16 Kempshott Road
Horsham
West Sussex
RH12 2EY

Samantha Owen
Principal Planning Officer
East Hampshire District Council
PO Box 310
Petersfield
GU32 9HN

Date: 11 September 2026

[redacted]

Reference: 20260810P1

Dear Samantha,

INDEPENDENT REVIEW OF HYDROGEOLOGICAL ASSESSMENT

H2Ogeo Ltd has completed an independent technical review of the Hydrogeological Assessment prepared by H Fraser Consulting Ltd for Redbrown Ltd, dated 20 May 2026 (reference 31255R2D2). A copy of our review is enclosed.

The assessment presents a conceptual model in which seasonal groundwater within the Chalk discharges through the superficial deposits and local springs. However, the available evidence and calculations are not yet sufficiently robust for a high level of confidence to be placed in the proposed groundwater management and drainage approach.

The principal uncertainties relate to the short and incomplete groundwater monitoring record, inconsistencies and omissions within the geological interpretation and supporting logs, the derivation of the adopted hydraulic parameters, errors and assumptions within the throughflow calculations and the absence of a clearly demonstrated surface water and groundwater catchment assessment. Consequently, the groundwater levels, spring flows, gravel throughflow and storage requirements used to inform the proposed drainage strategy should only be regarded as preliminary estimates.

Particular consideration needs to be given to the potential for spring heads and seepage zones to migrate under different groundwater conditions.

The development layout should avoid the known spring-emergence zone and provide an appropriate allowance for the movement or activation of seepage and historic spring lines. The proposed equilibrium level of 105.15 mAOD has not yet been demonstrated to be representative of the credible range of groundwater conditions.

The assessment must also consider potential effects on off-site springs, water features and drainage infrastructure.

Changes to groundwater levels, recharge or conveyance could alter spring flows beyond the site boundary or transfer flood risk downstream. Further investigation of relevant off-site water features, including nearby springs and land drains is therefore required to establish the wider hydrogeological context and potential receptors.

The proposed SuDS strategy must account for the effect of changing diffuse rainfall recharge into concentrated point-source infiltration. This could locally raise or alter the groundwater elevations and move or intensify spring emergence elsewhere. It should also not be assumed that the superficial gravels will retain sufficient infiltration or storage capacity during winter when groundwater levels are high and the deposits may already be saturated.

In my opinion, further evidence is required before the proposed groundwater management principles can be relied upon as the basis of the drainage strategy.

In the ongoing monitoring the applicant should demonstrate that their drainage scheme can provide a technically feasible solution without relocating or intensifying spring emergence, increasing groundwater or surface water flood risk or adversely affecting off-site receptors.

The outline proposals must safeguard sufficient land for the spring zone, attenuation storage, exceedance routes and future maintenance access.

Yours sincerely,



David Walker
Director and Hydrogeologist
H2Ogeo Ltd
[redacted]

1 Introduction

H2Ogeo Ltd was instructed by East Hampshire District Council to undertake an independent technical review of the Hydrogeological Assessment for Development at Holybourne, prepared by H Fraser Consulting Ltd for Redbrown Ltd, dated 20 May 2026, Reference 31255R2D2.

The review has been carried out in line with the scope of work outlined in my proposal 20260810P1 and included assessment of the following:

- Desk study and baseline information;
- Site investigation;
- Groundwater monitoring;
- Geological interpretation;
- Hydraulic parameters;
- Spring flow assessment; and
- Development implications.

This document presents the findings of my review and a statement of limitations is presented at the end of this report.

2 Scope of Work

This review follows the scope set out in H2Ogeo Ltd proposal 20260810P1 dated 10 August 2026. It considers the submitted Hydrogeological Assessment and the evidence presented within its appendices.

The review distinguishes between observations, derived values and assumptions and considers whether remaining uncertainty is material to planning and drainage decisions.

No re-processing of logger files, survey dataset or hydraulic-test reviews have been undertaken as part of this review. Where supporting raw data are absent, H2Ogeo has assessed the reported information as presented.

