
Subject Land at former Hatfield Aerodrome

Date 8 November 2021

Job No/Ref APP/M1900/W/21/32
78097

Updated opinion of Jenny Lightfoot (HCC Hydrogeology)

I have been instructed by Hertfordshire County Council (HCC) to provide an objective expert opinion on the proposed quarry operations at Hatfield Aerodrome off Hatfield Road, and specifically the possible implications associated with the extensive existing plume of groundwater contaminated with bromate and bromide present to the north of the quarry site. On instruction I scrutinised the relevant information on the proposed development, supporting assessments and stakeholder responses on the HCC planning portal and had a series of expert-to-expert meetings with the EA, Affinity Water, Dr Michael Rivett and SLR.

In my proof of evidence (dated 19th October 2021) I identified the following residual concerns and data gaps (summarised from my proof):

1. If the quarry requires LMH pumping, the assessments presented were considered inadequate to demonstrate that the impacts of LMH pumping can be effectively managed.
2. If the quarry requires LMH pumping, the contingency actions presented were considered inadequate.
3. The additional assessments and monitoring and contingency actions to be implemented at the request of Affinity Water had not been shared and therefore I was unable to assess for myself the adequacy of the proposal to protect public water supply.
4. The EA-recommended planning conditions were unclear in part.

The SLR January 2020 GWMP identified a potential pumping rate of 2,500–4,500m³/d (GWMP Table 3-2) and the LMH pumping rate is not specifically limited in the abstraction licence. I identified this as a key concern as this pumping rate may be sufficiently high to potentially affect the plume.

Subsequent to sharing my proof additional clarifications have been provided that address my residual concerns as discussed below.

Pumping regime and potential plume impact

At a meeting on 29th October 2021, SLR described their assessment of the seasonal variation in groundwater levels across the proposed quarry phases in relation to base of the interburden – this is the key factor in determining whether pumping is necessary to remove the interburden. This is summarised in Table 1 of the SoCG. For all phases except phase G there is a sufficiently long period each year when groundwater levels are low enough for quarry operation without requiring pumping. Phase G is different due to the relative gradient on the base of the interburden and LMH groundwater level, resulting in more confined conditions in phase G than other phases. For phase G SLR anticipate the need for some pumping to extend the seasonal operating window.

SLR also presented the findings of a pumping test undertaken in 2018 and submitted as part of the abstraction licence application process (SLR Pumping Test Assessment Report, Sep 2018). The pumping test data has been analysed by SLR to assess the LMA response to pumping, including

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hydraulic parameters, extent of influence of pumping and continuity between the LMA and chalk aquifer. SLR has used this data in assessing phase G pumping.

No LMH pumping in phases A to F is now proposed and all these phases forming the eastern part of the quarry closest to the plume will be completed without LMH pumping. Backfill in phases A to F with lower permeability material will also form a partial barrier on the plume side of the quarrying operations.

SLR has assessed the phase G pumping configuration, rate and duration as follows: pumping will not exceed 900 cubic metres per day, with pumping on 1 to 2 days per week for up to 20 weeks per annum. SLR note the quarry will stop pumping if monitored water levels in lower mineral horizon are at or below 68mAOD. SLR estimate that phase G will commence in Year 24 of quarry operation so there will be many years of quarry groundwater monitoring data available to inform the phase-specific water monitoring and management plan is produced for phase G.

HATF pumping and Affinity Water

At my meeting with SLR on 29th October 2021, SLR also presented their analysis of monitoring well water level data in response to pumping at HATF. The data shows LMA monitoring wells located closer to HATF (on the eastern boundary of the proposed quarry) show greater relative drawdown characteristics than those further away from HATF and that all the quarry monitoring wells are influenced by HATF pumping and are therefore within the HATF catchment. This is summarised in the SoCG Figure 8. In periods when HATF has pumped at much higher rates than the current stable pumping rate the southern plume boundary has been shown not to move onto the proposed quarry. I consider this to be strong evidence that the plume is controlled by HATF and I have identified no foreseeable scenarios that will result in plume movement across the quarry site.

Monitoring, control levels and contingency actions

I have discussed with SLR (on 29th October and 3rd November) the monitoring, control levels and hierarchy of contingency actions that will be implemented at the proposed quarry. A phase-specific water monitoring and management plan will be produced in advance of each phase of working, informed by available monitoring data at the time. Monitoring will include automatic level logging devices with real time telemetry at selected monitoring wells and data sharing with stakeholders. In addition to bromate/bromide groundwater quality control levels, a groundwater level control is proposed in a monitoring well southwest of the quarry. It is understood this groundwater level control and data provision is included at the request of Affinity Water. This control level will be related to lowest recorded groundwater level (when movement of the plume to the south is most likely). In response to an exceedance of a control level a hierarchy of contingency actions is proposed by SLR (see SoCG Section 6.4). I consider the proposed monitoring, control levels and contingency actions to be sufficiently robust.

EA planning conditions

The EA has requested planning conditions to require an updated phase-specific water monitoring and management plan to be agreed in advance of each phase of working. The previously proposed EA planning conditions have been revised into three conditions (see SoCG). I consider the revised conditions to have addressed the concerns I raised in my proof in relation to clarity of the EA conditions.

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Conclusions

Since submission of my proof I have had detailed dialogue with SLR in relation to the residual concerns and data gaps I identified in my proof.

On the basis that there will be no pumping from the LMH in phases A to F and the limited proposed rates and durations of pumping from the LMH in phase G, most distant from the plume, I do not expect any impact on the plume associated with the quarry LMH pumping. I consider the proposed monitoring plan to be sufficiently robust to provide early warning in the unlikely event of any hydrogeological changes that have implications for the bromate plume and the proposed contingency actions are considered the appropriate response.

Subject to an additional suitably worded planning condition that prevents LMH pumping in phases A to F and limits pumping in Phase G (draft below), I am satisfied the proposed quarry can be developed without unacceptable risk to groundwater resources and public water supply.

Draft LMH pumping planning condition

- A. No pumping from the lower mineral horizon is permitted within any part of the mineral working with the exception of Phase G, and only then in accordance with the parameters set out in Condition B.
- B. Pumping from the lower mineral horizon is only permitted within Phase G, and shall not exceed 900 cubic metres per day for not more than 2 days in any calendar week, and shall not exceed 20 weeks/annum in any calendar year and pumped water level shall not be lower than 68mAOD.
- C. Prior to the commencement of any mineral extraction within each phase of the development [as shown on plan] a water monitoring and management plan for that phase shall be submitted and approved in writing by the Mineral Planning Authority. The Plan shall identify control levels that, if exceeded, trigger a hierarchy of contingency actions defined in the plan, including:
- i. a groundwater level control level at BH102LMA; and
 - ii. monitoring well-specific bromate and bromide control levels derived from baseline data.
- D. If any water is pumped as provided for in condition B, then a record shall be kept of when the pumping took place and the quantities of water pumped. The record of pumping and monitoring data and interpretation shall be provided quarterly to the local planning authority.