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Ref: 15-280-L6-1

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EHO RESPONSE LETTER – GAS CUT-OFF BARRIER SPECIFICATION CHERRYFIELD DRIVE, KIRKBY

Following a review of the proposed Gas Cut-Off Barrier Specification at Cherryfield Drive, Kirkby (E3P Ref: 15-280-L4-2, April 2026) by Knowsley Metropolitan Borough Council (KMBC) and their contaminated land consultant, MEAS, E3P understands that KMBC/MEAS have raised a number of queries in relation to the proposed specification which require a response/additional information.

As such, E3P have prepared a formal response to KMBC/MEAS's queries:

1. **KMBC/MEAS** – Please provide justification for the proposed permeability.

E3P response – This was reported in error and should actually be 1×10^{-9} m/s.

2. **KMBC/MEAS** – Is a membrane to be incorporated as well?

E3P response – A membrane is not currently proposed to be incorporated into the design.

The initial design was for the installation of a granular ventilation trench with a membrane lined granular filled trench and vent pipes. However, following consultation with the NHBC, they expressed a preference not to adopt an active gas ventilation trench as a form of gas mitigation, due to potential long-term maintenance considerations over the lifespan of the development (i.e. damage to membrane and clogging up of granular fill).

It was therefore proposed to install a gas cut-off barrier as part of the general earthworks, with the wholesale removal of hazardous gassing materials from within the northern site boundary and replace them with impermeable cohesive deposits forming a 25m "impermeable wall", whilst along the western boundary, a 2m wide gas barrier trench (comprising the same impermeable cohesive deposits as the northern boundary) would be installed via trench box installation methods.

3. **KMBC/MEAS** – Is the placement of an impermeable barrier likely to impact groundwater levels and flow and if so, what are the implications?

E3P response – The site currently comprises of soft standing and is underlain by a mixture of glacial clay, Shirley Hill Sand, and sandstone bedrock.

The groundwater regime at the site is interpreted to comprise localised discontinuous perched groundwater within the Made Ground / fill materials, rather than a laterally continuous regional groundwater table within the underlying natural superficial deposits.





This interpretation is supported by observed seasonal variability during intrusive works. During trial pitting undertaken in May 2025, following a prolonged dry period, the deeper Made Ground/fill was observed to be dry. In contrast, during remedial works undertaken in Q1 2026, following an extended wet winter period, perched groundwater was encountered at approximately 2–3 m bgl within the fill materials. This indicates that groundwater levels are predominantly influenced by seasonal infiltration of surface water and rainfall recharge, rather than sustained groundwater flow through the underlying strata.

The topography of the locality based on the current OS map indicates that the direction of local shallow perched groundwater flow is likely to be towards the southwest, in the direction of the off-site landfill and Kirkby Brook. The proposed gas cut-off barrier will intercept the Made Ground/Landfill horizon and be keyed into the underlying natural superficial deposits. While this may locally alter shallow perched groundwater movement and temporarily redirect flow laterally around the barrier, it is not expected to impound a significant groundwater body or create a flooding risk. It is also noted that the development drainage will largely intercept surface water and rainfall infiltration, thus nullifying the presence of shallow perched groundwater.

The British Geological Survey Hydrogeological 'Map of Clwyd and the Cheshire Basin' (1:100,000, dated 1989) indicates the potentiometric surface of the Sherwood Sandstone Group underlying the site is between +10 and +20 m AOD (ground surface of site is between approximately 16 and 28 m AOD). Based on the potentiometric surface contours on this map, the direction of regional (deep) groundwater flow in the Sherwood Sandstone aquifer is considered to be towards the south in the direction of a regional cone of depression associated with a Public Supply Pumping Station. Regional groundwater within the bedrock is therefore unlikely to be affected by the gas cut-off barrier

In relation to foundations/infrastructure and their interactions with groundwater, plot foundations and infrastructure are to be installed alongside the gas cut-off barrier, so groundwater is unlikely to be affected until after completion of the cut-off barrier.

It is also noted that these works are to be undertaken during the summer months where shallow perched groundwater is likely to deepen (due to it being fed by surface water and rainwater infiltration). No sustained groundwater regime is anticipated within the proposed founding depths; as such, groundwater is not expected to materially influence foundation performance, VSC installation, or associated infrastructure. This will remain subject to confirmation during detailed design and construction-phase verification.

It is noted that the majority of plots on-site are proposed to utilise a VSC foundation solution, with exception to those plots located along the northern and western boundaries; these plots will utilise a driven pile foundation solution in order to prevent creating a preferential gas pathway (via VSC granular columns).

We trust this information is satisfactory to your requirements, and should we be able to be of any further assistance, please do not hesitate to contact us.

Yours sincerely,
For and on behalf of E3P Ltd

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