



**ENVIRONMENT
AGENCY**

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SANDWELL METROPOLITAN BOROUGH COUNCIL		
DEVELOPMENT CONTROL		
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FAO Stephen Hayes,

Dear Sir,

GEO-ENVIRONMENTAL ASSESSMENT & QUANTATIVE RISK ASSESSMENT.

W H KEYS LTD, CHURCH LANE, WEST BROMWICH, WEST MIDLANDS.

I refer to your letter regarding the above which was received by the Environment Agency on 16 June 2006.

I apologise for the delay in replying, and trust that the Agency's comments, as set out below, will still be taken into consideration.

We have now reviewed the following reports submitted in relation to this planning permission (PA08137/012):

- Geo-environmental Assessment, WH Keys, Church Lane, West Bromwich (WSP, January 2006)
- Quantitative Risk Assessment, WH Keys, Church Lane, West Bromwich (WSP, June 2006)
- Remediation Strategy, WH Keys, Church Lane, West Bromwich (WSP, July 2006)

We have the following comments to make which relate solely to the protection of 'Controlled Waters', matters relating to Human Health should be directed to the relevant Local Authority.

Site Investigation:

We understand from the 'Geo-environmental Assessment, WH Keys, Church Lane, West Bromwich' (WSP, January 2006) that groundwater was sampled in boreholes RH7a, RH2, RH4a, SA7a, RH1, SA5, SA2, SA7 (x2), RH1, RH2 and RH4. It is unclear which strata each of these boreholes was screened within.

Section 6.3 of the 'Geo-environmental Assessment, WH Keys, Church Lane, West Bromwich' (WSP, January 2006) indicates that further groundwater monitoring was due to be undertaken over an extended period (3 – 6 months). Has this further monitoring been conducted and if so what were the results?

Environment Agency

Environment Agency, Sentinel House, Wellington Crescent, Fradley Park, Nr Lichfield, Staffordshire, WS13 8RR, Tel no:(01543) 404945, Fax no:(01543) 444161

Section 8.2.9 of the 'Geo-environmental Assessment, WH Keys, Church Lane, West Bromwich' (WSP, January 2006) states:

'Elevated concentrations of phenols, hydrocarbons and benzo(a)pyrene recorded in groundwater samples obtained from both the perched groundwater within the made ground and the underlying shallow coal measures aquifer.'

However section 9.4 of the 'Geo-environmental Assessment, WH Keys, Church Lane, West Bromwich' (WSP, January 2006) states:

'The limited permeability of the overlying Glacial Till appears to be preventing significant groundwater contamination and thus protecting the underlying minor aquifer and Hobnail Brook from the contamination identified with shallow soils on site.'

These two comments seem to contradict each other. The results of groundwater sampling indicate that significant (i.e. in excess of relevant standards) contamination has reached the groundwater underlying the site.

Risk Assessment:

The risk assessment undertaken seems to be based on an assessment of the potential for soil contamination to migrate to the groundwater and then any impacted groundwater to migrate towards the receptor. It is unclear why the risk assessment did not take into account the concentrations of contamination already present in the groundwater of the site and assess the potential for this contamination to migrate towards the receptor.

Section 6.7.1 of the 'Quantitative Risk Assessment, WH Keys, Church Lane, West Bromwich' (WSP, June 2006) states:

'The results of the simulated Tier 1 test within ConSim indicated that for the majority of contaminants in all source zones, the simulated leachate concentration at the base of the unsaturated zone exceeded that identified from site leachate analysis.'

The NRA leaching test methodology used during leachate analysis is primarily designed to assess inorganic contaminants and is not best suited for volatile/semi-volatile contaminants for the following reasons:

1. Desorption of organics from the solid matrix may take significantly longer than a standard equilibrium test permits.
2. Sampling and preparation methods required by standard methods may not be conducive to preservation of volatile/semi-volatile organics, (the filtration stage is open to atmosphere and evaporative loss of volatile compounds such as BTEX compounds which would be empirical rather than mimicking a real life scenario).
3. Influence of oxygen, (degradation) during testing.
4. Dilution effects of liquid:solid ratio.
5. Influence of headspace on volatile organics.
6. Resorption during filtration.

Consequently we would expect the simulated leachate concentration at the base of the

unsaturated zone to exceed that identified from site leachate analysis. Furthermore given the issues relating to the NRA leaching test methodology the leachate results taken from the site should not be used in validation of the risk assessment model.

Section 6.8.1 of the 'Quantitative Risk Assessment, WH Keys, Church Lane, West Bromwich' (WSP, June 2006) states:

'The assessment indicates that risks are generally low, with marginal breakthrough predicted for each source at the defined receptor points.'

