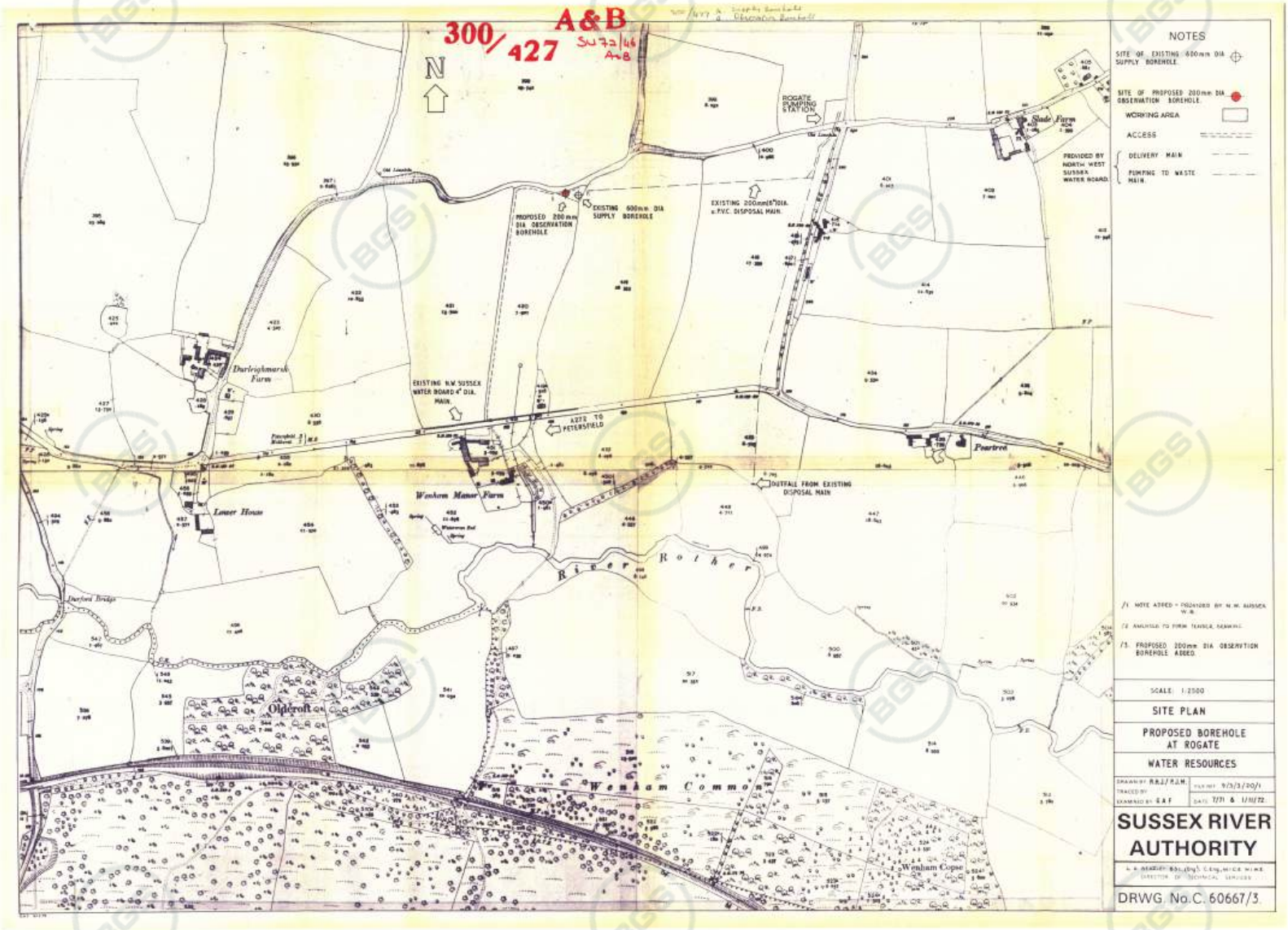
GEOLOGICAL CLASSIFICATION	NATURE OF STRATA (and any additional remarks)	T	D	THICKNESS		DEPTH	
		METRES.		FEET	INCHES	FEET	INCHES
? SANDGATE BEDS.	Topsoil	0.91	0.91	3	0	3	0
	Soft yellow sand	8.22	9.14	27	0	30	0
	Soft golden sand	4.57	13.71	15	0	45	0
	Soft yellow sand	0.91	14.63	3	0	48	0
HYTHE BEDS.	Very hand green rock	0.60	15.24	2	0	50	0
	Very hard brown sandstone	0.60	15.84	2	0	52	0
	Yellow sand - clay particles	0.91	16.76	3	0	55	0
	Dark brown sandstone with iron	1.52	18.28	5	0	60	0
	Dark brown sand	1.52	19.81	5	0	65	0
	Soft golden sand	1.52	21.33	5	0	70	0
	Dark brown sand - hard particles	1.52	22.86	5	0	75	0
	Hard light grey sandstone - iron	1.52	24.38	5	0	80	0
	Green clay with soft sand [- STONES]	5.48	29.87	18	0	98	0
	Green grey sand	0.60	30.48	2	0	100	0
	Grey sandstone with iron	3.04	33.52	10	0	110	0
	Fine yellow sand	1.52	35.05	5	0	115	0
	Grey sandstone hard	3.04	38.10	10	0	125	0
	Golden sand	1.52	39.62	5	0	130	0
	Hard grey sandstone	3.04	42.67	10	0	140	0
	Hard grey - yellow sandstone	3.04	45.72	10	0	150	0
	Ironstone bed	0.30	46.02	1	0	151	0
	Dark grey sandstone with iron	2.74	48.76	9	0	160	0
	Hard light yellow sandstone	1.52	50.29	5	0	165	0
	Hard brown ditto	1.52	51.81	5	0	170	0
	Green cemented sand	4.57	56.38	15	0	185	0
	Grey green cemented sand	1.52	57.91	5	0	190	0
	Hard light yellow sandstone	1.82	59.74	6	0	196	0

P.P.
B. YOUNG

25. 3. 74


300/427 A + B.
300/427 A - Supply Borehole B - Observation Borehole
300/427 A+B
300/427 A+B
SU72/46 A+B
NOTES
SITE OF EXISTING 600mm DIA SUPPLY BOREHOLE.
SITE OF PROPOSED 200mm DIA OBSERVATION BOREHOLE.
WORKING AREA
ACCESS
DELIVERY MAIN
PUMPING TO WASTE MAIN
PROVIDED BY NORTH WEST SUSSEX WATER BOARD
ROGATE PUMPING STATION
PROPOSED 200 mm DIA OBSERVATION BOREHOLE
EXISTING SUPPLY
600mm DIA BOREHOLE
EXISTING 300mm(12")DIA. u.PVC. DISPOSAL MAIN.
EXISTING N.W.SUSSEX WATER BOARD 4" DIA. MAIN.
Durleighmarsh Farm
TO PETERSFIELD


4
Lesser House
Wenham Manor Farm
OUTFALL FROM EXISTING DISPOSAL MAIN
Dorfold Bridge
Otterolt
Wenham Copse
300/427 A+B
300/427 A+B
6
300/427 A+B
SU72/46 A+B
/1 NOTE ADDED - PROVIDED BY M.W. SUSSEX W. B.
/2 AXEHOLD TO FORM TENDER DRAWING
/3. PROPOSED 200mm DIA OBSERVATION BOREHOLE ADDED.
SCALE: 1:2500
SITE PLAN
PROPOSED BOREHOLE AT ROGATE
WATER RESOURCES
DRAWN BY R.J.J./J.J.H.
TRACED BY
EXAMINED BY G.A.F.
FILE REF. 9/5/1/20/1
DATE 7/71 & 1/71/72.
SUSSEX RIVER AUTHORITY
DRWG. No. C 60567/3


A&B
300/427
SU72/46
A&B
N
NOTES
SITE OF EXISTING 600mm DIA SUPPLY BOREHOLE
SITE OF PROPOSED 200mm DIA OBSERVATION BOREHOLE
WORKING AREA
ACCESS
DELIVERY MAIN
PUMPING TO WASTE MAIN
PROVIDED BY NORTH WEST SUSSEX WATER BOARD
ROGATE PUMPING STATION
Slade Farm
PROPOSED 200 mm DIA OBSERVATION BOREHOLE
EXISTING 600mm DIA SUPPLY BOREHOLE
EXISTING 200mm(8")DIA. u.P.V.C. DISPOSAL MAIN.
Durleighmarsh Farm
EXISTING N.W. SUSSEX WATER BOARD 4" DIA. MAIN
A272 TO PETERSFIELD
Pentrod
Wenham Manor Farm
Lower House
OUTFALL FROM EXISTING DISPOSAL MAIN
River Rother
Durford Bridge
Oldcroft
Wenham Common
Wenham Copse
/1. NOTE ADDED - PROVIDED BY N.W. SUSSEX W.B.
/2. ANALYSIS TO FIRM TENDER REMOVED.
/3. PROPOSED 200mm DIA. OBSERVATION BOREHOLE ADDED.
SCALE 1:2500
SITE PLAN
PROPOSED BOREHOLE AT ROGATE
WATER RESOURCES
DRAWN BY R.R.J./P.J.M.
TRACED BY
EXAMINED BY R.A.F.
PLAN REF. 9/3/3/20/1
DATE 7/71 & 1/11/72
SUSSEX RIVER AUTHORITY
DRWG. No. C. 60667/3

SU 7884 2611 SU 72 NE/14

RECORD of WELL or BORING

300/69

Survey No. 300
1" N.S. 300
1" O.S. 9

at (house or farm) Clayton Court Hill Brow
Town, Village, &c. ~~Liss~~ Rogate P. Rogate County Sussex XX N.E/E Six-inch map
Exact site (unless a tracing from a map is supplied, give distance and direction from parish church, cross-roads, or other object shown on maps). South-east corner of the cross roads London-Portsmouth and Rogate-Liss. 144.78 Popular Edition of one-inch map. Sheet / Square

Surface level of ground 475 ft. above Ordnance Datum. Well or Bore commenced at 0 ft. below surface level of ground.
Sunk - ft., diameter - ft. Bored 290 ft.: diameter of boring: at top 6 in., at bottom 4½ in.
Details of lining tubes (internal diameters preferred) 6" I.D. surface to 219'0"
4½" I.D. perforated tubes from 216'0" to 287'0"
Water struck at depths of (feet) 215' to 225' and at about 270'
Rest-level of water below ~~above~~ top of well or bore 204 ft. Pumping level ft. Time of recovery hours.
Suction at 226 ft. depth. Yield: (i) on test 500 galls. per hour, (ii) normal 500 galls. per hour
Quality (attach copy of analysis if available)
Made by Duke & Ockenden Ltd. for Mr. T.L. Van Norden Date of boring May 1938
Information from Duke & Ockenden Ltd., Artesian Well Engineers, London and Littlehampton.

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA. (and any additional remarks)	THICKNESS. Feet.	THICKNESS. Inches.	DEPTH. Feet.	DEPTH. Inches.
Hythe Beds	Sand	4	0	4	0 (1.22)
	Sandstone	8		12	0 (3.96)
	Sand and Sandstone	48		60	0 (18.29)
	Sandstone	20		80	0 (24.38)
	Sand and Clay	21		101	0 (30.78)
	Yellow Sand and Sandstone	49		150	0 (45.72)
	Yellow Sand and Clay	25		175	0 (53.34)
	Yellow Sand	5		180	0 (54.86)
	Sand and Clay	35		215	0 (65.53)
	Sand (Grey)	10		225	0 (68.58)
	White Sand and Clay	4		229	0 (69.80)
	Sand and Clay	31		260	0 (79.25)
Atherfield Clay	Green Sandy Clay	19		279	0 (85.03)
	Blue Sandy Clay	11		290	0 (88.39)

Analysis	Grs. per gall.
Total solids	13.0 (186 ppm)
Chlorine	1.15 (16.4)
Ammonia	Absent
Albuminoid Ammonia	Absent
Nitrogen as Nitrites	Absent
" " Nitrates	0.73
Total hardness	3.6° = 5.14 per 100,000

O.D. 485'. In use for garden. No details of yield available. Automatic electric pump. Hants 53 NW (E). Owner Mr. T. L. Van Norden, Clayton Court, Liss, Hants. [Postal address] (In Sussex). Ident by visiting. ?. T.B. 16.4.41

JJ? 8/6/38

?.T. 5/11/68.