I have assessed the Hydrogeological Assessment using the following parameters:

Confidence	***Rationale***
High	*Conclusions directly supported by appropriate field observations or monitoring data.*
Moderate	*Conclusions that are hydrogeologically reasonable and supported by the available evidence but remain dependent upon assumptions, limited monitoring duration or interpretation.*
Low/further Evidence Required	*Conclusions for which the available evidence is insufficient, where alternative hydrogeological interpretations remain credible or where uncertainty could materially influence assessment.*

Topic	Review	Confidence Level	Comment
Desk study and baseline information	There are errors in the Geology Section of Table 2.1. The River Terrace Deposits mapped across the southern part of the southern field, north of London Road are not described in the table with only mention of Head Deposits being mapped in the channel on the eastern boundary. The local bedrock succession should refer to the Upper Greensand beneath the Gault Clay and Chalk. The report currently refers to the Lower Greensand, which is a materially different stratigraphical unit. The site-scale bedrock mapping distinguishes the West Melbury Marly Chalk Formation and Zig Zag Chalk Formation. The statement that the site crosses the White Chalk and Grey Chalk subgroups should be checked against the cited 1:50,000 and 1:625,000 mapping. The Zig Zag Chalk Formation and the West Melbury Marly Chalk Formation are both constituents of the Grey Chalk Subgroup with no formations of the White Chalk Subgroup shown on the 1:50,000 mapping on site. There are two relevant groundwater monitoring stations in the region, The Wey Spring Chalk and Alton Town observation boreholes. The rationale for selecting and reporting only the Wey Spring Chalk monitoring borehole should be explained or data from both boreholes used and reported in the analysis. The private-supply search should be documented. The identified Hawbridge Farm borehole appears to be on the boundary of the Grey Chalk and Upper Greensand and its relevance to the Chalk and superficial deposits at the site is unclear. The wider BGS water-well dataset should be reviewed and presented as there are boreholes in closer proximity that may yield useful information. In addition, anecdotal evidence of nearby small scale private boreholes should also be presented.	Moderate	Parts of the evidence base are incorrectly reported or missing.

Topic	Review	Confidence Level	Comment
	The source and derivation of the quoted annual rainfall of 850 mm should be corrected or justified. H2Ogeo reviewed the identified SAAR values of c890 mm for 1941 to 1970, 868 mm for 1961 to 1990 and 940 mm for 1991 to 2020 at NRFA station 39078. The available East Worldham record, excluding incomplete years, indicates an average of about 915 mm per year. The selected rainfall baseline will affect recharge and water-budget estimates and should represent site conditions. The rainfall gauge used in the hydrographs should be named and the plotted daily totals and axis checked against the source dataset. The current rainfall presentation could not be independently replicated from the report.		
Site investigation	The combined investigation comprises a useful spread of cable percussion, rotary and window-sampling locations. Nevertheless, the supporting information is incomplete and this limits independent verification of the geological interpretation and well response. Appendix C does not appear to include the logs for BH201, BH202 or WS201 to WS206, despite Section 4.1 stating that logs from all phases are compiled there. The basis for assigning BH104 and BH105 to structureless Chalk should be reconciled with Figure 5.1, which appears to place them within the mapped superficial-deposit extent. Descriptions of gravel in WS1 and the other wells should be compared directly to establish whether the deposits have a common origin.	Moderate	There is a good spread of data points around the proposed development site however not all of it has been presented in this report. There appear to be some inconsistencies between what has been encountered and what has been reported which reduces the confidence.
Groundwater monitoring	The main logger dataset shown extends from 24 February to 16 April 2026 and five loggers were installed after the March drilling.	Moderate	Revised hydrographs with additional data should be carried out.