Section 7.2 of the 'Quantitative Risk Assessment, WH Keys, Church Lane, West Bromwich' (WSP, June 2006) states:

'Risks to identified controlled waters receptors are not considered to be extensive considering the limited permeability of the ground beneath the site, the relative immobility of the hydrocarbon impact and the distance and nature (culverted) of the nearest surface water feature.'

However Table 6.6 indicates predicted concentrations at the receptor significantly above relevant standards of C5 – 8 Aromatic TPH (549 ug/l), Naphthalene (10,880 ug/l) and MTBE (8790 ug/l).

Section 6.8.1 of the 'Quantitative Risk Assessment, WH Keys, Church Lane, West Bromwich' (WSP, June 2006) states:

'Site groundwater analysis to date indicates that general TPH concentrations within both the Glacial Till and the Middle Coal Measures do not exhibit significantly elevated contaminant concentrations, with a maximum of 240 ug/l Total TPH recorded in the Glacial till in SA4. This correlates with the results of the risk assessment modelling and suggests that TPH contamination in soils across the site is predominantly longer-chain aliphatic and aromatic fractions that are less soluble and are not subject to significant leaching into groundwater.'

The information contained within the 'Geo-environmental Assessment, WH Keys, Church Lane, West Bromwich' (WSP, January 2006) indicates a concentration of 420 ug/l in SA2. Furthermore the groundwater results presented in that document indicate that there is significant (i.e. in excess of relevant standards) contamination in the groundwater at the site suggesting either direct spillage has been made or the contamination in the soils is subject to significant leaching into groundwater.

Section 7.2 of the 'Quantitative Risk Assessment, WH Keys, Church Lane, West Bromwich' (WSP, June 2006) states:

'To avoid the potential for continual, long term inputs into the groundwater it is concluded that hydrocarbon concentrations in soils should be reduced to a threshold below a saturation value.'

Given that the risk assessment has indicated that the soil contamination has the potential to impact on identified receptors suitable Remedial Targets (derived from the risk assessment) should be used to determine what concentration of contamination it is acceptable to leave in

the soils and groundwaters of the site. It should be noted that these Remedial Targets may be more stringent when a risk assessment is conducted on the contamination already present in the groundwater of the site.

Environment Agency R&D publication 95, 'Guidance on the Assessment and Monitoring of Natural Attenuation of Contaminants in Groundwater' indicates (page 4) that risk assessments which take account of natural attenuation (i.e. degradation) should be verified with Monitoring Natural Attenuation:

'This document is also relevant to the derivation of Tier 3 remedial targets that take account of natural attenuation.'

Furthermore Page 51 of the document states:

'Natural attenuation processes are taken into account in the Environment Agency's 'Methodology for the derivation of remedial targets for soil and groundwater to protect water resources', at Tiers 3 and 4. The methodology described in Sections 3 to 5 of this document sets out the procedure for determining site-specific rates of natural attenuation. The Agency expects that degradation will be assumed to be nil when calculating remedial targets unless relevant and adequate evidence is collected and presented, as described here.'

Consequently any risk assessment which allows for natural attenuation (i.e. degradation) should be supported by information which meets the requirements of the Environment Agency's guidance on Monitoring Natural Attenuation quoted above.

Foundations:

It is noted that piled foundations are proposed for the site. Reference should be made to the Environment Agency's 'Piling into Contaminated Sites' document available from our publications web-site. This document provides guidance on what factors should be considered when piling into contaminated sites and a framework to follow to prove that such operations will not pose a risk to 'Controlled Waters'.

Conclusion:

We have no objections to the remediation of the site but have the following comments to make on the work undertaken:

- The site investigation has indicated that significant concentrations of contamination (predominantly hydrocarbons) are present in the soils and groundwaters of the site.
- The risk assessment undertaken to date indicates that the soil contamination poses a risk to 'Controlled Waters' receptors.
- A suitable risk assessment should be undertaken to determine the risk that the groundwater contamination poses to 'Controlled Waters' receptors.
- Any risk assessment which takes account of natural attenuation (i.e. degradation) should be verified with Monitoring Natural Attenuation.
- Suitable Remedial Targets, derived from the risk assessment process, should be used to determine the level of remediation required at the site.

We therefore do not recommend any conditions relating to contaminated land be discharged by the Local Authority at present and look forward to receiving further information in due course.

If you have any questions regarding the above information please contact Sarah Victor Tel. 01543 404880.

Yours faithfully

JAMES KITCHEN
Planning Liaison Team Leader

Please ask for : Jane Field