Data Bank

300/69. ~~Clayton Court~~, Hill Brow, Rogate
Ickwold House

SU72/31

Surface +485. Lining tubes: 219 x 6 in from surface; 71 x 4½ in from 216 down (perforated). Water struck at +270 to +260 and +c.215. R.W.L. +281. Suction +259. Yield 500 g.p.h. Hardness: total 51. Anal. Dando, May 1938.

Electric pump. Apr. 1941.

H	...	...	260	260
AC	...	...	30	290

Hythe Beds	Sand	4	0	4	0
	Sandstone	8		12	0
	Sand and Sandstone	48		60	0
	Sandstone	20		80	0
	Sand and Clay	21		101	0
	Yellow Sand and Sandstone	49		150	0
	Yellow Sand and Clay	25		175	0
	Yellow Sand	5		180	0
	Sand and Clay	35		215	0
	Sand (Grey)	10		225	0
	White Sand and Clay	4		229	0
	Sand and Clay	31		260	0
Atherfield Clay	Green Sandy Clay	19		279	0
	Blue Sandy Clay	11		290	0

8/6/38

V.T. 27/6/68.

SU 7884 2611

RECORD of WELL or BORING

300/69

Survey No. 300
1" N.S.
1" O.S. 9

at (house or farm) Clayton Court Hill Brow

Town, Village, &c. ~~Liss~~ Rogate P: Rogate County Sussex XX N.E/E Six-inch map

Popular Edition Sheet of one-inch map. Square

Exact site (unless a tracing from a map is supplied, give distance and direction from parish church, cross-roads, or other object shown on maps). South-east corner of the cross roads London-Portsmouth and Rogate-Liss.

Surface level of ground 475 ft. above Ordnance Datum. Well or Bore commenced at 0 ft. below surface level of ground.

Sunk - ft., diameter - ft. Bored 290 ft.; diameter of boring: at top 6 in., at bottom 4½ in.

SU72/31

Details of lining tubes (internal diameters preferred) 6" I.D. surface to 219'0"
4½" I.D. perforated tubes from 216'0" to 287'0"

Water struck at depths of (feet) 215' to 225' and at about 270'

Rest-level of water below ~~above~~ top of well or bore 204 ft. Pumping level ft. Time of recovery hours.

Suction at 226 ft. depth. Yield: (i) on test 500 galls. per hour (ii) normal 500 galls. per hour

Quality (attach copy of analysis if available)

Made by Duke & Ockenden Ltd. for Mr. T.L. Van Norden Date of boring May 1938

Information from Duke & Ockenden Ltd., Artesian Well Engineers, London and Littlehampton.

(For Survey use only). GEOLOGICAL CLASSIFICATION.	NATURE OF STRATA. (and any additional remarks)	Thickness Feet	Thickness Inches	Depth Feet	Depth Inches
Hythe Beds	Sand	4	0	4	0
	Sandstone	8		12	0
	Sand and Sandstone	48		60	0
	Sandstone	20		80	0
	Sand and Clay	21		101	0
	Yellow Sand and Sandstone	49		150	0
	Yellow Sand and Clay	25		175	0
	Yellow Sand	5		180	0
	Sand and Clay	35		215	0
	Sand (Grey)	10		225	0
	White Sand and Clay	4		229	0
	Sand and Clay	31		260	0
Atherfield Clay	Green Sandy Clay	19		279	0
	Blue Sandy Clay	11		290	0

Analysis	Grs.per gall.	
Total solids	13.0	186 ppm
Chlorine	1.15	16.4
Ammonia	Absent	
Albuminoid Ammonia	Absent	
Nitrogen as Nitrites	Absent	
" " Nitrates	0.73	
Total hardness	3.6°	= 5.14 per 100,000

JHS 8/6/38 O.D. 485'. In use for garden. No details of yield available. Automatic electric pump. Hants 53 N.W (E). Owner Mr. T.L. Van Norden, Clayton Court, Liss, Hants [Postal add] (in Sussex). Visited by visiting. B.T.B. 16.4.41

KPT 5/7/68. This site is now called "Icknield House" (Information received from Thames Water Authority) 3/7/75

Data Bank

For Survey use only.

Date received.	G.S.M.	M. of H. notified.	Site marked on 1" map.
6/38	6859		

SU 72 NE/15

(143) 300/38

March 19th 1925

SU 7807 2573

BOREHOLE SECTION

BORED & COMMUNICATED BY LE GRAND SUTCLIFF & GELL LTD., SOUTHALL

P: Rogate
20 NE/E

BORED FOR- H. Harvey Esq.,
Westdown Cottage,
Hindhead, Surrey.

DISTRICT- Petersfield IN THE COUNTY OF- Hants

POSITION OF BORING- At Upper Furze Field, Durford Wood, Rogate, Sussex
3 miles N.E. of Petersfield.

MAPS- 6" Ordnance Hants 53 S.W.
1" Geo. New, Hants 300 O.D. OF SITE: 430

WATER LEVEL BELOW SURFACE- 197 feet YIELD OF WATER- 240 gallons per hour.

TUBING REMAINING IN BOREHOLE - 240' 6" of 5" top 1' 6" above surface

STRATA	THICKNESS Ft.	Ins.	DEPTH Ft.	Ins.
Red Sand, Pit 5' 0"	21	0	21	0
Sand & hard layers of Sandstone	98	0	119	0
Hard Sand	121	0	240	0
Total depth of boring	240	0	240	0

the Lower E.B. to Greensand
H. 8.8.42
HT 17/1/63

GENERAL REMARKS

Water was struck at 216 feet and rose to 197 feet.
15' x 4" Ashford Sand Strainer with 30' of 4" plain tubing inserted.
Some trouble with the sand was overcome by using those strainers.

BORING FINISHED- 22nd October 1924

LE GRAND SUTCLIFF & GELL LTD.,

Signature ....

Furzewood House, nr. Petersfield. Pulsometer gives about 400 gallons in first 2-3 hours pumping, then fails. Disused except for very occasional use. Mr. Harvey, owner, Hindhead. Failure occurred after the Clayton House well was sunk. O.D. 430. [illegible] by [illegible] on Hants. 53 SW (E)
A.J.B. 16.4.41

Our Ref. S.B.4/30
Our Order No. 1544.21/7/24

LI/AMP.

Data Bank

SU72/32

300/38 Fullwood House, Rogate. (Disused)

Surface +430. Lining tubes: 240½ x 5 in from 1½ above; 30 x 4 in from 195 down; sand screen 15 x 4 in from 225 down. Water struck at +214. R.W.L. +233. Yield 240 g.p.h. LeGrand, Oct. 1924.

Yield 400 g.p.h. fails after 2-3 h. I/c engine. Apr. 1941.

H 240 240

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS ft.	DEPTH ft.
Hythe Beds 240'	Red Sand	21	21
	Sand & hard layers of sandstone	98	119
	Hard sand.	121	240

pp. L.P. Thomas 4-7-66

SU 7807 2573

143 300/38 No. 15

March 19th 1925

BOREHOLE SECTION

BORED & COMMUNICATED BY LE GRAND SUTCLIFF & GELL LTD., SOUTHALL

BORED FOR- H. Harvey Esq.,
Westdown Cottage,
Hindhead, Surrey.

P: Rogate
20 NE/E
SU 72/32

DISTRICT- Petersfield IN THE COUNTY OF- Hants

POSITION OF BORING- At Upper Furze Field, Durford Wood, Rogate, Sussex
3 miles N.E. of Petersfield.

MAPS- 6" Ordnance Hants 53 S.W.
1" Geo. New, Hants 300 O.D. OF SITE: 430

WATER LEVEL BELOW SURFACE- 197 feet YIELD OF WATER- 240 gallons per hour.

TUBING REMAINING IN BOREHOLE - 240' 6" of 5" top 1' 6" above surface

STRATA	THICKNESS Ft.	THICKNESS Ins.	DEPTH Ft.	DEPTH Ins.
Red Sand, Pit 3' 0"........	21	0	21	0
Sand & hard layers of Sandstone.........	98	0	119	0
Hard Sand.................	121	0	240	0
Total depth of boring	240	0	240	0

Hythe Beds Lower G.B. Greensand

Scale 288.42 Wft 4/7/68.

GENERAL REMARKS

Water was struck at 216 feet and rose to 197 feet.
15' x 4" Ashford Sand Strainer with 30' of 4" plain tubing inserted.
Some trouble with the sand was overcome by using these strainers.

BORING FINISHED- 22nd October 1924

LE GRAND SUTCLIFF & GELL LTD.,

Signature ....

Fullwood House, nr. Petersfield. [illegible] gives about 400 gallons in first 2-3 hours pumping, then fails. Disused except for very occasional use. Mr. Harvey, owner, thinks failure occurred after the Clayton House well was sunk. O.D. 430. Sited by [illegible] on Hants. 53 SW (E)
AJB. 16.4.41

Our Ref. S.B.4/30
Our Order No. 1344.21/7/24

LI/AMP.

Data Bank

SU 72 SE /1 N. 14134

GEORGE STOW CO. LTD.

Waterworks Engineers

READING ROAD – HENLEY-on-THAMES. OXON.

300/427/A

RECORD OF WELL (SHAFT OR BOREHOLE)

DATE COMPLETED June, 1972

NGR. SU 72 SE (790623)

All depths to be measured below Ground Level

Work carried out for SOUTHERN WATER AUTHORITY SUSSEX RIVER and WATER DIVISION.

Locality (Exact Site) G.R. SU79062396 Rogate, Sussex Sussex 20 NE/E

Level of Ground Surface above Sea Level (O.D.) c. 57'm m.

Depth of Shaft ..... m. Diameter ..... mm.

Depth of Bore 96 (315 ft) m. Diameter: At Top 600 (24 inch) mm. At Bottom 380 (15 inch) mm.

Details of Permanent Lining Tubes

Diameter		Length Inserted				Top At		above / below	Ground Level
15 Stainless Steel	mm.		m. Plain		m Slotted		m		
600	"	32 (105 ft)	"	–	"	"			"
380	"	10 (33 ft)	"	64 (210 ft)	"	"	22m below (72 ft)		
	"		"		"	"			"
	"		"		"	"			"
	"		"		"	"			"

Water Struck at depth of (in m.) (17 ft. 3 ins)

Rest Level of Water below / above Ground Level 5.26 m.

Yield on 14 Hours / Days test. Pumping 35 litres per sec. Date 1.6.72

Pump Water level 22.60 (74 ft. 2 ins) m. below Ground Level.

Time of Recovery See extended pumping test carried out by Sussex River Authority themselves.

Remarks Stainless steel screen tubes with gravel pack from 22m to 96m (72 ft. to 315 ft.)

Sited on 6" maps. Sussex 20 NE/E by ☐

See back for Strata Record.

