

My objections:

- That the planning application has not considered NPF rules on **Ground conditions and pollution** in paragraph 178:
- The applicant has not supplied adequate information to demonstrate that the risks posed to groundwater can be satisfactorily managed.
- That the application does not address vertical movement of groundwater into the underlying principle aquifer, thereby influencing movement and cross contamination of the aquifers.

EA objection.

We anticipate that the aspects of the proposal that could potentially mobilise shallow contamination and/or affect the groundwater are:

- *construction activities (including foundations/piling/services),*
- *infiltration drainage of surface water from roofs and areas of impermeable hard standing,*
- *sewerage,*

interference with groundwater monitoring and mitigation measures for adjacent/overlapping sites.

- that there is no mention of “adjacent/overlapping sites” such as the proposed Brett quarry to the East. Attenuation lakes practically touch Infiltration lagoons in a specific area - a catalyst for cross-contamination ...see fig 3.

“Boulder clay in the area has a mean thickness of 4.3 m, ranging in thickness from 0.9 m in 20 NW 17 to 8.8 m in 20 NW16.” *Institute of Geological Science. Mineral Assessment report 67. J.R. Gozzard.*

- that the interburden (clay barrier) is the only protection of the primary and secondary aquifers. The clay interburden thickness is cyclic in nature and does not give adequate protection to the underlying primary aquifer.

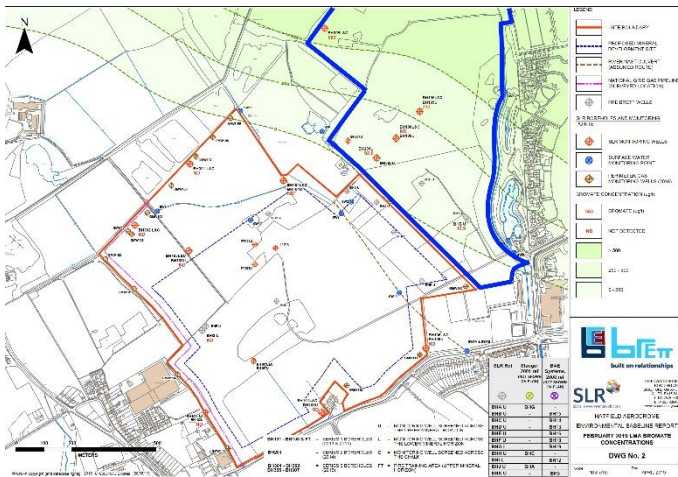
My objection is that a thorough investigation of the site has not been achieved:

- Insufficient boreholes sunk to determine the depth & thickness of the interburden and the depth of chalk aquifer – only three boreholes CP001/3/2 are sunk to a depth of 6 m, 12.5 m, 14.5 m below ground level. These boreholes are of insufficient depth to monitor bromate & bromide. The two Environment Agency boreholes 80163A05 & 80163A23 are located on the west side of Ellenbrook Fields, the bromate levels are extremely high at 808 & 1020 µg/l recorded in 2017.
- Test samples for bromate & bromide have not been sampled at all geological strata levels. The plume has not been analysed correctly due to insufficient depth, and a laboratory measurement problems below 100µg/l of bromate.

- A conceptual map has not been drawn up of the plume of contamination across the whole site.
- Lack of clarity about the contamination plume under the site – none of the documents show the extent and mapping of the plume. The first document Statement on ground conditions Hydrology & Contamination published in 2018 did not mention **bromate** in or under the site.

Baynham Meikle & RSK Environment Ltd.

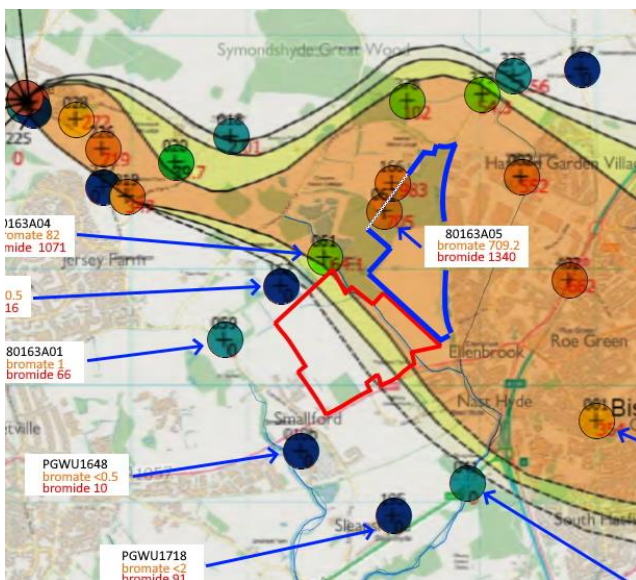
The latest plume drawing from Hatfield Quarry Application. Over 500µg/l (green) in the North where the planned housing would be:



This map was produced for the quarry application and shows the bromate contours under the housing site (dark green). The blue shows the southern part of the housing application.

