Our ref: 211210 JL NT JER9121 V1 R0

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Environmental Protection Specialist
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Dear [redacted],

TECHNCAL REPORT REVIEW - PROPOSED DEVELOPMENT AT PRINCES PARADE, HYTHE, KENT

RPS Consulting Services Ltd was commissioned by Folkestone & Hythe District Council to undertake a technical review of third party documents submitted to the local planning authority in support of the discharge of Condition 25 relating to planning application, reference Y17/1042/SH, which was granted (subject to conditions) on 18th July 2019.

The planning application relates to the development to land along the seafront, Princes Parade, Kent, to provide housing, a leisure centre, car parking and public landscaping.

BACKGROUND INFORMATION

RPS previously reviewed several technical reports relating to the proposed development including:

- An ***Environmental Statement***, ***Geo-Environmental Assessment*** and a subsequent Letter Report which is summarised in RPS letter reference HLEC56996/001L dated 20th October 2017; and
- A ***Land Contamination Preliminary Risk Assessment*** (LBHGEO Ltd. Reference LBH4635pra, March 2021) and ***Requirements for Ground Investigation*** (LBHGEO Ltd. Reference LBH4625GI Ver. 1.3, March 2021) summarised in RPS letter reference 210504 AC JL JER9121 V1 R3 dated 4th May 2021.

In relation to the most recent reviews RPS considered the LBHGEO Preliminary Risk Assessment report (March 2021) to be generally appropriate in relation to the proposed development and agrees with the overall conclusions and recommendations.

It was noted that the report did not include an account of a site inspection and only limited information relating to surrounding land uses, both current and historical. RPS also noted that not all the potential contaminants identified by the Preliminary Risk Assessment were covered by the laboratory analysis completed as part of the previous investigations. In particular, only five samples were analysed for asbestos with each returning positive screens.

RPS considered the LBHGEO Requirements for Ground Investigation document (March 2021) to be largely appropriate subject to a number of clarifications/requirements, including the following:

- The potential contaminants of concern detailed in the Preliminary Risk Assessment did not appear to be covered by the proposed soil and groundwater analysis (i.e. pesticides, biocides, fungicides, Bisphenol A, preservatives including tributyl tin and flame retardants.
- RPS suggested replacing some of the proposed soil leachate tests with analysis of groundwater samples collected from the shallow wells to provide an indication of the quality of shallow groundwater that may exist within the waste mass.
- It was required for PID screening of soil arisings be undertaken during the site investigation; and
- Gas monitoring needed to be undertaken during low and significantly falling atmospheric pressure events and that at least six sets of robust ground gas monitoring data needed to form the basis of the ground gas risk assessment.

The RPS reviews detailed above should be read in conjunction with that below.

TECHNICAL REVIEW AND CONSIDERATION

The following additional documents have been provided to RPS for technical review:

- ***Land Contamination Assessment***. *LBHGEO Ltd. Reference LBH4635lca, Version 1.2, dated 17th December 2021.*
- ***Land Contamination Remediation Plan***. *Bam Construction. Version 1.2, dated 19th October 2021.*

RPS cannot vouch for the accuracy or validity of the data supplied within the reports sent for review and the following opinion is based solely upon the content of these reports. This technical review should be read in conjunction with the submitted reports themselves.

RPS comment/opinion is presented in ***bold italic*** text.

Land Contamination Assessment. LBHGEO Ltd. Reference LBH4635lca, Version 1.2, dated 17th December 2021.

The Land Contamination Assessment was completed to provide enough information for potential funders and purchasers to make an informed decision regarding the proposed development cost plan. ***The report acknowledges budgetary constraints have limited the extent of the site investigation and that further, more detailed, phases of investigation may be required in due course.***

The assessment was based upon a factual site investigation report provided by Idom Merebrook (report reference FR-22281-21-195 Rev B, dated 30th June 2021), which reported a total of 32 trial pits, 23 window sample boreholes and six cable percussion boreholes. ***This report has not been appraised as part of this review.*** The additional exploratory hole locations are stated to have improved the sampling density for the site from approximately one per 10,000m^3 to approximately one per 1,300m^2 (or a notional hole spacing of around 35m to 40m).

The landfill was proven to extend to a maximum depth of approximately 6m, but was generally approximately 4m to 5m in thickness. An anticipated cap of approximately 0.5m to 1m of dredged silt material was not encountered during the investigation as landfill was typically encountered immediately beneath the surface at the site. This landfill material appeared to comprise predominantly construction waste in the eastern portion of the site with an increase in the proportion of domestic, commercial and industrial waste in the western portion. There was an increase reporting of discolouration and odours in the western portion of the site (although this evidence is noted as being poorly defined by Idom Merebrook).

Beach deposits were encountered beneath the landfill material generally comprising gravel and cobbles in with more cohesive clay deposits encountered in the east of the site. These deposits were underlain by the Atherfield Clay (between 4m to 8m in thickness) overlying the Weald Clay Formation to an unproven depth.

