



Hampshire County Council

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Enquiries to	Thomas Callaway	My reference	SWM/2021/0660
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Date	13 February 2023	Email	swm.consultee@hants.gov.uk

Dear Sir/Madam,

Outline planning application for up to 43 dwellings, with access from Lower Road and associated landscaping, open space and allotments, and all other matters reserved at Land south of, Lower Road, and west of Old Manor Farm, Havant(Application No. APP/21/01071

Hampshire County Council as Lead Local Flood Authority has provided comments in relation to the above application in our role as statutory consultee on surface water drainage for major developments.

This response does not reflect the position of Hampshire County Council as the Highway Authority. If there is a potential for the drainage features to be offered for adoption, this will need to be discussed separately with Highways development planning as they might not be considered acceptable by the Highway Authority.

In order to assist applicants in providing the correct information to their Local Planning Authority for planning permission, Hampshire County Council has set out the information it requires to provide a substantive response at <https://www.hants.gov.uk/landplanningandenvironment/environment/flooding/planning>

The LLFA maintains a holding objection to the development proposals based on the surface water drainage information submitted to date. The surface water drainage strategy relies on deep-bore soakaways as final discharge points, that will be saturated by high groundwater levels during winter. Shallow infiltration was found to not be possible at this site due to slow infiltration rates in the superficial deposits. No watercourses are present nearby, however surface water sewers exist in this area albeit upgradient from the site.

Director of Universal Services
Patrick Blogg

Deep-bore soakaways are considered to be an option of last resort by the LLFA, as stated on page 4, guidance note 2 of the 'Surface Water Checklist Guidance' available online at <https://documents.hants.gov.uk/flood-water-management/SurfaceWaterChecklistGuidance.pdf>, where the LLFA requests that discussions must be held as soon as possible to avoid delays to the application and confirm any additional requirements that will apply.

The Geo-Environmental report (ref. GE20814/WP02/220518, 18/5/22) provides the supporting evidence of the ground conditions, showing a groundwater strike in the chalk in borehole BH101 at 6.40 mbgl during drilling on 25/4/22, rising to 4.50 mbgl 20 minutes after drilling finished, and monitored at 2.71 mbgl on 4/5/22. The less permeable clay river terrace deposits are situated between ground level and 3.0 mbgl and were shown to be unsuitable for infiltration in an earlier report.

Although not specifically relating to deep-bore soakaways, guidance documents for infiltration drainage design such as BRE 365, CIRIA R156 and CIRIA C753 often recommend that groundwater levels are monitored to ensure that an unsaturated zone (usually one metre) exists between peak groundwater levels and the base of an infiltration structure. The reasons are to reduce the risk of contamination pathways to the groundwater and to ensure that the infiltration structure functions effectively at all times of year (the infiltration capacity is not reduced by high groundwater levels). No such unsaturated zone is proposed for this drainage system, and there may even be a risk of groundwater emerging from the boreholes in a worst-case scenario – no other records of groundwater level monitoring have been provided for the winter period to determine the peak level. **The LLFA requires a one metre unsaturated zone beneath the base of any proposed infiltration structure.**

Infiltration testing for the design of the deep-bore soakaways was also included in the Geo-Environmental report referred to above. The report implied that a single falling head test was undertaken within borehole BH101 with groundwater at 4.50 mbgl prior to the test. It is not clear whether the falling head test was continued through to the original groundwater level. No further detail has been provided other than the estimate preliminary infiltration rate of 1.48×10^{-5} m/s, which has been used for the deep-bore soakaway design. Testing appears to have been undertaken one time only and at one depth into the saturated chalk, which is insufficient for determining whether the rate achieved is an anomaly or even representative of the entire depth of the proposed boreholes. As the groundwater levels will continue to impede infiltration through much of the winter, it is not clear whether increasing the depth or number of deep-bore soakaways makes much difference to the discharge rate of water off-site. A significant volume of attenuation storage has also been proposed upstream of the deep-bore soakaways, raising concerns over the effectiveness of deep-bore soakaways designed using the sole test infiltration rate. The Soakaway Design Guide (Kent County Council, July 2000)

refers to the influence of groundwater restricting the driving head and hence the soakage capacity of the system. **The LLFA requires more evidence of a suitable infiltration rate than a single falling head test result**, should the proposal to maintain a one metre unsaturated zone at the base of infiltration structures be successfully argued against.

The application of the infiltration rate data in the hydraulic calculations is of some concern, in addition to questions over its suitability. The rate was originally applied across the full depth of the proposed deep-bore soakaways, however the most recently submitted calculations show a variation by depth. It is not clear how this was calculated as there is no evidence for additional testing. A safety factor of 2 is applied to the infiltration rate, however it is not clear whether this should be 10 due to the effects of failure on the railway line to the south. The only consideration given to the railway line is the offset distance due to potential dissolution of the chalk, and further input from Network Rail may be necessary to ascertain the risk of failure of the drainage system as their expectation will be that the surface water system will work as stated in the application. The EA surface water flood risk mapping shows that there is an elevated flood risk in this corner of the site and that the railway line is at a lower level and also susceptible to surface water flooding. **The LLFA requires that the infiltration rate used in the hydraulic calculations is representative of actual conditions on-site and risks off-site.**

No evidence has been provided to show that the drainage network in its entirety will not flood during the 1 in 30 year event. Attenuation storage has been provided for the 1 in 100 year event plus an allowance for climate change, however the LLFA requires further evidence of suitable infiltration rates to be certain of suitable half-drain times for all storm events. **The LLFA requires network calculations to show that flooding does not occur for the 1 in 30 year event and revised calculations showing suitable half-drain times.**

The LLFA has experience of a development site proposing deep-bore soakaways (13/00720/MAJOR, 17/01017/FUL – Surface Water Drainage: Additional Information for LLFA [Martin J Harvey, March 2018], Hart DC), where more representative infiltration testing was undertaken than for this site and with lower groundwater levels, however the drainage system failed because infiltration rates after construction had been completed were found to be an order of magnitude lower than those encountered during ground investigations. Despite the design relying on data from falling head tests at varying depths including in saturated and unsaturated ground, chambers in the completed drainage system were found to be full of water long after any rainfall, and the surface water drainage system required additional elements including overflows to attenuation storage and pumps discharging to a watercourse to rectify the situation.

Therefore, the LLFA ultimately requests that a surface water drainage strategy is submitted that follows the hierarchy for sustainable drainage discharge

locations. Note that the existing evidence available to the LLFA excludes infiltration to ground as an option, and the only likely acceptable solution is a pumped discharge to a surface water sewer with the relevant safeguards and permissions in place. As no consideration of an alternative workable surface water drainage strategy has been submitted, **the LLFA maintains its holding objection as the site cannot be shown to effectively drain sufficiently** at this outline application stage.

Note: Should infiltration be successfully argued as a suitable surface water drainage strategy for this site against the advice of the LLFA, the LLFA would require further evidence of a suitable infiltration strategy as detailed above.

Note: The Environment Agency have been consulted and agreed to details in relation to the protection of groundwater. The LLFA is responsible for checking the suitability of the proposals with regards to the technical viability of the design and the quantity of surface water runoff to be disposed of.

This response has been provided using the best knowledge and information submitted by the applicant as part of the planning application at the time of responding and is reliant on the accuracy of that information.

Yours faithfully,

A handwritten signature in black ink, appearing to read 'T. Callaway', with a stylized flourish at the end.

Thomas Callaway
Flood and Water Management Engineer