

Our ref. 1444_TN_200808_AffinityWater

8th August 2022

Attn. Affinity Water Catchment Officer and Welwyn Hatfield Planning

Re. Beales Hotel. Comet Way, Hatfield, AL10 9NG (planning ref. 6/2022/1355/MAJ) – Response to Affinity Water Comments on bromate contamination dated 14th July 2022

1 Introduction

Development description: Demolition of existing building and construction of 145 residential units (Use Class C3) with private and communal amenity space, landscaping, access, associated car and cycle parking, refuse and recycling storage and supporting infrastructure.

Thank you for your comments on the above application with regard the bromate contamination plume in the groundwater underlying the site. This is not something that had come up in the searches at this stage, but we do appreciate the potential significance of the issue.

As discussed below however, we consider that the issues raised may be dealt with through conditioned site investigation and risk assessments (in combination with those already anticipated in relation to other potential contamination issues and engineering designs etc.) rather than outright objection to the development.

2 Review of Ground and Groundwater Conditions

The (BGS mapped) published geology indicates:

- Superficial geology: Lowestoft Fm. diamicton (generally sandy gravelly clay) on-site with Kesgrave Catchment sands and gravels present in the surrounding area. BGS borehole records indicate clays consistent with Lowestoft Fm. to around 4m overlying gravels then further clays at around 16 – 21mbgl.
- Bedrock geology: Lewes Nodular Chalk Formation and Seaford Chalk Formation (undifferentiated). BGS records suggest Chalk below around 18 – 22mbgl.

On the basis of the site history and available BGS borehole data for the near surrounding area, including for the site to the immediate east / north-east the ground conditions at the subject site are very likely to be (approximately) -

- Made ground, over
- Sandy Clay to around 4mbgl (assumed to represent the Lowestoft Fm Diamicton)
- Sands and / or gravels to around 12 - 16mbgl
- Silty clay to around 16 - 21mbgl
- Gravels to 18 - 22mbgl
- Chalk

Groundwater is expected at around 7.5 - 8 mbgl in the upper sand and gravel unit.

Water was also present in gravels and the chalk below the deeper clay layer with water strike observations indicating a degree of confinement of the deeper aquifer.

The superficial deposits are classified as Secondary Undifferentiated (Lowestoft Fm.) or Secondary A aquifers (Kesgrave Catchment); the bedrock chalk is classified as a Principal aquifer.

The site is within a groundwater Source Protection Zone (SPZ) Zone 2 (Outer Catchment)

There is an associated SPZ 1 (Inner Catchment) 372m to the south-east and the nearest groundwater abstraction licenses (including potable abstractions) identified are 937m west.

3 Affinity Water Objection

The Affinity Water objection letter noted that -

You should be aware that the proposed development site is located within an Environment Agency defined groundwater Source Protection Zone (SPZ) corresponding to our Pumping Station (HATF). This is a public water supply, comprising a number of Chalk abstraction boreholes, operated by Affinity Water Ltd. You should also be aware that the proposed development site is located within an area that is impacted by Bromate contamination

We currently object to the application due the potential for deep excavation works to require penetration through the Lowestoft formation creating a pathway between to two aquifers, which must be avoided. The Bromate plume is present in the upper aquifer and connections between the two risk the migration of bromate plume into the Chalk/lower aquifer towards other abstractions.

4 Bromate Plume

From the Environment Agency 'St Leonards Court, Sandridge: groundwater pollution remediation' web page¹, we understand that - The bromate plume originates from a former chemical works site developed to residential housing in the late 1980s at Sandridge around 5km to the west of the subject site – now regulated under Part II A of the EPA 1990. The pollution is managed by scavenger pumping from a closed public water supply well.

From Wyke et al (2013)²

- Bromate was identified in the groundwater water at the Hatfield Pumping Station in 2000.
- Water quality monitoring in 2000 confirmed pollution of the chalk aquifer arising from a former chemical works 5km away at Sandridge where bromine-based chemicals were manufactures from 1955 – 1980.
- Abstraction at the Hatfield Pumping Station acts to intercept some of the bromate released into the aquifer from the source site that would otherwise lead to contamination of water sources further downstream.

¹ www.gov.uk/government/consultations/st-leonards-court-sandridge-groundwater-pollution-remediation

²

www.researchgate.net/publication/308076153_Bromate_contamination_of_the_Hertfordshire_chalk_aquifer_and_how_it_was_remediated

5 Discussion in Relation to Proposed Development

The proposed development comprises of 145 residential units (Use Class C3) with private and communal amenity space, landscaping, access, associated car and cycle parking, refuse and recycling storage. The building will be up to 7 storeys, plus plant room on the roof and with a small area of basement housing building services, and 3 no. lift cores extending below ground level.