It was assumed that there was a tidal water level in the shingle beneath the site. It was reported that “some” groundwater monitoring of the five cable percussion holes was undertaken. ***No indication is provided on***

the number of monitoring rounds undertaken, the wells monitored, the depth to groundwater recorded or the range of elevations encountered.

The results of chemical analysis undertaken on soil sampled from beneath the site were compared to the Land Quality Management Ltd (LQM) and the Chartered Institute of Environmental Health (CIEH) 2019 generic assessment criteria. The site was zoned so that appropriate end use scenarios were assessed for the various aspects of the proposed development.

61 soil samples were analysed in total for a wide range of contaminants. ***It is not clear whether all the potential contaminants of concern in soil identified as part of the Land Contamination Preliminary Risk Assessment have been analysed for as part of the site investigation. This potential issue was raised as part of the previous review of the Requirements for Ground Investigation by RPS.***

Approximately 10% of the soil samples returned a positive asbestos screen with these distributed across the site. The concentrations of contaminants of concern detected were generally greater than those encountered previously with come contaminants, notably polychlorinated biphenyls (PCBs) encountered for the first time.

Numerous petroleum hydrocarbon compounds, polycyclic aromatic hydrocarbons (PAH) and metals were detected above the relevant assessment criteria under the residential and public open space development scenarios. These exceedances were distributed evenly across the site, contrary to the occurrence of visual evidence of contamination.

An initial round of groundwater testing was undertaken on samples of groundwater taken from each of the six monitoring standpipes installed within the cable percussion boreholes. The results of chemical analysis undertaken on groundwater sampled from beneath the site were assessed against Environmental Quality Standards (EQS) for transitional and coastal waters. ***A number of exceedances of the EQS assessment criteria were encountered and no commentary is provided within the report on the occurrence and distribution of these. Furthermore, it is not clear whether all the potential contaminants of concern in groundwater identified as part of the Land Contamination Preliminary Risk Assessment have been analysed for as part of the site investigation. This potential issue was raised as part of the previous review of the Requirements for Ground Investigation by RPS.***

No assessment of the potential risk to human health receptors from contaminants of concern within groundwater has been undertaken despite this being identified as a potential pathway in the subsequent risk estimation section.

Leachate tests were undertaken on a total of 60 soil samples. The results of leachate analysis were compared to available EQS (for transitional and coastal waters) and Waste Assessment Criteria (WAC) for inert waste as these were devised for the protection of groundwater and surface waters. ***A number of exceedances of these assessment criteria were encountered and no commentary is provided within the report on the spatial occurrence and distribution of these.***

Three initial rounds of ground gas monitoring were undertaken on site between 10th May and 9th June 2021. ***It is not indicated whether this monitoring was undertaken during worst case scenario conditions of low and significantly falling atmospheric pressure.*** Monitoring was undertaken at monitoring standpipes installed within 19 window sample locations. Most of the positions were reported dry during monitoring and neither methane nor VOC vapours were recorded. The monitoring did not detect any borehole flow. ***It is not clear if monitoring for carbon dioxide was undertaken as part of this and this will need to be confirmed.***

It is reported that these findings are at odds with the previous testing and must be considered unlikely of the actual conditions of the landfill site. ***Ground gas assessment to date is inadequate and the potential risks from ground gas (and potentially volatile contamination) need to be determined. Given the sensitivity of the proposed use and significant potential source of ground gas generation, a minimum of six rounds of reliable ground gas monitoring visits will be required to establish the ground gas regime beneath the site. The influence of both atmospheric pressure and tidal fluctuations on the ground gas regime will need to be considered.***

The report identifies potentially sensitive ecological, human health, controlled water and property receptors associated with the proposed redevelopment.

Discussion of potential pathways suggests that removal of the landfill capping, even on a temporary basis to allow construction works, will radically alter the hazard profile presented by the site. ***The report states earlier that the purported 0.5m to 1.5m capping of dredged silt material was not recognised by the site investigation. It should be confirmed if the hazard profile of the site has been defined with the absence of this capping from the outset or whether it needs altering on the basis of this finding.***

The risk estimation section presents an Updated Pollutant Linkage Assessment (without mitigation). ***The risk ratings presented as part of this assessment are generally agreed, however, the potential risk to future end users from the contaminants of concern within groundwater via the vapour inhalation pathway is not considered to have been appropriately assessed. Furthermore, the potential risk from landfill gas needs confirming on the basis of comments provided above.***

It is agreed that, as part of the risk evaluation, given the nature of the site, it is not possible to use the location of any identified contamination as being representative of anything other than the whole landfill. RPS concurs that all twelve potential pollutant linkages identified should be carried forward, either through more detailed assessment or directly for remediation.

The report subsequently provides a brief options appraisal for remediating/mitigating the contamination encountered and potential disposal of material off-site. It is acknowledged that, due to the lack of investigation undertaken, this appraisal currently needs to be based on worst case assumptions.