Fig 1

EA plume drawing showing boreholes and housing applicant site. Borehole 80163A05 @ 709.2µg/l bromate is to the West of the housing site.



The EA map is expanded from Part 2A of Environmental Protection Act 1990 St Leonards Court document showing greater than 50µg/l bromate in light red. The site is in the middle of the plume.

To the South is the Brett quarry application in red outline.

Fig 2

The site chosen for housing is the most polluted in Hertfordshire, and in direct line for remedial work at Bishops Rise pumping station. Any change in the direction or mobility of the plume could impact on water supplies at Essendon and Roestock. This is why it is important to avoid interference to the chalk aquifer by industrial action such as digging, piling and flooding the secondary aquifers.

Flooding

Currently the site is covered with grassland and as such a significant amount of rainfall will infiltrate into the ground with runoff likely to be as little as 10%.

Assuming that the geology is relatively consistent across the site the effective rainfall is likely to be relatively uniform across all areas of the site.

With any proposed development where areas of hardstanding and buildings are introduced it is inevitable that this will affect the infiltration characteristics of the site with surface runoff rates increasing significantly in some areas (up to 80% or so).

The management of surface water runoff from buildings and hardstanding typically involves channelling of the water to attenuation features such as basins and soakaways sometimes utilising deeper borehole soakaways into permeable aquifers.

It is recommended that a **conceptual understanding** of the area of the attenuation basins be developed following an investigation of the ground and hydrogeological conditions in their vicinity.

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- The objection is this “conceptual understanding” has not been accomplished before the planning application.
- Groundwater from a mixed housing site is shown to be removed from the site by a mixture of swales and attenuation lakes. These ponds and lakes are situated in the south of the site where it is believed the underlying plume of contamination is lower. The objection is that lateral flooding due to these lakes overflowing will impact on housing, university, and A1057 roads to the south of the application site.

“A review of the potential **cumulative effect** on the water environment considering known projects in the vicinity.”

13. Water resources flood risk & drainage

- The cumulative effect of attenuation lakes in the South and Brett quarry infiltration lagoons in the same area was not taken into consideration Fig 3.

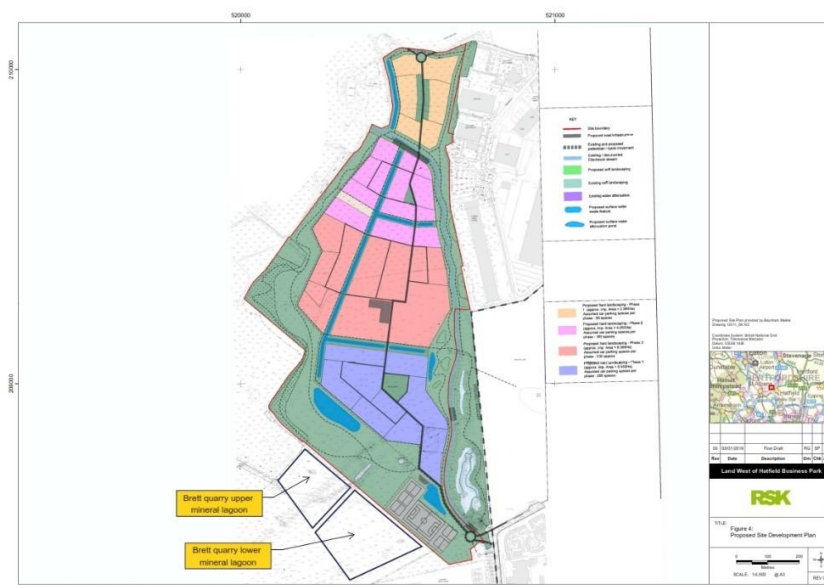


Fig 3

Fig 3 shows proposed Brett quarry lagoons in the South. The expected infiltration rate of UML is 1,100 to 2,300 cubic metres/day directly into the same ground that the attenuations ponds (blue) would add another 1000 to 2500 cubic metres/day.

These totals double the groundwater amount, which is now focused on a specific area potentially leading to flooding downstream of the combined sites.

