

Water-supply boreholes in Bengo Field preclude safe quarrying

In March 2017, “serious concerns” about the threat presented by proposed quarrying to the water-supply boreholes in Bengo Field were recorded by Hertfordshire County Council (HCC). An informative note to this effect accompanied the Decision Notice in which HCC refused permission to quarry that field.

I write concerning the geological evidence of this threat to water-supply boreholes. I comment as a geologist, based at the University of Cambridge. Previously I was with BP Exploration. I’m also adviser to the mining company BHP Billiton.

I was recently President of the Geological Society, the learned and professional body responsible for awarding chartered status to geologists. Chartered geologists apply their science to getting from rocks the resources we need, by mining, pumping and quarrying. Those resources include gravel, sand - and water. As a chartered geologist myself, I rather like quarries - but not this one.

In the field it’s proposed to quarry, sand and gravel lie on top of chalk. The chalk is the vital aquifer for the water-supply grid serving Hertford and other communities.

Six million litres of water a day come into that grid from the Wadesmill Road boreholes that lie at the edge of the very field it is proposed to quarry. All parties involved in the current proposal recognise the risk of pollution reaching these boreholes as a result of the proposed quarrying.

The specific geological nature of this risk is identified in the report from the applicants’ own consultants, Hafren Water. This risk is described in detail in the hydrogeological report on the area commissioned from Ove Arup by McMullen and Sons Ltd in 1992. The author of the 1992 report is K J Edworthy, CGeol, an expert on the chalk aquifer. His document provides independent confirmation of the risk to the Wadesmill Road boreholes. The implacable nature of that threat to Hertford’s water supply was identified to Hertford County Council in 1990 by Lee Valley Water Company, then operator of the Wadesmill Road boreholes.

The problem with the chalk aquifer is simply this: very quick pollution, very slow decontamination. Fractures in the chalk aquifer mean that any pollution can reach the Wadesmill Road boreholes rapidly. But clearing pollution from the small pores within the body of chalk rock is a lengthy and costly business.

By the time any pollution is detected, lasting damage may well have been done to Hertford’s aquifer. Monitoring of pollution as it takes place is not the main issue: pollution must be prevented from the word go.

Assessment of risk of pollution requires a detailed map of the buried chalk surface. Significantly, an uneven surface on the chalk aquifer has recently been recognised as a valid concern by the Environment Agency (e-mail from Simon Hawkins to Bryan Lovell, 20 September 2017). Assessment of risk of pollution also requires a survey of the size and orientation of fractures within the chalk aquifer.

We do not have this information. From studies in the area in which I have been involved in recent years, I would expect a survey in Bengo Field to show at least some roughness at top-chalk, rather than the smooth surface assumed in the report from Hafren Water that is presented in the current application to quarry. Indeed, the top-chalk surface may have so much relief that the protective measures proposed by the applicants cannot be implemented.

Mapping of top-chalk is feasible, but adequate survey of the fractures within the chalk aquifer is problematical. In this matter I draw on the advice of Dr Adrian Butler of Imperial College, Chairman of the Hydrogeological Group of the Geological Society.

To quarry safely, the operator would need to first establish the location in the subsurface of the feeder system for the high-inflow zone at 41-44 metres subsurface in the twin Wadesmill Road boreholes. It appears unlikely that the feeder system can be mapped with sufficient confidence, potentially ruling out any prospect of safe quarrying in Bengo Field.

Without this information on relief on top-chalk, and on the fractures in the aquifer, it is not possible to decide whether quarrying in this field is a feasible project, let alone give authority to begin operations.

On broader geological grounds, why are we even considering digging up this field? What resource lies there that is so valuable we might be justified in threatening our water supply? Especially when that threat continues once quarrying has finished?

The answer is that there is no local or national need for this particular sand and gravel. During the ten years of production proposed in the original application, only one thousandth part of UK onshore supply of aggregate would come from Bengo.

You wouldn't drill boreholes in the chalk at the edge of a working quarry to supply a town with water. So don't put a quarry by these boreholes. Given the boreholes are there, it is hard for a geologist to imagine a much worse site for a quarry.

This appeal against the refusal by Hertford County Council in March 2017 of permission to quarry, should be turned down. Both the original application to quarry, and a subsequent resubmission, fail to address the issues I raise here. Specifically, the chalk has not been mapped in anything like enough detail to assess adequately the risk of pollution of the aquifer.

That pollution could affect boreholes beyond Bengo Field. This includes boreholes in Hertford itself that are not the responsibility of Affinity Water, operator of the Wadesmill Road pumping station in Bengo Field.

Those boreholes on the Wadesmill Road were drilled in 1936, at the edge of a field. For 81 years the leaders of our community have had the good sense to leave that field undisturbed. We should continue to leave that field to the skylarks.

Dr Bryan Lovell, OBE, CGeol

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