

APP/21/00893 (Land north of Long Copse Lane, Emsworth) objection.



07/12/2022

Commenter type: Complainant

Stance: Object

Comment

Natural England (NE) released updated guidance for nutrient neutrality in February 2022 (ref. [1]). They also produced a consultee response to APP/21/00893 in June 2022 (ref. [2]), saying that L&P's shadow HRA should detail the proposed timing of the building works at site H8 to ensure that appropriate mitigation will be in place in advance of any potential effects from the development i.e. in advance of dwelling occupation. This is to ensure that planners take nitrate travel time through groundwater into account. L&P produced amended versions of their shadow HRA (refs. [3] and [4]) in October 2022, and NE responded to these in November 2022 (ref. 5). This is an updated objection produced in response to these new documents.

According to L&P, the proposed mitigation site at Horsepasture Farm “comprises a combination of Soilscape 18 (Slowly permeable seasonally wet slightly acid but base-rich loamy and clayey soils which have impeded drainage and drain to stream network) and Soilscape 6 (Freely draining slightly acidic loamy soils which drain to groundwater and rivers)” (ref. [3]). L&P say that “It does not contain (for example) Soilscape 3 (Shallow lime-rich soils over chalk or limestone which drain to chalk or limestone groundwater). There is therefore no potential risk of a significant temporal lag between mitigation and the effects of development.”

In ref. [4], L&P introduce a Hydrogeological Conceptual Site Model (HCSM), which models how precipitation falling on the mitigation site is partitioned between surface water and groundwater flows. Using the model, L&P anticipate that “an observed change in nutrient concentrations could be seen within a year”.

Would that it were that simple. There is a large amount of scientific literature arguing against this.

Ref. [6], based partly on a study on the South Downs, says that “One known problem with catchment level solutions for nitrate is the lead time for seeing nitrate reductions in raw water due to the time of travel through groundwater”..... “Recovery times for groundwater can be long, potentially up to 40 years, so over the lifetime of the Local Plan (up to 2036) some reductions in nitrates would be expected but they would be relatively small (circa 10%)”.

Ref. [7] says depth to groundwater (i.e. the depth of the unsaturated soil zone beneath the site's surface) is the most significant parameter affecting nitrate concentration in groundwater, with soil type being a secondary parameter.

In ref. [4] L&P state that, at the nearest borehole logs, at Horsepasture Farm and Woodberry Cottage, the mean groundwater level is 15 m. The mean surface elevations of the Northern, Central and Eastern areas of the mitigation site are 46 m, 42 m and 32 m respectively. So the mean depths to groundwater in these 3 areas are 31 m, 27 m and 17 m respectively.

Ref. [8] measured nitrate concentration dynamics in the unsaturated zone beneath a fertilized crop field as a function of time and depth. Good agreement was found between observed nitrate concentrations and those simulated using a quantitative nitrate transport model. The study had a depth to groundwater of 18 m, similar to that of the Eastern area of the mitigation site and less than the Northern and Central areas. The authors found that it took 6 years for nitrogen to pass out through groundwater after agriculture on land above had ceased. Their study was on sandy soil. With the loamy/clayey soil present at the mitigation site, the time would be longer.

Regarding L&P's HCSM model (ref. [4]), it is important to note that this only models water flow in a qualitative sense. It is not a computer-based quantitative model. Furthermore, the model knows nothing about nutrients at all. In particular, it does not model nitrate concentration dynamics in the unsaturated soil layer above the groundwater. Therefore, when L&P conclude that "an observed change in nutrient concentrations could be seen within a year", they can't actually say whether the change might be 1%, 10% or 100%.

As a result, we object to L&P's simplistic estimate that there would be no significant temporal lag between mitigation and the effects of development. We believe that the actual time for nitrates to pass out through groundwater would be in excess of 6 years (ref. [8]) and could be significantly longer (order of decades) (ref. [6]).

We also object to NE's response to L&P's estimate. NE seems simply to have accepted that what L&P say is true without examining their reasoning. As the scientific body responsible for introducing the temporal delay rule, which requires computer modelling, NE should have properly assessed L&P's estimate and judged if it was reasonable or not. This they have failed to do, and instead have abrogated their responsibility to HBC as the Competent Authority. It is unreasonable to expect HBC to make a judgment on a scientific issue such as this unless NE provides it with sensible advice or the modelling tools to allow the Council to make the necessary calculations.

As a precursor to a decision regarding APP/21/00893, it would seem reasonable to request that the hydrogeological systems at the mitigation site be properly modelled to provide more accurate estimates of nitrate travel times. The type of modelling required is described in ref. [8], and depends on site-specific parameters such as depth to groundwater, initial nitrate concentration, pore-water velocity and nitrate retardation. Where possible the modelling should be validated by monitoring.

References

1. Nutrient Neutrality Generic Methodology. Natural England. February 2022.

2. APP_21_000893-CONSULTEE_RESPONSE_-_NATURAL_ENGLAND_1671886.pdf, NE, June 2022.
3. APP_21_00893-AMENDED_-_REPLACEMENT_SHADOW_HRA_APPENDIX_4-1711472.pdf, Tetra-Tech, October 2022.
4. APP_21_00893_REPLACEMENT_SHADOW_HRA_APPENDIX_4B_-_HYDROGEOLOGICAL_APPRAISAL_OF_LAND__PROPOSE -1711450.pdf, H2Ogeo, September 2022.
5. APP_21_00893-CONSULTEE_COMMENTS_NATURAL_ENGLAND-1720727.pdf, NE, November 2022.
6. Chichester District Council Water Quality Assessment. Amec Foster Wheeler. 2018.
7. Lockhart et al 2013. Identifying sources of groundwater nitrate contamination. J. Contaminant Hydrology, 151, 140-154.
8. Turkeltaub et al. 2016. Real-time monitoring of nitrate in the deep vadose zone under a crop field - implications for groundwater protection. Hydrol. Earth Syst. Sci., 20, 3099-3108.