7.7 Infiltration drainage

Infiltration from surface through to the underlying aquifer, specifically the contaminated groundwater present within the granular Lowestoft Formation are considered to be a significant risk presented by the potential development of the site. It is understood that while the bromate and bromide contamination within the underlying aquifer has not originated on site, its concentration within groundwater is directly affected by disturbance and increased flow. As such the development has the **potential to concentrate flows** of water to specific areas of the site such as the attenuation basins. Water would then drain through these at a significantly high rate causing increased mobility of the contamination present.

- The objection is that the “development has the potential to concentrate flow” and “causing increased mobility of the contamination present” that is bromate and bromide.

Permeability

Based upon the results of the soakaway tests undertaken, all of which returned noncalculable results due to the **slow rate** of infiltration, the ground conditions appear do not appear to be sufficiently permeable to allow for **rapid infiltration** of surface water into the ground. It should be noted that soakaways conducted in TP055, 056 and 059 were undertaken within the footprint of the proposed attenuation features for the site. This is supported by the laboratory permeability tests undertaken on three samples of cohesive Lowestoft Formation soils which revealed laboratory permeabilities of between $3.3 \times 10^{-11} \text{m/s}$ and $2.1 \times 10^{-10} \text{m/s}$.

“therefore vertical migration or leaching is unlikely. Instead, **lateral migration** from the attenuation ponds into nearby surface water features is probable. Reducing the risk of groundwater influx into the chalk aquifer which enable mobilisation of the bromate plume”.

RSK phase 1 Desk Study

- The objection is that the soakaway is extremely slow and attenuation lakes will not allow rapid infiltration of the groundwater. An overwhelming lateral migration of groundwater may lead to a potential flooding regime.

Gas on site

Due to the various infilled ponds and infilled ground on site and the neighbouring landfills to the south west and west, there is a fairly significant source of ground gas to the site.

- The objection is that “migration and potential accumulation of ground gases, creating explosive or asphyxiating atmospheres” has been found on the site caused by infill material at quarry works near to the west of the site – The CEMEX quarry.

Piling

Given the presence of a contamination plume within the underlying groundwater, into which piles are likely to penetrate, some piling techniques may not be considered acceptable. Additionally, care needs to be taken to prevent preferential pathways to be formed between the surface and the groundwater beneath the site.

- The objection is that piling is a high-risk activity and inclusion into the Lowestoft Formation could open vertical pathways into the lower aquifer allowing migration of groundwater.

EA remedial plan for the area

ST LEONARD'S COURT
DECISION DOCUMENT
PART 1
Environment Agency
July 2019

130. Report D at paragraph 2.7 included a further array close to Hatfield Quarry, known as Group 2 and shown in Figure 1 of the report. This location has the advantage of boreholes forming an arc across much of the width of the plumes. The Agency accepts that there may be practical difficulties such as the current distance to a suitable sewerage system. Hatfield Quarry has many advantages, including land availability and current groundwater abstractions which may provide information on aquifer properties in the vicinity (ref).

- The objection is that the EA remedial plan using an array of boreholes, perpendicular to the plume and at its highest bromate levels, would require an area to operate that is clear of obstacles and housing.

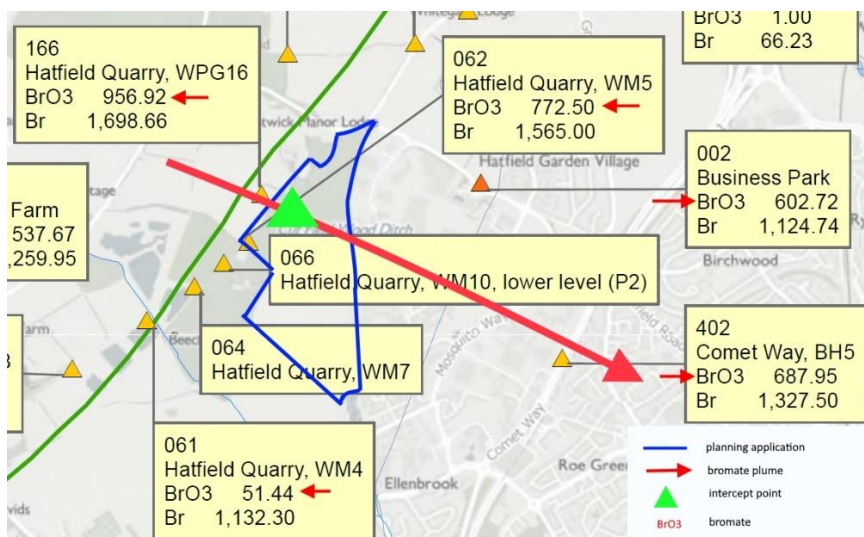


Fig 4

The intercept point is shown in green. The plume has a S.E direction.

Mike Hartung

Ellenbrook Lane

7/1/2021