Topic	Review	Confidence Level	Comment
	The reference borehole reportedly peaked on 12 February 2026, before the principal monitoring period. The statement that peak conditions were captured is therefore an inference based on another borehole rather than a direct site observation. The site record does not include a complete winter recharge and recession cycle or demonstrate representativeness relative to a range of wet and dry years. For confidence it would be useful to provide installation dates, monitoring intervals, barometric compensation procedures, datum survey checks and the full manual-dip validation record for each logger. Clarify whether WS206 contained a logger and explain the rapid fall from approximately 104.52 to 103.74 mAOD during April 2026. Confirm whether groundwater was at or above ground level in March and April. It is important to plot comparable hydrographs using a common vertical scales and clearly identify screen interval, geological unit, rainfall gauge and any data corrections.		Comparisons of additional data sets for groundwater elevations and rainfall would provide more certainty to the interpretation.
Geological interpretation	The broad concept of Chalk groundwater rising seasonally and discharging into superficial deposits and at the spring is hydrogeologically reasonable. Confidence is reduced because the geometry and hydraulic roles of the weathered Chalk, gravels and gravelly Clay have not yet been demonstrated consistently. There is no demonstration of where the proposed confining or semi-confining weathered Chalk gives way to the River Terrace Deposits. The report should distinguish evidence from inference and explain whether the gravelly Clay is a separate unit, weathered Chalk or Head. Assessment of the transmissivity and saturated thickness of the gravels and whether the clay-rich units actually confine them would have been	Low /Moderate	Without further interpretation of logs and compilation of all the data it is difficult to see the whole picture on site. Further details of confining and semi-confining layers should be provided considering the soakage potential of these layers from surface. (BRE365 has taken place at 2mbgl, what is the soakage potential from surface?

Topic	Review	Confidence Level	Comment
	useful along with the incorporation of the soakage or permeability testing from Ground & Water Soakaway Report GWPR6159/SR/December 2024. It should be noted that these BRE365 Tests were carried out in August 2024 and did not encounter groundwater. This is unsurprising however should not provide confidence to drainage design as monitoring of groundwater elevations is contrary to this. It is also not apparent from the Trial Pit Log TP3 presented in Figure 4 of the G&W Report that the River Terrace Deposits were not encountered at this location.		
Hydraulic parameters	Section 7.1.1 applies a Chalk hydraulic conductivity of 190 m/day. The cited MacDonald and Allen paper reports distributions of Chalk transmissivity rather than supporting a general hydraulic conductivity of 190 m/day. How was the K value derived? If K = 190 m/day is combined with the stated average saturated thickness of 9.23 m, the implied transmissivity is approximately 1,754 m^2/day. This is above the reported 75th percentile Chalk transmissivity of 1,500 m^2/day. Such a value is possible in highly transmissive fractured Chalk but it would require site-specific evidence and cannot be treated as a representative value without justification. The cross-sectional area and gradient also require review. BH201 and BH103 differ in location, depth, screened intervals and interpreted geology. The assessment should demonstrate that the head difference represents the gradient through the same hydraulically connected flow zone.	Moderate	The hydraulic parameters are on the whole within a standard range for the region however the evidence base needs identifying. The T values are high and, as discussed this is feasible, but local site specific testing/results should be used to confirm these inputs as they are at the outer limits of regional data sets.

Topic	Review	Confidence Level	Comment
	The contributing saturated thickness should represent the active section feeding the spring rather than borehole water columns. I would suggest that the 34 L/s estimate is an order-of-magnitude scenario, not a validated spring inflow. The WS201 in gravels test gives K = 4.50×10^{-3} m/s, equivalent to approximately 389 m/day. This is a very high bulk value. This single test was conducted in the southern gravel area and not in the area of the known spring. It may not represent the full paddock or the Chalk to gravel transition. Additional testing would be recommended to understand how the properties of the gravels change along the discharge route and how the k values can vary. Section 7.1.2 of the report is inconsistent. Using the values printed in the equation: $Q = 0.0045 \text{ m/s} \times 162 \text{ m}^2 \times 0.01 = 0.00729 \text{ m}^3/\text{s} = 7.29 \text{ L/s}$ The text in the report instead states 0.005175 m^3/s and 5.17 L/s, while also showing 7.29 L/s beside the equation. For a saturated thickness of 1.6 m, the cross-sectional area would be 259.2 m^2 and the corresponding result would be approximately 11.66 L/s, subject to the assumed gradient and full saturation. It is important to note that these calculations describe potential Darcy flow for the adopted parameters and that the aquifer's capacity alone does not demonstrate that this flow occurs.		
Spring flow assessment	There is measurement uncertainty in the spring flow assessment and whilst it is acknowledged that the selection of channels in shallow flows is challenging the estimated 19.7 L/s channel flow and 7.9 L/s off-site	Low/Moderate	