SU72SE/1
N.G.R. 7906.2396

BOREHOLE NO. 3 - ROGATE

STRATA LOG

Description	Thickness (feet)	(m)	Depth (feet)	(m)
Topsoil	2	0.60	2	0.60
Sandy loam	2	0.60	4	1.21
Orange brown clayey sandstone	4	1.21	8	2.43
Sandy ironstone	4	1.21	12	3.65
Fine-grained brownish/yellow loamy sand	8	2.43	20	6.07
Fine-grained reddish/brown loamy sand with quartz pebbles	5	1.52	25	7.60
Fine-grained orange/yellow ferruginous sand	15	4.57	40	12.19
Fine-grained yellow speckled sand	5	1.52	45	13.71
Fine-grained brownish/yellow ferruginous sand	3	0.91	48	14.63
Hard grey crystalline sandstone	2	0.60	50	15.24
Hard brownish/buff crystalline sandstone speckled with glauconite	2	0.60	52	15.84
Fine-grained reddish brown loamy sand	3	1.91	55	16.76
Hard grey to brown crystalline sandstone ironstone	5	1.52	60	18.28
Soft light brown loamy sand with ironstone and shell fragments	5	1.52	65	19.81
Fine-grained brownish yellow ferruginous sand with sandstone fragments	10	3.04	75	22.85
Ironstone	5	1.52	80	24.38
Fine-grained yellow speckled	5	1.52	85	25.90
Fine-grained green clayey sand	13	3.96	98	29.87
Hard fine-grained orange/buff iron stained sandstone speckled with glauconite	12	3.65	110	33.52
Fine-grained buff silty sand	5	1.52	115	35.05
Hard fine-grained buff speckled cherty sandstone	10	3.04	125	38.10
Fine grained buff silty sand	5	1.52	130	39.62
Hard very fine-grained white cherty sandstone speckled with glauconite and occasional pyrite nodules	15	4.57	145	44.19
Hard fine grained orange buff sandstone speckled with glauconite	5	1.52	150	45.72
Ironstone	1	0.30	151	46.02
Hard fine-grained white/buff sandstone	19	5.79	170	51.81
Ironstone	5	1.52	175	53.34
Hard fine grained white/buff sandstone speckled with glauconite	25	7.62	200	60.96
Fine grained buff sand with glauconite grains	10	3.04	210	64.00
Hard fine grained buff sandstone speckled with glauconite	20	6.09	230	70.10
Very fine-grained grey sandstone	5	1.52	235	71.63
Hard grey sandy mudstone with sandstone fragments	15	4.57	250	76.20
Soft very fine grained grey sandstone	10	3.04	260	79.24

BGS ID: 426016 : BGS Reference: SU72SE1
British National Grid (27700) : 479060,123960

Description of strata (Contd). SU72 SE 11

Thickness (feet)	(m)	Depth (feet)	(metres)
5	1.52	265	80.77
5	1.52	270	82.29
5	1.52	275	83.82
10	3.04	285	86.86
15	4.57	300	91.44
10	3.04	310	94.48
5	1.52	315	96.01
		315	96.01

Soft grey silty sandstone with pyrites nodules and carbonised wood

Very fine-grained grey silty sand with glauconite grains and pyrites

Fine-grained silty sand with pyrites lignite and carbonised wood

Very fine grained bluish-grey compact silty sand.

Bluish-grey clayey sand

Bluish-grey sandy silt

Sticky grey silty clay

SU 72 SE 11

No site map?

This description of strata received from Southern Water Authority (S.R.W.D.) u/c letter dated 7/10/75.

N. 14134

GEORGE STOW CO. LTD.

Waterworks Engineers

READING ROAD – HENLEY-on-THAMES. OXON.

SU 72/46A

300/427 A

RECORD OF WELL (SHAFT OR BOREHOLE)

SU 7906 2396

DATE COMPLETED June, 1972

NGR. SU 72 SE (7906 2396)

All depths to be measured below Ground Level

Work carried out for SOUTHERN WATER AUTHORITY SUSSEX RIVER and WATER DIVISION (B/H No. 3)

Locality (Exact Site) G.R. SU79062396 Rogate, Sussex Sussex 20 NE/E

Level of Ground Surface above Sea Level (O.D.) ..... m.

Depth of Shaft ..... m. Diameter ..... mm. (24 inch) (15 inch)

Depth of Bore 96 (315 ft) m. Diameter: At Top 600 mm. At Bottom 380 mm.

Details of Permanent Lining Tubes

Diameter		Length Inserted				Top At		above / below	Ground Level
Stainless steel	600 mm.	32 (105 ft) m.	Plain	– m.	Slotted	"	"		"
	380 "	10 (33 ft) "	"	64 (210 ft) "	"	"	22m below (72 ft)		"
	"		"		"	"			"
	"		"		"	"			"
	"		"		"	"			"

Water Struck at depth of (in m.) (17 ft. 3 ins)

Rest Level of Water below / above Ground Level 5.26 m.

Yield on 14 Hours / Days test. Pumping 35 litres per sec. Date 1.6.72

Pump Water level 22.60 (74 ft. 2 ins) m. below Ground Level.

Time of Recovery See extended pumping test carried out by Sussex River Authority themselves.

Remarks Stainless steel screen tubes with gravel pack from 22m to 96m (72 ft. to 315 ft)

Sited by ⊡ on 6" map. Sussex 20 NE/E

EA CSG

See back for Strata Record.

DETAILS OF STRATA

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA (and any additional remarks)	THICKNESS METRES	DEPTH METRES
	As per observation borehole record which was sent you dated 17.8.73		

300/427 A
SU72/46A

BOREHOLE NO. 3 - ROGATE

STRATA LOG

GEOL. CLASSIFICATION

DRIFT

LOWER GREEN SAND

Description	Thickness (feet)	Thickness (m)	Depth (feet)	Depth (m)
Topsoil	2	0.60	2	0.60
Sandy loam	2	0.60	4	1.21
Orange brown clayey sandstone	4	1.21	8	2.43
Sandy ironstone	4	1.21	12	3.65
Fine-grained brownish/yellow loamy sand	8	2.43	20	6.09
Fine-grained reddish/brown loamy sand with quartz pebbles	5	1.52	25	7.62
Fine-grained orange/yellow ferruginous sand	15	4.57	40	12.19
Fine-grained yellow speckled sand	5	1.52	45	13.71
Fine-grained brownish/yellow ferruginous sand	3	0.91	48	14.63
Hard grey crystalline sandstone	2	0.60	50	15.24
Hard brownish/buff crystalline sandstone speckled with glauconite	2	0.60	52	15.84
Fine-grained reddish brown loamy sand	3	1.91	55	16.76
Hard grey to brown crystalline sandstone ironstone	5	1.52	60	18.28
Soft light brown loamy sand with ironstone and shell fragments	5	1.52	65	19.81
Fine-grained brownish yellow ferruginous sand with sandstone fragments	10	3.04	75	22.86
Ironstone	5	1.52	80	24.38
Fine-grained yellow speckled	5	1.52	85	25.90
Fine-grained green clayey sand	18	3.96	98	29.87
Hard fine-grained orange/buff iron stained sandstone speckled with glauconite	12	3.65	110	33.52
Fine-grained buff silty sand	5	1.52	115	35.05
Hard fine-grained buff speckled cherty sandstone	10	3.04	125	38.10
Fine grained buff silty sand	5	1.52	130	39.62
Hard very fine-grained white cherty sandstone speckled with glauconite and occasional pyrite nodules	15	4.57	145	44.19
Hard fine grained orange buff sandstone speckled with glauconite	5	1.52	150	45.72
Ironstone	1	0.30	151	46.02
Hard fine-grained white/buff sandstone	19	5.79	170	51.81
Ironstone	5	1.52	175	53.34
Hard fine grained white/buff sandstone speckled with glauconite	25	7.62	200	60.96
Fine grained buff sand with glauconite grains	10	3.04	210	64.00
Hard fine grained buff sandstone speckled with glauconite	20	6.09	230	70.10
Very fine-grained grey sandstone	5	1.52	235	71.62
Hard grey sandy mudstone with sandstone gragments	15	4.57	250	76.20
Soft very fine grained grey sandstone	10	3.04	260	79.24

300/427 A.

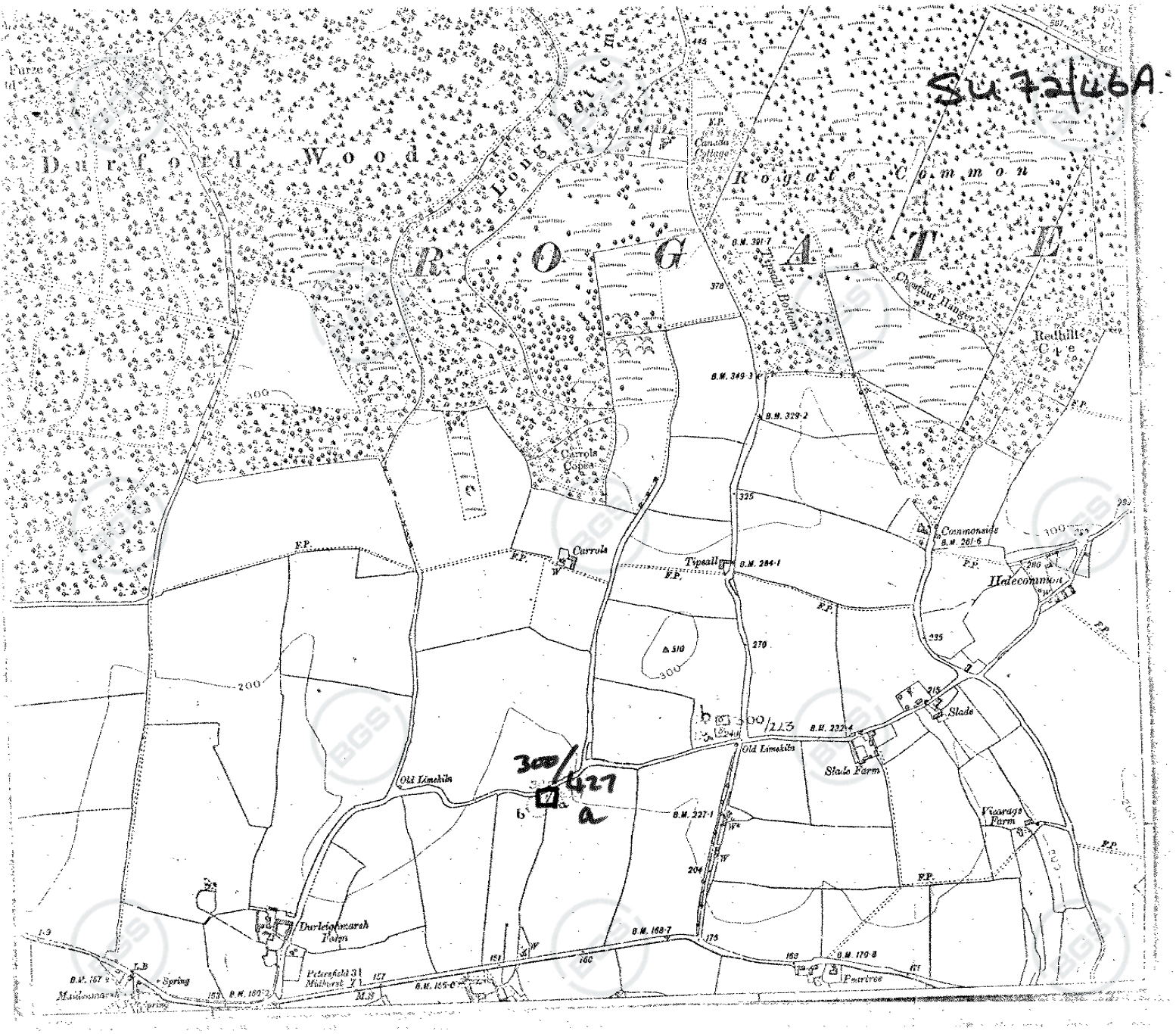
GEOL. CLASSIFICATION

Description of Strata (Contd). SU72/46A.