We noted in the Phase I report that the basement structures might breach the near surface Lowestoft Fm. sandy clay layer presenting a potential preferential migration route for contaminant into the shallower aquifer – however, note that this was in relation to potential contamination near surface arising from historic uses on site and in the immediate surrounding area. The groundwater is at around 7.5 – 8mbgl however, well below the depth of the basement / lift cores, so the building structure itself would not directly interact with or impact on the groundwater contamination.

Any foundation solution would also penetrate this near surface clay layer and could interact with the shallow groundwater. However, if this is the hydraulic barrier layer referred to in the Affinity Water objection (noting *“the potential for deep excavation works to require penetration through the Lowestoft formation creating a pathway between to two aquifers, which must be avoided”*) then penetration of this layer will not lead to connection of the various aquifer bodies as it is present above the groundwater levels.

The deeper silty clay layer identified could form such a layer, however. On the neighbouring site a BGS borehole identified stiff silty clay with some - occasional gravel from 11.7mbgl - 16.5mbgl. This would potentially form a significant hydraulic barrier between the shallow aquifer body and the gravel and chalk below the clay layer. Groundwater strike observations do suggest this is the case – in BGS borehole ref. TL20NW494 (total depth 21.7mbgl) a water strike was recorded 16.5m rising to 11.8mbgl after 20 minutes indicating some degree of confinement of the groundwater below the clay.

It is noted that a piled foundation solution would penetrate the shallow aquifer and potentially be required to penetrate into the deeper gravels and possibly the chalk below. However, importantly it is also noted that CFA piles (the most likely piling method for the site) tend to seal into the host soils and prevent groundwater movement up or down the pile (i.e. minimises or prevents any preferential pathway). Environment Agency guidance³ indicates that well-constructed CFA piles should seal adequately in a clay layer of 2-pile diameters or more. The clay layer in this case is likely to be around 5m thick (note that, given the BGS borehole data is from the adjacent site there is a reasonable degree of certainty that the ground conditions identified will be representative of the subject site), well in excess of 2x any reasonable pile diameter. On this basis a piled foundation solution would not be likely to connect the upper and lower aquifer bodies.

It is noted that there are numerous existing developments in the surrounding area likely to be on piled foundations and that that the proposed development would be unlikely to exacerbate any existing issues or significantly affect the groundwater flow regime, particularly in relation to the Hatfield Pumping Station. The pumping station is around 940m to the south-east and the subject site not in the associated SPZ I; but rather in the SPZ II zone and around 370m from the SPZ I.

³ Environment Agency, Piling in layered ground: risks to groundwater and archaeology, Science Report SC020074/SR, Environment Agency 2006; and Environment Agency, Piling in layered ground: risks to groundwater and archaeology – Summary SC020074/SR, ref. SCHO0906BLLU-E-P, Environment Agency 2006

6 Conclusions

It is noted that the bromate plume must be fully considered within the conceptual site model for the site and any on-going site investigation works and risk assessments

On the basis of the available data however it is considered that the development is unlikely to have a significant impact on the groundwater quality in the area or on the groundwater flow regime in the region of the Hatfield Pumping Station – but it is further acknowledged that this must be confirmed through site investigation before any foundation solution is finalised.

It is suggested that this site investigation (along with any investigations relating to on-site / near site potential contamination sources arising from former activities on or near the site) may be conditioned in the planning decision (as opposed to being required pre-approval assuming the site is acceptable on other planning grounds).

We do also note that similar investigations and risk assessment with respect the bromate plume were conditioned on a similar development site around 250m north of the subject site – planning ref. 6/2020/3222/MAJ.⁴

We further note that the Environmental Health Officer has indicated that the site investigations recommended by the Phase I report should be conditioned with in any planning decision.⁵

I hope this addresses to a sufficient degree the concerns raised. If there are any queries or if there is anything else to add please don't hesitate to contact me.

Regards

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⁴ Demolition of existing buildings and construction of new building comprising 118 residential apartments, layout of parking areas, landscaping, electricity substation and ancillary development at Former Volkswagen Van Centre Comet Way Hatfield AL10 9TF – also up to 7 storeys.

⁵ Planning Consultation Memo - 6/2022/1355/MAJ, Environmental Health Officer, 13/07/2022.