Topic	Review	Confidence Level	Comment
	flow must be considered snapshots and should not be treated as fixed design rates. Ideally the spring assessment would have undergone installation of a suitable rated structure or weir whilst relating flow rates to simultaneous groundwater levels and rainfall. There are some potential rounding issues in the storage estimations. More importantly, total porosity represents the porosity of the whole gravel aquifer, not necessarily the volume that can drain or be replaced. Effective porosity or specific yield and the actual change in saturated thickness are probably more relevant to available attenuation.		
Climatic Changes	The comparison between 2014 and 2026 is helpful but does not establish the range of credible high-groundwater conditions. The assessment should compare the site monitoring period with the full long-term record, identify other high and low years and test the water balance and spring response across several representative conditions. The reported 2014 Alton groundwater high was approximately 0.39 m above the 2026 high, but the transfer of that difference directly to BH202 assumes a stable relationship that has not been demonstrated. It would be worth running sensitivity scenarios using observed long-term highs and lows at the most appropriate reference borehole, not a single selected year. The assessment should apply reasonable climate-change allowances and explain how prolonged rainfall, high antecedent groundwater levels and saturated gravels could affect the combined groundwater and surface-water drainage system.	Low	

Topic	Review	Confidence Level	Comment
Development implications	The report correctly recognises that lowering elevations at the spring outlet may draw additional groundwater into a drainage system. This is an important design constraint. It has not yet been demonstrated, however, that 105.15 mAOD is the appropriate equilibrium or design level across the relevant range of groundwater conditions. Further monitoring and surveyed spring-stage data are essential. From a hydrogeological standpoint, the proposed drainage measures are reasonable principles but consideration should be given to the following at outline stage, in particular: • The development should avoid the spring emergence zone and an appropriate allowance for movement of seepage or spring locations – see recommendations below; • The effect of changes from diffuse recharge to concentrated point-source infiltration should be assessed. Point-source soakage could alter the local piezometric surface and move or intensify seepage further north or elsewhere; • The capacity of gravels to receive surface-water infiltration during winter cannot be assumed when they may already be saturated; • Ground raising should use demonstrably permeable and maintainable materials and should not displace groundwater or impede lateral flow. Measures are needed to prevent long-term siltation and clogging; • Foundation drainage and groundwater conveyance must avoid creating preferential pathways or continuously drawing aquifer water into the surface-water system;		

Topic	Review	Confidence Level	Comment
	• The condition and capacity of existing off-site drainage, culverts and land drains must be established. Conveying additional water off site should not transfer flood risk downstream; and • The outline layout should reserve sufficient land and levels for the maximum credible storage, spring area, exceedance routes and maintenance access.		

3 Recommendations

Based on my review I have the following recommendations.