	Thickness (feet)	(m)	Depth (feet)	(metres)
Soft grey silty sandstone with pyrites nodules and carbonised wood	5	1.52	265	80.77
Very fine-grained grey silty sand with glcuconite grains and pyrites	5	1.52	270	82.29
Fine-grained silty sand with pyrites lignite and carbonised wood	5	1.52	275	83.82
Very fine grained bluish-grey compact silty sand.	10	3.04	285	86.86
Bluish-grey clayey sand	15	4.57	300	91.44
Bluish-grey sandy silt	10	3.04	310	94.48
Sticky grey silty clay	5	1.52	315	96.01
			315	96.01

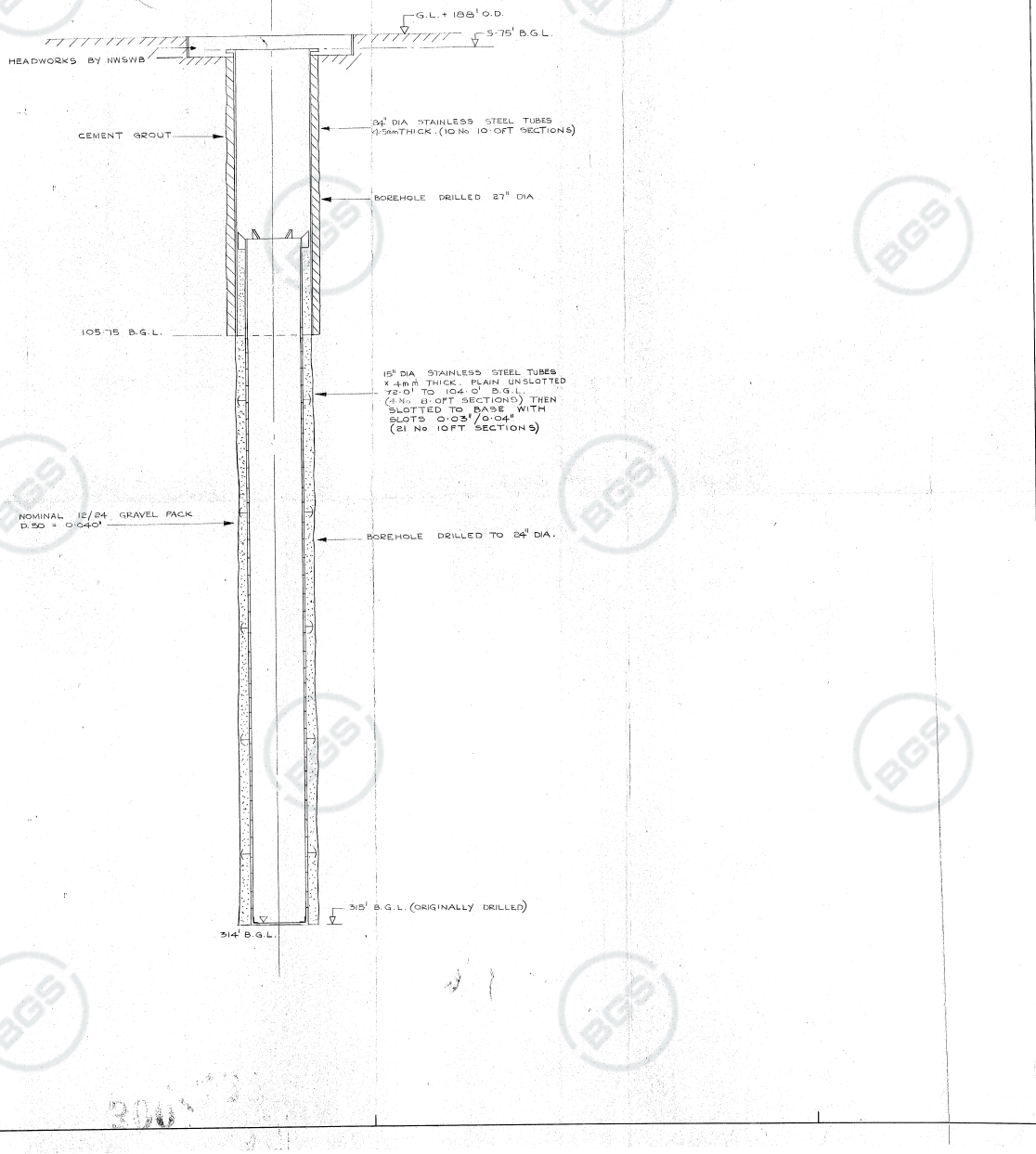
B.Y. 3/46

This description of strata received from Southern Water Authority (S.R.W.D.) u/c letter dated 7/10/75.


SU72SE6A
Durford Wood
Long Bottom
ROGATE
Rogate Common
Redhill Cre
Carrols Copse
Carrols
Typsall
Commonside
Hdecommon
Slade
Slade Farm
Old Limekiln
Old Limekilns
Durleighmarsh Farm
Petersfield 3
Midhurst 7
Spring
Fourtrees
Vicarage Farm
Chestnut Hanger
Furze
F.P.
B.M. 391·7
B.M. 349·3
B.M. 329·2
B.M. 284·1
B.M. 261·6
B.M. 232·4
B.M. 227·1
B.M. 168·7
B.M. 170·8
B.M. 155·0
B.M. 167·4
B.M. 169·2
300/223
300/427
a
b

SU72/46A

300/427 A



NOTES

SCALE :- 1" TO 20FT.

CONSTRUCTION DETAILS.

ROGATE BOREHOLE.

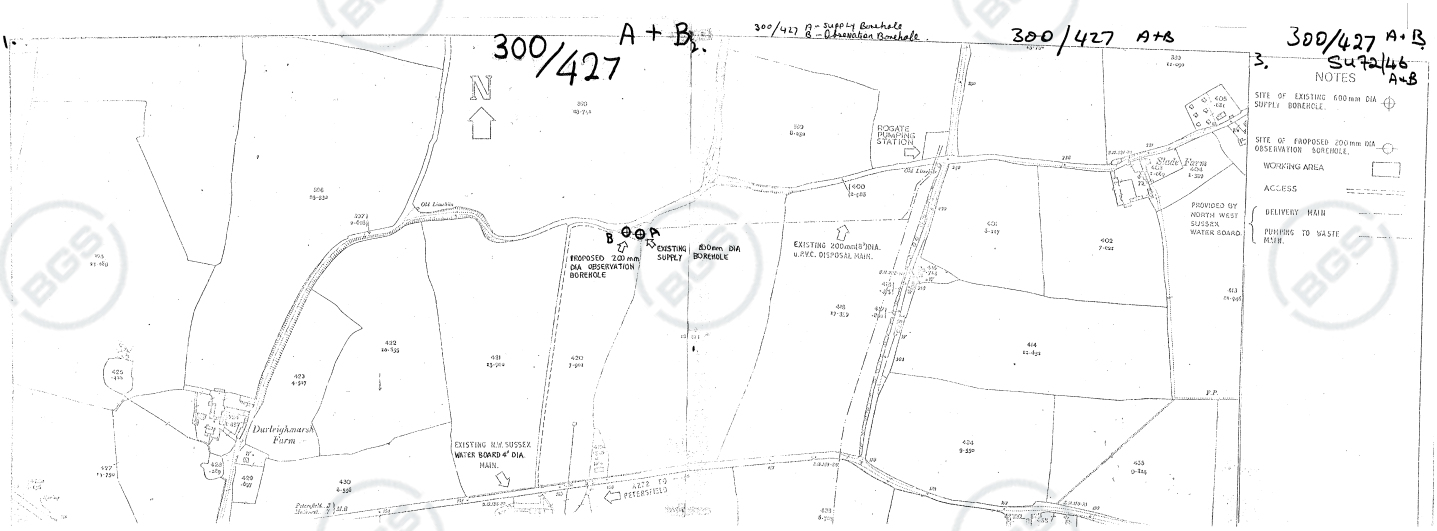
WATER RESOURCES.

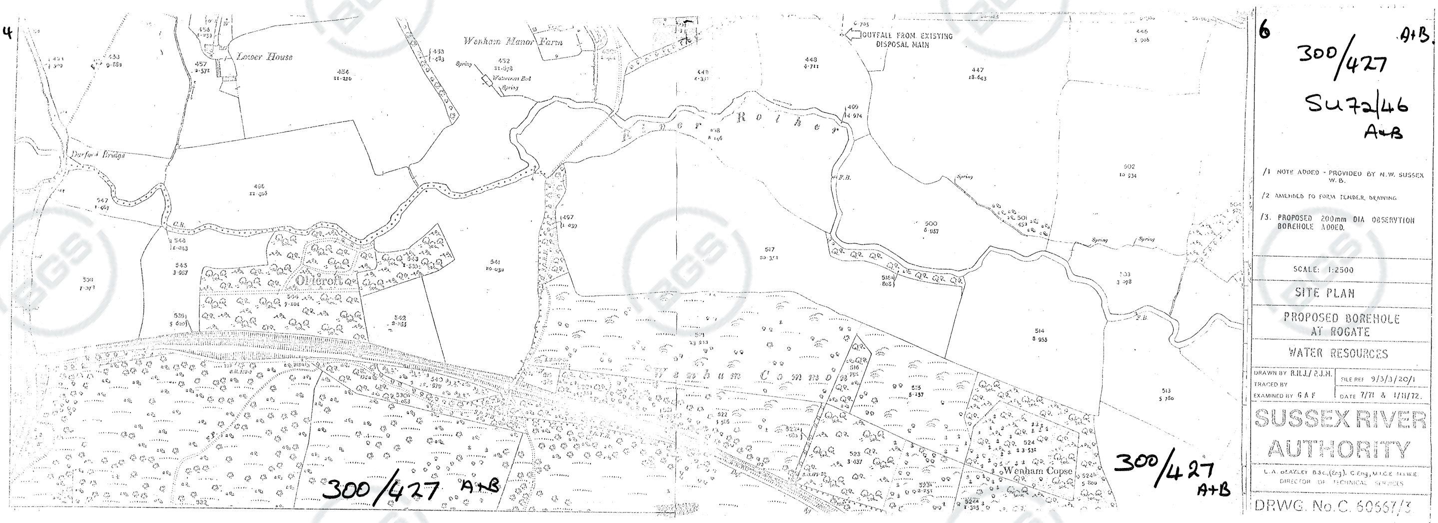
DRAWN BY P. J. M.
TRACED BY P. J. M.
EXAMINED BY G. A. F.
FILE REF. 9/3/3/20/1
DATE 17/8/72.