The report concludes that, in particular, wider investigation of groundwater quality is required across the whole site (rather than just the existing six locations). ***N.B. This investigation should be used to inform assessment of risks to human health from contaminants of concern within groundwater in addition to controlled water receptors.***

Furthermore, it is recommended that wider and more extensive investigation of the soil gas regime beneath the site should be undertaken to enable satisfactory ground gas risk assessment. It is currently stated that ground gas mitigation measures for all new buildings should be assumed as at least Characteristic Situation CS3 and that requirement for high quality VOC protection also be assumed in the cost plan. ***This would be considered prudent given the existing lack of site investigation data and more onerous remediation and/or mitigation requirements to those proposed cannot be discounted at this stage.***

RPS General Opinion

There are a number of clarifications required regarding the Land Contamination Assessment (as detailed above). Detail is lacking in both the conceptualisation of the site and in the subsequent risk estimation that will need to be resolved through additional site investigation to enable an appropriate remediation scheme to be produced.

The Land Contamination Assessment makes various comments regarding the accuracy/reliability of data provided as part of the Idom Merebrook site investigation factual report and this is of significant concern as the risk evaluation is formulated on the interpretation of this information. Any data gaps or misrepresentation of information within the site investigation factual report should also be addressed or resolved (where possible) through the additional site investigation to ensure that the risk estimation is as accurate as possible. There are also comments from the previous RPS review (reference 210504 AC JL JER9121 V1 R3 dated 4th May 2021) that remain unaddressed.

On the basis of the above, the Land Contamination Assessment is not considered acceptable in the discharge of Condition 25 (part b) of planning application reference Y17/1042/SH.

It is agreed that the appropriate way forward should be discussed with the Local Authority and Environment Agency.

Land Contamination Remediation Plan. Bam Construction. Version 1.2, dated 19th October 2021

This document has been prepared to "*translate the remediation options appraisal for this site into a clear set of activities that will deliver the remediation objectives in accordance with Client and regulatory requirements*". ***It should be noted that this document is based on a previous version of the Land Contamination Assessment to that above and that the remediation plan will need to be updated to reflect any changes made to that updated document.***

The plan presents a Conceptual Model of Relevant Potential Pollutant Linkages, based on those presented as part of the Risk Estimation in the LBHGEO Contaminated Land Assessment. ***The risk rankings for the identified pollutant linkages will require updating following the additional site investigation proposed, in particular, those for the potential risk to future end users from the contaminants of concern within groundwater via the vapour inhalation pathway and the potential risk from ground gas.***

Both site-wide and zone specific remediation activities/objectives are set out within the document. ***One of these activities refers to preservation and reuse of the existing landfill capping layer. There was some ambiguity within the Contaminated Land Assessment as to the presence of this cap and this needs to be confirmed.***

The remediation activities include provision of passive gas protection measures beneath the buildings, including flooring, membrane and ventilation. ***Given the ground gas assessment remains unresolved following concerns in the data provided by the Idom Merebrook Site Investigation factual report (as raised by LBHGEO within the Land Contamination Assessment), it may be that source removal and/or active ventilation measures may be required.***

The details of what is to be provided as part of the verification for each of the remediation activities should be confirmed - with definition of the site test data and measurements of quality-critical parameters referred to in Section 9.2. For example, verification of topsoil and subsoil in areas of soft landscaping will require hand pitting and sampling of the material once in situ, along with logs and photographic evidence of material composition and thickness.

A Remediation Implementation Plan (Cognition Land and Water PROJECT NO: 1927, draft V1.2, dated July 2021) included as an appendix to the Contaminated Land Remediation Plan will also need to be updated to account for any amends made as part of the most recent issue of the LBHGEO Contaminated Land Assessment and pending additional site investigation.

The Remediation Implementation Plan currently refers to Characteristic Situation CS2 being applicable to the site, whereas the LBHGEO Contaminated Land Assessment and BAM Contaminated Land Remediation Plan parent document state CS3 measures should be assumed for the site pending further investigation.

Similarly, details on the thickness of the proposed cover system in the Remediation implementation Plan are at odds with those presented within the BAM Contaminated Land Remediation Plan parent document.

Proposals presented within the Remediation implementation Plan for material re-use on site will need to be agreed with the Environment Agency.

RPS General Opinion

In principle, the outlined remediation activities/objectives are considered appropriate, however, more detailed site-wide and zone specific proposals will be required upon completion of the additional site investigation (to address comments on the LBHGEO Land Contamination Assessment) and confirmation of detailed design.

Furthermore, a detailed verification plan needs to be provided as part of the Remediation Plan to indicate how the various remediation activities are to be documented in the verification report.

On the basis of the above, the Land Contamination Remediation Plan is not considered acceptable in the discharge of Condition 25 (part c) of planning application reference Y17/1042/SH.

The applicant should also refer to RPS letter reference HLEC56996/001L (dated 20th October 2017) and RPS letter reference 210504 AC JL JER9121 V1 R3 (dated 4th May 2021) for comment in relation to previous assessments/reports for the site reviewed by RPS. Copies of these can be provided on request.

Please do not hesitate to contact me if you have any questions.

Yours sincerely,
for RPS Consulting Services Ltd

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