1. Ideally there should be continued monitoring through at least one complete hydrological year and the following winter high, with comparison to long-term Chalk levels and rainfall. A longer record may be required if the next winter is not representative of elevated conditions;
2. A robust spring monitoring arrangement should be installed to capture seasonal flow results;
3. The surface water and groundwater catchments supplying the spring must be defined as the current assessment does not delineate either catchment;
4. Investigate existing land drains, including the drain observed discharging to Cuckoo's Corner Spring and establish whether similar drains influence the paddock spring or convey water off site;
5. Assess the controls on migration of the spring lines and/or activation of historic spring lines through SuDS. What is the risk and has it been considered? I have concerns that changes in recharge patterns through the implementation of SuDS (point source discharge versus existing diffuse recharge) may influence the spring flow rates and locations. This does not appear to have been considered in the Hydrogeological Assessment report to date;
6. There are several water features in the area that have not been assessed, albeit beyond the red line boundary, for example, Springfield Cottage on London Road has a water feature in its grounds on a similar elevation to the Paddock Spring. As outlined in point 5 above, by changing the recharge mechanisms on site there is the possibility of changing the discharge dynamics (spring flows) in the vicinity. This could have potential flooding implications off-site and needs consideration.

4 Conclusions

The Hydrogeological Assessment presents a conceptual model in which seasonal groundwater within the Chalk discharges through superficial deposits and local springs.

The site investigation provides a useful spread of data points, but confidence in the interpretation is reduced by geological inaccuracies, omitted borehole logs, inconsistencies between the recorded and interpreted strata and insufficient documentation of the baseline data and monitoring methods.

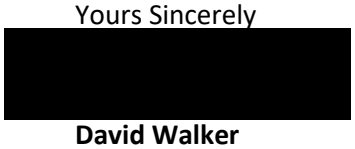
The available monitoring does not capture a complete winter recharge and recession cycle or demonstrate conditions during a range of wet and dry years. Spring-flow estimates and Darcy calculations are subject to substantial uncertainty, with some hydraulic parameters at the upper end of regional ranges not supported by sufficient site-specific testing. Consequently, the adopted groundwater levels, spring flows and available storage should be regarded as preliminary estimates rather than validated design values.

It appears that offsite water features have not been assessed and this is important due to the potential change in flows as a result of the altered recharge, SuDS point-source recharge and drainage plans. The assessment does not yet demonstrate that the development can be accommodated without altering spring locations or impacting on flows, increasing groundwater emergence or transferring flood risk off site and so further works are required.

These findings should inform the drainage layout and establish appropriate allowances for the spring zone, storage, exceedance routes and maintenance access. In my opinion, further evidence is required before the proposed groundwater management principles can be relied upon as the basis of the drainage strategy.

Should you have any questions please do not hesitate to contact me.

Yours Sincerely



David Walker
Director & Hydrogeologist
[redacted]

5 Statement of Limitations

This review has been prepared by H2Ogeo Ltd for the specific purpose of providing an independent technical assessment of the hydrogeological information, interpretations and conclusions presented in the documents made available at the time of review. It is limited to matters within H2Ogeo Ltd's professional competence, principally geology, hydrogeology and the potential hydrogeological implications of the proposed development and drainage strategy.

The review is desk-based and relies upon information prepared by others.

H2Ogeo Ltd has not independently verified the accuracy or completeness of the borehole logs, groundwater monitoring records, survey data, rainfall data, hydraulic testing, spring-flow measurements, calculations or other third-party information.

No intrusive investigation, groundwater monitoring, surveying, laboratory testing or independent flow measurement has been undertaken by H2Ogeo Ltd as part of this commission. The absence of comment on any particular matter should not be interpreted as confirmation that the associated information or conclusion is correct.

The findings represent H2Ogeo Ltd's professional opinion based on the information available and the scope agreed at the time of writing. Hydrogeological conditions vary spatially and seasonally, while groundwater levels, spring positions and flow rates may differ under wetter, drier or more extreme climatic conditions. The review should not therefore be relied upon as a detailed drainage design, flood risk assessment, ground investigation, geotechnical assessment or guarantee of future groundwater conditions.

The conclusions and recommendations may require revision if additional monitoring, investigation, calculations or design information becomes available.

Responsibility for the design, performance, regulatory approval and construction of the development and drainage measures remains with the relevant designers, contractors and approving authorities. This review has been prepared solely for the named client and stated purpose, and no third party may rely upon it without the prior written agreement of H2Ogeo Ltd.

The report will not constitute legal advice.