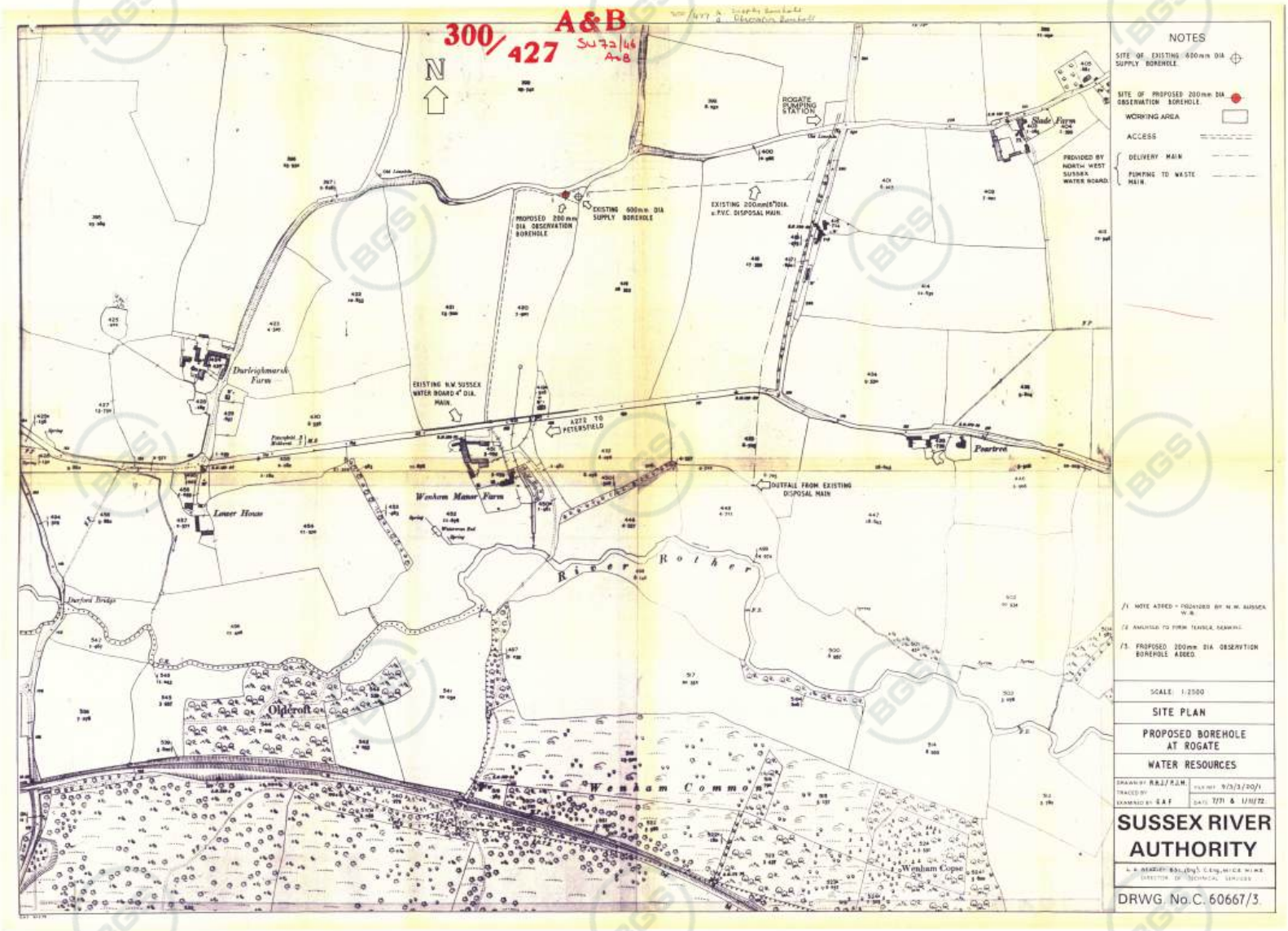
SUSSEX RIVER AUTHORITY

L. A. BEAZLEY B.Sc.,(Eng). C.Eng, M.I.C.E. M.I.W.E.
DIRECTOR OF TECHNICAL SERVICES

DRWG. No.C. 60719.


300/427 A + B.
300/427 A+B
300/427 A+B
SU72/46 A+B
N
NOTES
SITE OF EXISTING 600mm DIA SUPPLY BOREHOLE.
SITE OF PROPOSED 200mm DIA OBSERVATION BOREHOLE.
WORKING AREA
ACCESS
DELIVERY MAIN
PUMPING TO WASTE MAIN
PROVIDED BY NORTH WEST SUSSEX WATER BOARD
ROGATE PUMPING STATION
PROPOSED 200 mm DIA OBSERVATION BOREHOLE
EXISTING SUPPLY
600mm DIA BOREHOLE
EXISTING 300mm(12")DIA. u.PVC. DISPOSAL MAIN.
EXISTING N.W.SUSSEX WATER BOARD 4" DIA. MAIN.
Durbrighmarsh Farm
Old Limekiln
PETERSFIELD


4
Lower House
Wenham Manor Farm
OUTFALL FROM EXISTING DISPOSAL MAIN
River Rother
Wenham Common
Wenham Copse
300/427 A+B
300/427 A+B
6
300/427 A+B.
SU72/46 A+B
/1 NOTE ADDED - PROVIDED BY N.W. SUSSEX W.B.
/2 AMENDED TO FORM TENDER DRAWING
/3. PROPOSED 200mm DIA OBSERVTION BOREHOLE ADDED.
SCALE: 1:2500
SITE PLAN
PROPOSED BOREHOLE AT ROGATE
WATER RESOURCES
DRAWN BY R.H.J./ P.J.H.
TRACED BY
EXAMINED BY G A F
FILE REF 9/3/3/20/1
DATE 7/71 & 1/11/72.
SUSSEX RIVER AUTHORITY
L.A. BEAZLEY B.Sc.,(Eng). C.Eng., M.I.C.E. M.I.W.E.
DIRECTOR OF TECHNICAL SERVICES
DRWG. No. C. 60667/3


A&B
300/427
SU 72/46
A+B
N
NOTES
SITE OF EXISTING 600mm DIA SUPPLY BOREHOLE
SITE OF PROPOSED 200mm DIA OBSERVATION BOREHOLE
WORKING AREA
ACCESS
DELIVERY MAIN
PUMPING TO WASTE MAIN
PROVIDED BY NORTH WEST SUSSEX WATER BOARD
ROGATE PUMPING STATION
Slade Farm
PROPOSED 200 mm DIA OBSERVATION BOREHOLE
EXISTING 600mm DIA SUPPLY BOREHOLE
EXISTING 200mm(8")DIA. u.P.V.C. DISPOSAL MAIN.
Durleighmarsh Farm
EXISTING N.W. SUSSEX WATER BOARD 4" DIA. MAIN
A272 TO PETERSFIELD
Pentrod
Wenham Manor Farm
Lower House
OUTFALL FROM EXISTING DISPOSAL MAIN
River Rother
Durford Bridge
Oldcroft
Wenham Common
Wenham Copse
/1. NOTE ADDED - PROVIDED BY N.W. SUSSEX W.B.
/2. ANALYSIS TO FIRM TENDER REMOVED.
/3. PROPOSED 200mm DIA. OBSERVATION BOREHOLE ADDED.
SCALE 1:2500
SITE PLAN
PROPOSED BOREHOLE AT ROGATE
WATER RESOURCES
SUSSEX RIVER AUTHORITY
DRWG. No. C. 60667/3

NGRC

BOREHOLE RECORDS

ADJUSTMENT FORM

QUARTER SHEET SU 72 SE

BH REGISTRATION NUMBER 23 - 34

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

WATER RESOURCES BOARD
WELL RECORD

SHEET 1

W.R.B. REF. No. SU 72/47

R.A. LICENCE No.

1. WELL IDENTITY

NATIONAL GRID REFERENCE SU 779 241

Well at WESTMARK FARM
Dunford ~~DERNFORD~~.

I.G.S. REF. No.

RIVER AUTHORITY

Town

HYDROMETRIC AREA

County

SUB-CATCHMENT

Owner of well

Well made by

Date of sinking

Information from W.D.U.

Date received

2. WELL DESCRIPTION

Level of ground surface ..... m. / above sea level (O.D.) ..... ft.

If well top is not at above* ..... m. / ground level how far below ..... ft.

Shaft ..... m. / ..... ft. deep; Diameter at top ..... mm. / ..... in.; at bottom ..... mm. / ..... in.

Bore ..... m. / ..... ft. deep; Diameter at top ..... mm. / ..... in.; at bottom ..... mm. / ..... in.

Details of headings

DETAILS OF PERMANENT LINING TUBES

Length Plain ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Length Slotted ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Top ..... m. / ..... ft. above* / below surface

Length Plain ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Length Slotted ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Top ..... m. / ..... ft. above* / below surface

Length Plain ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Length Slotted ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Top ..... m. / ..... ft. above* / below surface

Details of well screen

DETAILS OF REST WATER LEVELS DURING CONSTRUCTION

Water struck at depths of ..... below well top

Rest level of water ..... m. / ..... ft. above* / below O.D.* well top when bore ..... m. / ..... ft. deep. Date

Rest level of water ..... m. / ..... ft. above* / below O.D.* well top when bore ..... m. / ..... ft. deep. Date

Rest level of water on completion of bore ..... m. / ..... ft. above* / below O.D.* well top when bore ..... m. / ..... ft. deep. Date

Method of drilling

Brief details of well development e.g. acid treatment etc.

* delete as applicable

(18127/1)

DETAILS OF PUMPING TEST

Water level depressed from ..... m. / ..... ft. above* / below* well top to ..... m. / ..... ft. below well top, pumping at ..... l/s / ..... galls/hr.

Water level depressed from ..... m. / ..... ft. above* / below* well top to ..... m. / ..... ft. below well top, pumping at ..... l/s / ..... galls/hr.

Water level depressed from ..... m. / ..... ft. above* / below* well top to ..... m. / ..... ft. below well top, pumping at ..... l/s / ..... galls/hr.

Suction at ..... ft. below well top. Capacity of pump ..... l/s / galls/hr. Test from ../../19.... to ../../19 ....

DETAILS OF PERMANENT PUMPING EQUIPMENT

Make and/or type ..... Motive Power .....

Capacity ..... l/s / galls/hr. Suction at ..... m. / ..... ft. below well top.

Amount pumped ..... m^3/day* / galls/day. Pumping for ..... hrs./day.

Estimated consumption ..... m^3/week* / galls/week ..... m^3/year* / galls/year

3. WELL DATA

WELL USE. Abstraction ☐, Recharge ☐, Observation ☐, Disused ☐, Filled-in ☐

WATER USE. Public Supply ☐, Industrial ☐, Irrigation ☐, Agriculture ☐, Domestic ☐, Unused ☐, Misc. ☐

WATER LEVEL OBSERVATIONS

	Rest Water Level	Pumping Water Level	Depression	Rate of Pumping	Date
(1)	..... m. O.D. / ..... ft.	..... m. O.D. / ..... ft.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....
(2)	..... m. O.D. / ..... ft.	..... m. O.D. / ..... ft.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....
(3)	..... m. O.D. / ..... ft.	..... m. O.D. / ..... ft.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....
(4)	..... m. O.D. / ..... ft.	..... m. O.D. / ..... ft.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....

GEOPHYSICAL DATA AVAILABLE

Resistivity ☐ Conductivity ☐ Temperature ☐ Any other logs .....

PARTIAL ANALYSIS DETAILS in milligrams per litre

Date	TDS	Tot H	Carb H	Non-Carb H	Alk	SO4	Cl	E.C.

Site marked on: 1 inch (print) ....., 1 inch (master) ....., 2½ inch ..... (use symbol and give data)

(18127/1)

IGS [redacted]0 7/71

Rega 7-5-91

Institute of Geological Sciences

RECORD OF SHAFT OR BOREHOLE

6-in or 1:10 000 Map Registration No.

SU 82 NW /22

Name and Number of Shaft or Borehole

HARTING DOWN (NO 19)

National Grid Reference

SU 8018 2618

For whom made SOUTHERN WATER AUTHORITY

Town or Village Rogate *County* W. Sussex

1-in or 1:50 000 New Series Map No.	Enter 'C' if Confidential
300	

Exact site (reference to a fixed point on 1-in or 1:50 000 Map:

400m NE of Combe Hill

Purpose for which made Observation Borehole

Ground level at shaft bore relative to O.D. C.101 *m. If not ground level give O.D. of beginning of shaft bore* _____ *m.*

Made by BB Drilling Ltd *Date of sinking* Dec 1983

Information from _____ *Examined by* D.E. Highley

Specimen Numbers and Additional Notes

Western Rother Boreholes. Phase IV
Core samples available only from 36.00 - 38.45 m
Small 'composite' bag samples taken every 2m.

