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Your ref:

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Dear Dan

Former New Inn, Longsdon, Staffordshire

Further to your recent e-mail correspondence and discussions with Lee Kilcran, regarding Condition 15 of planning permission 12/00872/FUL, please find below the proposed remediation strategy for the New Inn, Leek Road, Longsdon.

Background
The 2009 report entitled "Phase 1 & 2 Site Investigation (Contamination) Report, Former New Inn, Longsdon nr. Leek" identified three contamination issues at the site. These were:

- The presence of an underground petroleum storage tank and associated infrastructure.
- The presence of PAH contaminated made ground.
- Elevated concentrations of carbon dioxide in ground gas.

The petrol tank, its associated infrastructure and TPH contaminated soils in the vicinity of the tank have since been removed from site, as described in the 2015 report entitled "Removal of Petrol Tank and Hydrocarbon Contaminated Soils, New Inn, Leek Road, Longsdon". The following therefore presents the proposed remedial measures that will be employed to mitigate the risk posed by PAH contaminated soils and ground gas.

PAH Contaminated Soils
Of the 8 samples of made ground tested in the 2009 site investigation, 5 contained PAH concentrations that exceed S4UL human health screening values. It was concluded that there is no risk to groundwater from contaminant leaching, but that potential human health risks remained. In order to eliminate the human health risks, a system of clean cover is proposed.

Clean cover calculations have been performed in accordance with the guidance contained within BRE (2004): 'Cover Systems for Land Regeneration – Thickness of Cover Systems for Contaminated Land', and are based on the maximum recorded concentrations of each contaminant.

The clean cover system determined by this approach will comprise a layer of clean topsoil/subsoil materials to a total thickness of no less than 600mm, with topsoils placed to a minimum thickness of 150mm. Due to the magnitude of exceedances recorded in some samples, in addition to the clean cover, it is proposed to place a break layer, comprising 200mm of compacted coarse granular materials, (crushed concrete or similar). This break layer will be placed between the underlying soils (made ground) and clean cover, in order to prevent digging/exposure of the underlying soils and root growth.

It is anticipated that areas of permanent hard standing (including floor slabs) will not require the provision of a clean cover system or break layer.

Validation

This system will be subjected to accurate record keeping during construction and post-construction verification, by hand auger, to prove the placed thickness of clean cover. Samples of imported topsoil and subsoil will also be subject to analysis to confirm their suitability for incorporation on site. The importation to the site and testing of topsoil and subsoil materials will be undertaken in accordance with the requirements of Condition 18 of the planning consent.

Ground Gas

The highest ground gas flow recorded in the 2009 site investigation was 0.4l/hr, whilst the highest CO_2 concentration recorded was 8.7%. This produces a gas screening value of 0.03 l/hr, which places the site in Characteristic Situation 1, as defined by CIRIA 665. However, as CO_2 concentrations of >5% were recorded in four boreholes in the south of the site, as a precautionary measure, this has been upgraded to Characteristic Situation 2.

It is understood that the new build, proposed to be constructed on Plots 3 and 4, will be low rise houses with ventilated underfloor voids. As such, it is considered appropriate to use the NHBC 'traffic light' system. Under this system, CS2 corresponds to Amber 1. Low level gas protection measures are therefore required, as prescribed in BRE414, comprising a gas proof membrane and a sub-floor void with a ventilation rate of one volume change every 24 hours.

Plots 1 & 2 will be conversions of the former public house building. As discussed above, the site has been characterised as Amber 1; requiring mitigation measures comprising the installation of a gas membrane and an assumed floor slab construction incorporating a sub-floor void. In cognisance of the age of the existing building, it is probable that equivalent gas protection measures are unlikely to be present.

The characterisation of the site as CS2/Amber 1 is a conservative assessment, based on carbon dioxide concentrations in the boreholes in the south of the site. The two boreholes located nearest to the existing building (WS5 and WS6) record a maximum carbon dioxide concentration of 2.5%v/v and a maximum flow of 0.2l/hr, resulting in a gas screening value of 0.005l/hr. On this basis, this area of the site would be characterised under the NHBC 'traffic light' system as 'Green' (no gas mitigation measures required).

However, in regard to the relatively small size of the site, and as a pragmatic approach, it is proposed that gas monitoring is undertaken within the existing building (including any basement areas) to determine whether gas ingress is occurring. This monitoring should focus on areas such as service entries and confined spaces, and the results be used to inform a further assessment of whether mitigation measures are required to be retrofitted to the building.

The retrospective installation of gas mitigation measures in existing buildings is considerably more difficult to achieve than installing remedial measures into new build, and specialist advice will be sought in the event that further monitoring indicates that such measures are appropriate.

The form of retrofitted protection will therefore depend on a number of factors, including the type of wall construction (solid vs cavity) and floor slab construction (ground bearing or suspended). Several proven methods are available to safeguard an existing building against gas ingress, including introduction of a sub-floor void, installation of a membrane, tanking of basements, or sealing the top of a floor.

We trust that the foregoing represents an acceptable scheme of remediation, with regard to the remaining identified human health risks at the site.

Yours sincerely
for Wardell Armstrong LLP

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