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FAO Mr Helen Bradshawe

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29 May 2024

TIER RESPONSE TO KNOWSLEY COUNCIL LETTER DATED 8th MAY 2024 – 24/00145/REM

Dear Helen,

Tier Environmental has produced this letter as a response to the correspondence received from Knowsley Council dated 8th May 2024. In particular to the comments in relation to clarification on proposed ground gas protection measures.

Tier can confirm that the Ground Gas Verification Plan is the overarching document that details the proposed ground gas protection measures for the proposed units. This document supersedes the multiple ground investigation reports produced for the site. Tier also confirms that all proposed units at the site have been classified as a Characteristic 2 Scenario (CS2) in accordance with BS8485. Below a summary of the proposed ground gas protection measures for Unit 03 and Unit 04 has been reproduced.

In accordance with Table 4 of BS8485, a low hazard potential (CS2) would require a points score of 1.5; however, there is a requirement to ensure at least two types of protection measures should be implemented. This is based on a Type D building as defined in Table 3 of the aforementioned British Standard. For the office areas (Type C building), a point score of 2.5 would be required.

For a Characteristic Situation 2 – Low Risk scenario:

A points score of 2.5 (which would satisfy both office and warehouse areas) may be attained thusly:

- Gas resistant membrane which satisfies specification of Table 7 of BS5930:2015, lapped and sealed – **2 points** and;
- Cast in situ ground-bearing floor slab (with only nominal mesh reinforcement)– **0.5 points**.

Or:

- Gas resistant membrane which satisfies specification of Table 7 of BS5930:2015, lapped and sealed – **2 points** and;

- Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations. – **1 or 1.5 points** (To achieve a score of 1.5 the raft or suspended slab should be well reinforced to control cracking and have minimal penetrations).

Or:

- Cast in situ monolithic reinforced ground bearing raft or reinforced cast in situ suspended floor slab with minimal penetrations. – **1 or 1.5 points** (To achieve a score of 1.5 the raft or suspended slab should be well reinforced to control cracking and have minimal penetrations) and;
- Passive sub floor dispersal layer. Very good performance – **2.5 points**. Good Performance - **1.5 points**. Performance criteria for methane and carbon dioxide within passive sub floor dispersal layers are shown in [Figure B.6](#) and [Figure B.7](#), of BS5930:2015, respectively.

The gas resistant membrane should meet the following criteria in order to achieve the necessary 2 points in accordance with Table 7 of BS8485:2015:

- Sufficiently impervious to the gases with a methane gas transmission rate <40.0 ml/day/m²/atm (average) for sheets and joints (tested in accordance with BS ISO 15105-1 manometric method);
- Sufficiently durable to remain serviceable for the anticipated life of the building and duration of gas emissions;
- Sufficiently strong to withstand in-service stresses (e.g. settlement if placed below a floor slab);
- Sufficiently strong to withstand the installation process and following trades until covered (e.g. penetration from steel fibres in fibre reinforced concrete, penetration of reinforcement ties, tearing due to working above it, dropping tools etc);
- Capable, after installation, of providing a complete barrier to the entry of the relevant gas; and
- Verified in accordance with CIRIA C735

It is considered that the combination of gas protection measures specified above would provide a sufficient 3.5 points of protection required in accordance with BS8485:2015.

For and on behalf of

TIER ENVIRONMENTAL LTD

Alex Preston

Principal Geo-Environmental Engineer

Tier Environmental Ltd