Geological Classification	Description of Strata	Thickness *metres*	Depth *metres*
Hythe Beds	SANDSTONE: fine-grained, loose yellowish-brown. Clayey between 4-5m.	12	
	SANDSTONE: fine-grained, loose, dark-grey. Clayey betwen 18-20m.	14	12
	Core Loss	2	26
	SANDSTONE: fine-grained, loose, becoming lighter grey.	4	28
Atherfield clay	MUDSTONE: dark grey, very silty, becoming reddish brown	4	32

Institute of Geological Sciences

ame and Number of Shaft or Borehole:

HARTING DOWN NO 19

6-in or 1:10 000 Map Registration No.

SU 82 NW/22

National Grid Reference

SU 8018 2618

Page 2

Geological Classification	Description of Strata	Thickness *metres*	Depth *metres*
	Brought Forward		
	MUDSTONE: (Cored); massive clay-rich, reddish brown, becoming grey (7.5 YR N6) and fissile, with light grey silty wisps and laminae below 37.55m.	2.45	36.00
	Base of hole at 38.45m		

IGS 1805 3000 12/76

EASTERN LS SOUTHERN EA

SU82 NW

STATION REF. 244343007 HARTING DOWN DATUM M(OD) 107.29 DEPTH M 38.50 (300) NAT GRID REF. SU80182618

Hythe Beds

DATE	LEVEL	FLAG	DATE	LEVEL	FLAG	DATE	LEVEL	FLAG	DATE	LEVEL	FLAG
25 JAN 1984	96.93		3 JAN 1986	97.16		3 NOV 1987	97.27		13 MAY 1994	98.59	
16 MAR 1984	97.61		4 MAR 1986	98.15		3 FEB 1988	99.19		16 JUN 1994	98.19	
15 MAY 1984	97.91		12 MAY 1986	98.19		11 APR 1988	98.57		21 JUL 1994	97.70	
13 JUL 1984	97.44		2 JUL 1986	97.84		2 JUN 1988	97.95		17 AUG 1994	97.37	
28 SEP 1984	96.93		2 SEP 1986	97.30		19 DEC 1988	96.97		23 SEP 1994	97.30	
4 DEC 1984	96.76		4 NOV 1986	96.95		29 DEC 1993	97.70		20 OCT 1994	97.27	
5 FEB 1985	97.67		6 JAN 1987	97.75		24 JAN 1994	99.27		31 MAR 1995	99.05	
3 APR 1985	97.88		3 MAR 1987	97.69		24 FEB 1994	99.27		5 MAY 1995	98.25	
4 JUN 1985	97.97		6 MAY 1987	98.59		10 MAR 1994	98.86				
3 SEP 1985	97.40		2 JUL 1987	97.72		21 MAR 1994	98.69				
5 NOV 1985	97.13		8 SEP 1987	97.19		18 APR 1994	99.14				

SU 61/62

*** END OF REPORT ***

END OF LISTING OF FILE :NRA.GR11091216GR0310(1,*,1) FOR USER :NRA AT 1995/11/09__12:37:03

****

END OF BATCH [illegible]

NGRC
BOREHOLE RECORDS
ADJUSTMENT FORM

QUARTER SHEET SU 82 NW.

BH REGISTRATION NUMBER 24-27

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

WATER RESOURCES BOARD

WELL RECORD SHEET 1

W.R.B. REF. No. SU 82/51

R.A. LICENCE No.

1. WELL IDENTITY

NATIONAL GRID REFERENCE SU 805 255

Well at FYNING COMMON

I.G.S. REF. No.

RIVER AUTHORITY

Town

HYDROMETRIC AREA

County

SUB-CATCHMENT

Owner of well

Well made by

Date of sinking

Information from W.D.U.

Date received

2. WELL DESCRIPTION

Level of ground surface ..... m. / ..... ft. above sea level (O.D.)

If well top is not at ground level above* / below* how far ..... m. / ..... ft.

Shaft ..... m. / ..... ft. deep; Diameter at top ..... mm. / ..... in.; at bottom ..... mm. / ..... in.

Bore ..... m. / ..... ft. deep; Diameter at top ..... mm. / ..... in.; at bottom ..... mm. / ..... in.

Details of headings

DETAILS OF PERMANENT LINING TUBES

Length Plain ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Length Slotted ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Top ..... m. / ..... ft. above* / below* surface

Length Plain ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Length Slotted ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Top ..... m. / ..... ft. above* / below* surface

Length Plain ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Length Slotted ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Top ..... m. / ..... ft. above* / below* surface

Details of well screen

DETAILS OF REST WATER LEVELS DURING CONSTRUCTION

Water struck at depths of ..... below well top

Rest level of water ..... m. / ..... ft. above* / below* O.D.* / well top when bore ..... m. / ..... ft. deep. Date

Rest level of water ..... m. / ..... ft. above* / below* O.D.* / well top when bore ..... m. / ..... ft. deep. Date

Rest level of water on completion of bore ..... m. / ..... ft. above* / below* O.D.* / well top when bore ..... m. / ..... ft. deep. Date

Method of drilling

Brief details of well development e.g. acid treatment etc.

* delete as applicable

(18127/1)

DETAILS OF PUMPING TEST

Water level depressed from ..... m. / ..... ft. above* / below well top to ..... m. / ..... ft. below well top, pumping at ..... l/s / ..... galls/hr.

Water level depressed from ..... m. / ..... ft. above* / below well top to ..... m. / ..... ft. below well top, pumping at ..... l/s / ..... galls/hr.

Water level depressed from ..... m. / ..... ft. above* / below well top to ..... m. / ..... ft. below well top, pumping at ..... l/s / ..... galls/hr.

Suction at ..... ft. below well top. Capacity of pump ..... l/s / galls/hr. Test from ..../..../19.... to ..../..../19....

DETAILS OF PERMANENT PUMPING EQUIPMENT

Make and/or type ..... Motive Power .....

Capacity ..... l/s / galls/hr. Suction at ..... m. / ..... ft. below well top.

Amount pumped ..... m³/day* / galls/day. Pumping for ..... hrs./day.

Estimated consumption ..... m³/week* / galls/week ..... m³/year* / galls/year

3. WELL DATA

WELL USE. Abstraction ☐, Recharge ☐, Observation ☐, Disused ☐, Filled-in ☐

WATER USE. Public Supply ☐, Industrial ☐, Irrigation ☐, Agriculture ☐, Domestic ☐, Unused ☐, Misc. ☐

WATER LEVEL OBSERVATIONS

	Rest Water Level	Pumping Water Level	Depression	Rate of Pumping	Date
(1)	..... m. / ..... ft. O.D.	..... m. / ..... ft. O.D.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....
(2)	..... m. / ..... ft. O.D.	..... m. / ..... ft. O.D.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....
(3)	..... m. / ..... ft. O.D.	..... m. / ..... ft. O.D.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....
(4)	..... m. / ..... ft. O.D.	..... m. / ..... ft. O.D.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....

GEOPHYSICAL DATA AVAILABLE

Resistivity ☐ Conductivity ☐ Temperature ☐ Any other logs .....

PARTIAL ANALYSIS DETAILS In milligrams per litre

Date	TDS	Tot H	Carb H	Non-Carb H	Alk	SO4	Cl	E.C.

Site marked on: 1 inch (print) ....., 1 inch (master) ....., 2½ inch ..... (use symbol and give data)

(18127/1)

SU 82 SW 19

300/240 Rogate Lodge, Rogate. (Disused)

Surface +287. Shaft 137; rest bore. Lining tubes: $14\frac{1}{4}$ x 6 in from $126\frac{3}{4}$ down; $24\frac{1}{4}$ x $4\frac{1}{2}$ in from $133\frac{3}{4}$ down (perforated 140 to 158); sand screen 140 to 158. Water struck at +154. R.W.L. +154. Suction +$130\frac{3}{4}$. Yield 750 g.p.h. (8 h. test). Dando, July 1946. (87·47m)

SU 8066 2487

Sand entered. Before 1958.

H 298 298

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS ft.	DEPTH ft.
Hythe Beds.	Sand.		
	No thickness given.		

pp. J. Day

SU82/20

300/240 Rogate Lodge, Rogate. (Disused)

Surface +287. Shaft 137; rest bore. Lining tubes: 14¼ x 6 in from 126¾ down; 24¼ x 4½ in from 133¾ down (perforated 140 to 158); sand screen 140 to 158. Water struck at +154. R.W.L. +154. Suction +130¾. Yield 750 g.p.h. (8 h. test). Dando, July 1946.

Sand entered. Before 1958.

H 298 298

GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS ft.	DEPTH ft.
Hythe Beds.	Sand.		
	No thickness given.		

pp. J. Day

1063 Wt. 22438/0384 10M 7/45 (51) F.&S.

RECORD OF WELL (SHAFT OR BORE)

(For Survey use only) N415.
1-inch map Registered No. 300/240

At ROGATE LODGE

Town or Village ROGATE 21

County SUSSEX Six-inch quarter sheet XXI. NW/W

For Mr. Col Wyndham. (Mr. Gee)

Exact site of well 80yds E.N.E. of House. SU8066 2487 (Sketch a tracing from a map, or a sketch-map, if possible.)

Level of ground surface above sea level (O.D.) +287 ~~310 appox~~ ft. If well-top is not at ground level, state how far ... above; below; 0 ft.

SHAFT 137 ft.; diameter ft. Details of headings SU82/20

BORE 161. ft.; diameter of bore: at top 6 ins.; at bottom 4½ ins. Lengths, diameters, perforations, etc., of lining tubes 6" I.D. from 126'8" to 141'0" 4½" I.D. from 133'9 to 158' Expanded joint at 133'9. Perforated & Gauze covd from 140 to 158

Water struck at depths below well top, of (feet) from 133'0"

Rest-level of water 133 ft. above/below well-top. Suction at 156¼ ft. Yield on 8 hours'/~~days'~~ pumping 750 gal. per hour with depression to ? ft. below well-top, Capacity of pump 750 g.p.h. Recovery to rest level in mins./hours Date of measurements July 1946 Date of well July 1946

Quality of water (*attach copy of analysis if available*)

Well made by Duke & Ockenden Ltd

Information from ditto. DUKE & OCKENDEN LTD

Additional notes in space overleaf.

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS Feet	THICKNESS Ins.	DEPTH Feet	DEPTH Ins.
	If measurements start below ground surface, e.g., from bottom of an existing shaft, state how far				
LGS (Hythe beds)	Sand.				
	Visited and sited by O on Hants 53 SE/W. O.D. +284. Derived, pumping equipment still in position. According to gardener (H. Catling) there was 3'6" of water in well some years ago (autumn). Well went dry if use became water level low & sand clogged suction. NP. 23.4.58.				
	Data Bank				
	Continued over leaf				

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.	Date received	Correspondence File No.	1" N.S. Map No.	1" O.S. Map No.	Site marked (use symbol) on 1" Map	Site marked (use symbol) on 6" Map
	20/2/47.			300.	⊙	⊙

1063 Wt. 22450/0384 10M 1/45 (31) F.&S.

RECORD OF WELL (SHAFT OR BORE)

(For Survey use only) N·2343
One-inch Map 316 / Registered No. 221
SU 82 SW/21
8025 2193

At AYEWOOD BRICK & TILE Co
Town or Village ROGATE
County SUSSEX Six-inch quarter sheet XX S.E. - E
For Mr. W.T. LAMB & SON LTD.
Exact site of well 150 yds N.W of Rogate Station
(Attach a tracing from a map, or a sketch-map, if possible.)

Level of ground surface above sea-level (O.D.) app. 178. ft. (54.25m)
If well-top is not at ground level, state how far ... above; below; ...ft.

SHAFT 46. ft.; diameter 3 ft. Details of headings

BORE to 79 ft.; diameter of bore: at top 6" ins.; at bottom 4½" ins. Lengths, diameters, perforations, etc., of lining tubes 6" I.D. Surface surface to 68'
4½" Sand Screen 65' 7" to 79'

Water struck at depths, below well top, of (feet) from 46'

Rest-level of water 29½ ft. ~~above~~ below well-top. Suction at 73¼ ft. Yield on 8 hours' ~~days'~~ pumping, 585 gal. per hour with depression to ... ft. below well-top, Capacity of pump 600 g.p.h. Recovery to rest level in ... mins./hours Date of measurements Dec 1948 Date of well Dec 1948.

Quality of water (*attach copy of analysis if available*)

Well made by Duke & Ockenden Ltd
Information from DUKE & OCKENDEN, LTD LONDON AND LITTLEHAMPTON

Additional notes in space overleaf.

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS Feet	THICKNESS Ins.	DEPTH Feet	DEPTH Ins.
	If measurements start below ground surface, e.g., from bottom of an existing shaft, state how far				
	DUG WELL	46	0	46	0 (14.02)
	WHITE SAND	33	0	79	0 (24.08)
	In use. Deep well electric pump. O.D. +169				
	Visited 28.10.59 G.S.W				

1063 Wt. 22438/0384 10M 7/45 (51) F.&S.

RECORD OF WELL (SHAFT OR BORE)

(For Survey use only) N.2348
316 inch Map Registered No.
221

At AYEWOOD BRICK & TILE Co
Town or Village ROGATE
County SUSSEX Six-inch quarter sheet XX S.E. - E
For Mr. W.T. LAMB & SON LTD.
Exact site of well 150 yds N.W of Rogate Station
SU 8024 2192
(Attach a tracing from a map, or a sketch-map, if possible.)

Level of ground surface above sea-level (O.D.) app 178. ft.
If well-top is not at ground level, state how far above; below; ft.
SU82/14

SHAFT 46. ft.; diameter 3 ft. Details of headings

BORE to 79 ft.; diameter of bore: at top 6" ins.; at bottom 4½" ins. Lengths, diameters, perforations, etc., of lining tubes 6" I.D. Surface surface to 68'
4½" Sand Screen 65'7" to 79'

Water struck at depths, below well top, of (feet) from 46'

Rest-level of water 29½ ft. ~~above~~ below well-top. Suction at 73¼ ft. Yield on 8 hours' ~~days'~~ pumping, 585 gal. per hour with depression to ft. below well-top, Capacity of pump 600 g.p.h. Recovery to rest level in mins. hours Date of measurements Dec 1948 Date of well Dec 1948.

Quality of water (*attach copy of analysis if available*)

Well made by Duke & ockenden Ltd
Information from DUKE & OCKENDEN, LTD LONDON AND LITTLEHAMPTON

Additional notes in space overleaf.

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA	THICKNESS Feet	THICKNESS Ins.	DEPTH Feet	DEPTH Ins.
	If measurements start below ground surface, e.g., from bottom of an existing shaft, state how far				
DUG WELL	DUG WELL	46	0	46	0
LOWER GREENSAND	WHITE SAND	33	0	79	0
DM 21/12/76	In use. Deep well electric pump. O.D. + 169				
	Visited 28.10.59 GWBW				
	Data Bank				

Continued over leaf

GEOLOGICAL SURVEY AND MUSEUM, SOUTH KENSINGTON, LONDON, S.W.7.	Date received	Correspondence File No.	1" N.S. Map No.	1" O.S. Map No.	Site marked (use symbol) on 1" Map	on 6" Map
	18.2.49		316		⊙	⊙

(For Survey use only) GEOLOGICAL CLASSIFICATION	NATURE OF STRATA *(Continued)*	THICKNESS Feet	THICKNESS Ins.	DEPTH Feet	DEPTH Ins.

DITIONAL NOTES

NGRC

BOREHOLE RECORDS

ADJUSTMENT FORM

QUARTER SHEET SU 82 SW

BH REGISTRATION NUMBER 35 - 39

RECORDS ENTERED AND HELD BY WALLINGFORD

BH REGISTRATION NUMBER(S)

WATER RESOURCES BOARD
WELL RECORD

SHEET 1

W.R.B. REF. No. SU 82 /52

R.A. LICENCE No.

1. WELL IDENTITY

NATIONAL GRID REFERENCE SU 808 233

Well at GLEBE COTTAGE, ROWGATE

I.G.S. REF. No.

RIVER AUTHORITY

Town

HYDROMETRIC AREA

County

SUB-CATCHMENT

Owner of well

Well made by

Date of sinking

Information from W.D.W.

Date received

2. WELL DESCRIPTION

Level of ground surface ..... m. / ..... ft. above sea level (O.D.)

If well top is not at above* ground level how far below ..... m. / ..... ft.

Shaft ..... m. / ..... ft. deep; Diameter at top ..... mm. / ..... in.; at bottom ..... mm. / ..... in.

Bore ..... m. / ..... ft. deep; Diameter at top ..... mm. / ..... in.; at bottom ..... mm. / ..... in.

Details of headings

DETAILS OF PERMANENT LINING TUBES

Length Plain ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Length Slotted ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Top ..... m. / ..... ft. above*/below surface

Length Plain ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Length Slotted ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Top ..... m. / ..... ft. above*/below surface

Length Plain ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Length Slotted ..... m. / ..... ft.; Diam. ..... mm. / ..... in.; Top ..... m. / ..... ft. above*/below surface

Details of well screen

DETAILS OF REST WATER LEVELS DURING CONSTRUCTION

Water struck at depths of ..... below well top

Rest level of water ..... m. / ..... ft. above*/below O.D.*/well top when bore ..... m. / ..... ft. deep. Date

Rest level of water ..... m. / ..... ft. above*/below O.D.*/well top when bore ..... m. / ..... ft. deep. Date

Rest level of water on completion of bore ..... m. / ..... ft. above*/below O.D.*/well top when bore ..... m. / ..... ft. deep. Date

Method of drilling

Brief details of well development e.g. acid treatment etc.

* delete as applicable

(18127/1)

DETAILS OF PUMPING TEST

Water level depressed from ..... m. / ..... ft. above* / below* well top to ..... m. / ..... ft. below well top, pumping at ..... l/s / ..... galls/hr.

Water level depressed from ..... m. / ..... ft. above* / below* well top to ..... m. / ..... ft. below well top, pumping at ..... l/s / ..... galls/hr.

Water level depressed from ..... m. / ..... ft. above* / below* well top to ..... m. / ..... ft. below well top, pumping at ..... l/s / ..... galls/hr.

Suction at ..... ft. below well top. Capacity of pump ..... l/s / galls/hr. Test from ..../..../19.... to ..../..../19....

DETAILS OF PERMANENT PUMPING EQUIPMENT

Make and/or type ..... Motive Power .....

Capacity ..... l/s / galls/hr. Suction at ..... m. / ..... ft. below well top.

Amount pumped ..... m^3/day* / galls/day. Pumping for ..... hrs./day.

Estimated consumption ..... m^3/week* / galls/week ..... m^3/year* / galls/year

3. WELL DATA

WELL USE. Abstraction ☐, Recharge ☐, Observation ☐, Disused ☐, Filled-in ☐

WATER USE. Public Supply ☐, Industrial ☐, Irrigation ☐, Agriculture ☐, Domestic ☐, Unused ☐, Misc. ☐

WATER LEVEL OBSERVATIONS

	Rest Water Level	Pumping Water Level	Depression	Rate of Pumping	Date
(1)	..... m. / ..... ft. O.D.	..... m. / ..... ft. O.D.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....
(2)	..... m. / ..... ft. O.D.	..... m. / ..... ft. O.D.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....
(3)	..... m. / ..... ft. O.D.	..... m. / ..... ft. O.D.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....
(4)	..... m. / ..... ft. O.D.	..... m. / ..... ft. O.D.	..... m. / ..... ft.	..... l/s / ..... galls/hr.	.....

GEOPHYSICAL DATA AVAILABLE

Resistivity ☐ Conductivity ☐ Temperature ☐ Any other logs .....

PARTIAL ANALYSIS DETAILS in milligrams per litre

Date	TDS	Tot H	Carb H	Non-Carb H	Alk	SO4	Cl	E.C.

Site marked on: 1 inch (print) ....., 1 inch (master) ....., 2½ inch ..... (use symbol and give data)

(18127/1)

Appendix J

Pump Test and Analysis

Luke Eldridge
Devine Homes PLC
St Michael's House
111 Bell Street
Reigate
RH2 7LF

3rd February 2025

SUBJECT: SLADE FARM BOREHOLE PUMP TESTING AND ANALYSIS
PROJECT NO: 24250922

Dear Luke,

This report details the pump test conducted at the Slade Farm borehole on 16th January 2025, following the completion of drilling.

The borehole was drilled to a depth of 56.30 metres below well top, with a 4.5 inch internal diameter (ID) PVC casing and screen. The drilling contractor, George Osbourne, used his own pump for clearance pumping and left it in place at approximately 21 metres below well top, which facilitated the pump test by B. A. Hydro Solutions Limited (BAHS). The pump test was conducted by Rich Baker of BAHS.

Prior to the pump test, a flow meter was installed on the discharge line from the borehole. A data logger was programmed to record water levels every minute, and it was installed at 20 metres below well top. A barometric logger was also placed next to the borehole to measure atmospheric pressure for compensation. The rest water level was measured at 13.28 metres below well top at 10:00 am. The pump test was conducted to comply with BS EN ISO 22282-4:2012.

The pump test began at 10:00 hours, with the pump operating at full capacity. Flow meter readings and water levels were recorded at regular intervals. The water level dropped initially but quickly stabilised. The farmer requested that a bacteria analysis be undertaken when the water quality samples were taken, in addition to the physical and chemical analysis already planned. A water sample was taken after four hours of pumping, during which time more than 12 cubic metres of water was abstracted. The sample was dispatched to the BAHS laboratory for analysis (see following certificate).

The drawdown was very small, measuring 22cm, with a consistent flow rate of 3.0 m^3/hr. At 15:00 hours, the water level had stabilised at 13.50 metres below well top. The pump was then turned off and the recovery of the water level was measured. The borehole recovered quickly and then slowed, full recovery was achieved within 40

minutes. The following graph shows the change in water levels over the course of the pump test and recovery.

Following the recovery measurements, the flow meter and logger were removed, and the data was downloaded and checked. The data from both loggers was confirmed to be good. The pump was then pulled out of the borehole and all the testing equipment was packed away. The borehole was then covered with a flange plate top-hat. The site was demobilised at 16:30.

The water sample collected was sent to the BAHS laboratory for analysis. The water quality analysis indicated that the water was of good quality, with no parameters exceeding drinking water standards. The laboratory results showed the water to be of moderate hardness with a pH of 6.36. The water was odourless and had a low turbidity. The laboratory results also indicated no presence of microbiological contamination at the time of testing.

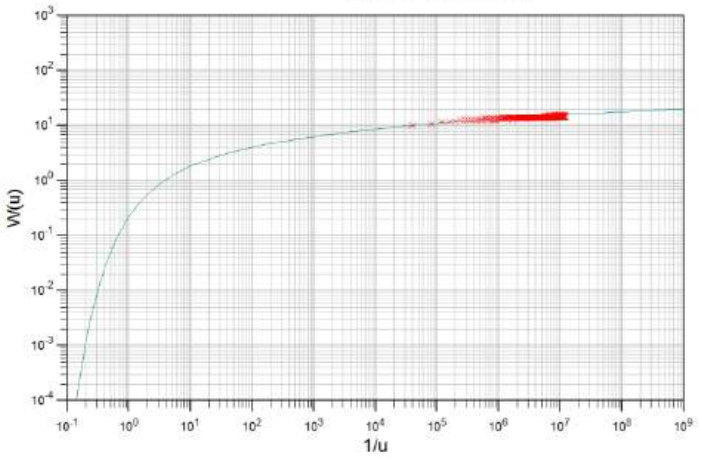
The pump test demonstrated:

- A very small drawdown with a consistent sustainable flow rate of 3 m^3/hour.
- The abstraction rates were maintained very close to a constant rate throughout the test.
- The water levels reached equilibrium, and steady state conditions were achieved.
- The test showed there to be no signs of interference from other abstractors.
- The pump test data was analysed as summarised below (see following graphs):
    - Analysis of the drawdown data using the Theis approximations for confined and unconfined aquifers generated a Transmissivity value of 372.01 m^2/day and 357.03 m^2/day respectively.
    - Analysis of the drawdown data using the Cooper-Jacob approximation generated a Transmissivity value of 556.739 m^2/day.
    - Analysis of the drawdown data using the Hantush approximation for confined aquifers generated a Transmissivity value of 511.09 m^2/day
    - Analysis of the drawdown data using the Neuman approximation for confined aquifers generated a Transmissivity value of 187.74 m^2/day
    - Analysis of the recovery data using the Theis Recovery approximation generated a Transmissivity value range of 483 m^2/day.
- The Transmissivity of the ground penetrated by the borehole is high, as reflected by the small drawdown during test pumping.
- The specific yield of the borehole being 13 m^3/hour/metre drawdown.
- The water quality is good and in line with what would be expected from the aquifer locally.
- The borehole represents a reliable and sustainable source of potable quality groundwater.

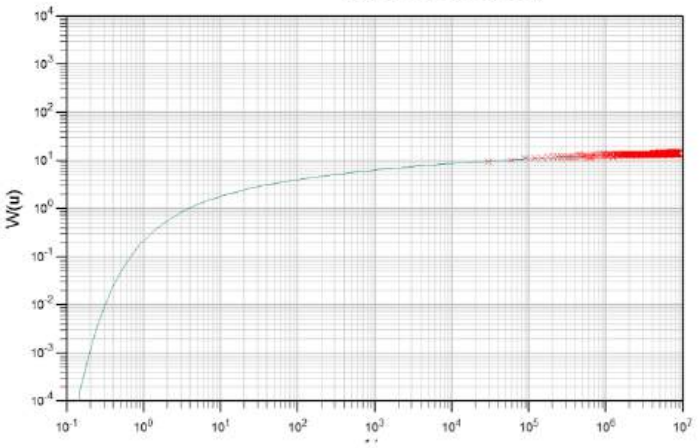
B. A. HYDRO Solutions

Providing Effective Surface & Groundwater Solutions

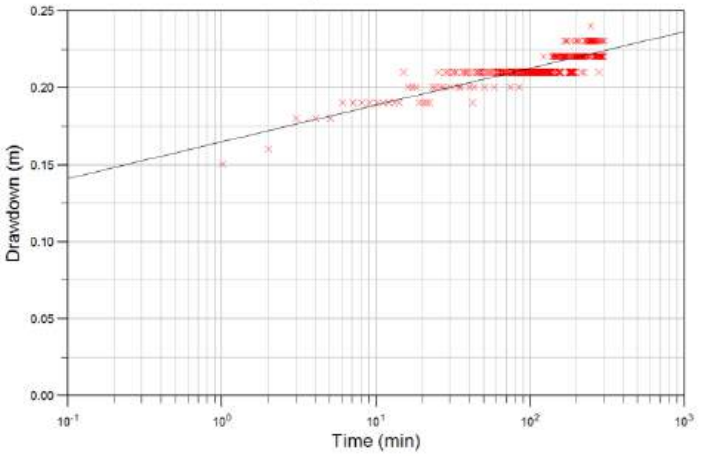
Theis (Confined)



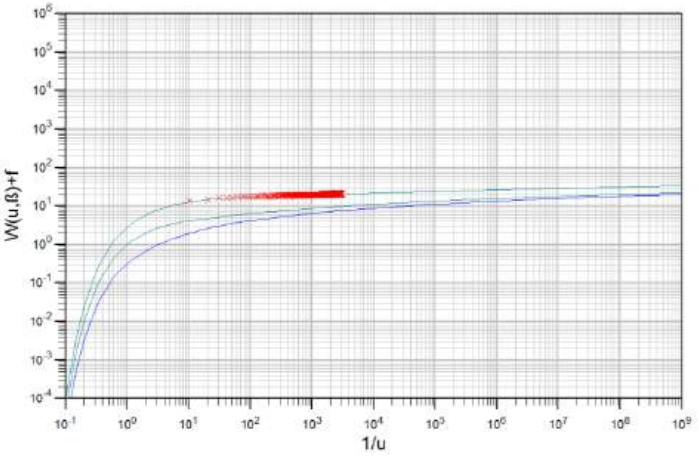
Theis (Uncofined)



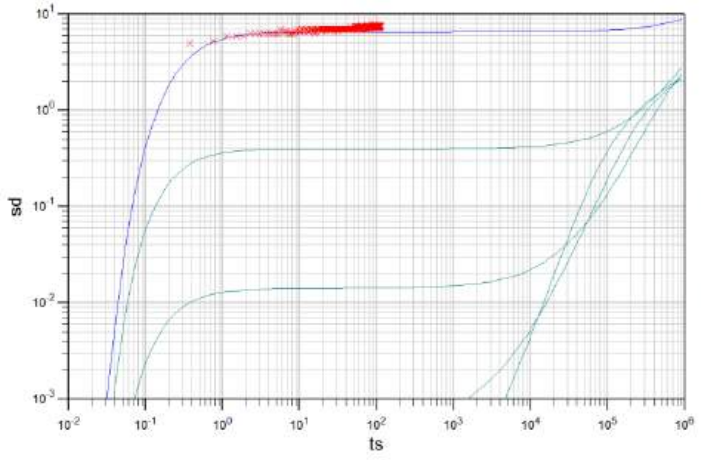
Cooper and Jacob



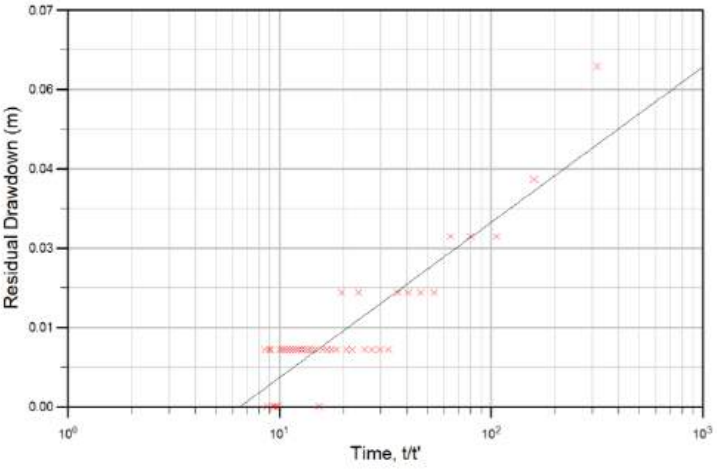
Hantush



Neuman



Theis Recovery



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In conclusion, at the time of testing, the pump test at Slade Farm demonstrated that the borehole is capable of providing a reliable and sustainable source of groundwater at a flow rate of at least 3 m^3/hour with minimal drawdown. The water quality is considered to be good and suitable for the intended purpose, with no parameters elevated above drinking water standards.

Yours sincerely,

Tim Baker
Principal Hydrogeologist
B. A. Hydro Solutions Limited

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LABORATORY REPORT - Page 1 of 2

Client:	Devine Homes PLC St Michael's House 111 Bell Street Reigate RH2 7LF	Certificate No: Order No: Date Reported: Site Name: Sample Desc:	24250922-1 - 23/01/2025 Slade Farm -

Test	Results	Limit	Units	Comment	Sample Details	
Alkalinity	39	-	mg/l			
Aluminium	<20.00	200	µg/l			
Ammonium	<0.020	0.5	mg/l		Sampling Date:	16/01/2025
Arsenic	<2.00	10	µg/l		Sampling Time:	-
Boron	<50.00	1000	µg/l		Date Received:	17/01/2025
Cadmium	<0.20	5	µg/l		Date Tested:	17/01/2025
Calcium	31.20	-	mg/l			
Chloride	22.30	250	mg/l			
Chromium	<30.00	50	µg/l			
Copper	<100.00	2000	µg/l			
Cyanide	<10.00	50	µg/l			
Fluoride	<100.00	1500	ug/l			
Dissolved Iron (Fe II)	<10.00	-	µg/l			
Total Iron (FeII+FeIII)	142	200	µg/l			
Lead	<1.00	10	µg/l			
Magnesium	2.92	-	mg/l			
Manganese	7	50	µg/l			
Nitrate	<22.00	50	mg/l			
Nitrite	<50.00	500	µg/l			
Nitrite/Nitrate	<0.46	≤1	-			
Phosphate	<0.15	-	mg/l			
Potassium	6.94	-	mg/l			
Sodium	11	200	mg/l			
Sulphate	<40.00	250	mg/l			
Sulphide	<0.1	-	mg/l			
Zinc	0.073	-	mg/l			

Disclaimers:

The results provided are not UKAS accredited and can only be used for non-regulatory purposes

* Denotes concentrations above UK drinking water standards

# Denotes results which must be treated with caution due to sampling, transit or storage issues prior to delivery to laboratory

</> Denotes concentration found within sample below/above the equipment's detection level

— Indicates test has been repeated due to uncertainty or testing issues

$ Indicates sample was tested outside of the stability period, validity of results may be affected

All analytical quality control associated with these results was satisfactory, details are available on request

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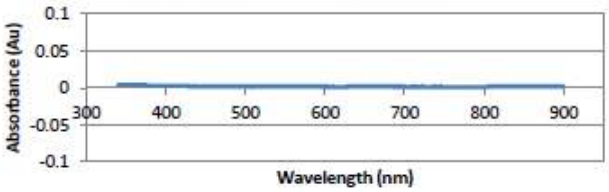
LABORATORY REPORT - Page 2 of 2

Client:	Devine Homes PLC	Certificate No:	24250922-1
	St Michael's House	Order No:	-
	111 Bell Street	Date Reported:	23/01/2025
	Reigate	Site Name:	Slade Farm
	RH2 7LF	Sample Desc:	-

Test	Results	Limit	Units	Comment	Sample Details	
Electrical Conductivity	275	2500	µS/cm			
Calcium Hardness	78	-	mg/l			
Total Hardness as $CaCO_3$	90	-	mg/l	moderate	Sampling Date:	16/01/2025
Magnesium Hardness	12	-	mg/l		Sampling Time:	-
pH	6.36	6.5-9.5	pH units		Date Received:	17/01/2025
Total Dissolved Solids	177	-	mg/l		Date Tested:	17/01/2025
Turbidity	0.42	4	NTU			
Colour	<1	20	mg/l Pt/Co			
Odour (Qualitative)	Odourless	-	-			
E.coli	0	0	cfu/100ml			
Total Coliforms	0	0	cfu/100ml			
Enterococci	0	0	cfu/100ml			
Pseudomonas spp.	0	-	cfu/100ml			
TVC 3 at 22°C	>300	no abnormal change	cfu/ml			
TVC 2 at 37°C	>300		cfu/ml			

Absorbance vs. Wavelength



Patrycja Malinowska
Laboratory Manager

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