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Our Ref: HLEC56996/001L
Your Refs: EH01833 & EH01834
Date: 20th October 2017

Mr. Daniel Stone
Shepway District Council
Civic Centre
Castle Hill Avenue
Folkestone
Kent
CT20 2QY

Dear Mr. Stone,

Re: Land at Princes Parade, Kent – Formal Second Opinion of Reports for Application Y17/1042/SH

I am writing in response to your recent request for a Formal Second Opinion of environmental reports relating to the above site.

Introduction

This review includes the following documents:

- Environmental Statement by Peter Radmall Associates (report reference: 2539), dated August 2017.
- Geo-environmental assessment by Idom Merebrook Ltd (report reference: GEA-17436AI-15-193), dated May 2017.
- Letter report by Idom Merebrook Ltd (report reference: L-17436ai-2.4.2-17-S235-NTD), dated 10th March 2017.

These reports have been submitted for outline application Y17/1042/SH, for up to 150 residential dwellings, up to 1,270sqm of commercial uses including hotel use, retail uses and / or restaurant/cafe uses; hard and soft landscaped open spaces, including children's play facilities, surface parking for vehicles and bicycles, alterations to existing vehicular and pedestrian access and highway layout within and around the site, site levelling and groundworks, and all necessary supporting infrastructure and services.

The objective of this Formal Second Opinion was to ensure the reports relating to contamination at the site are satisfactory in supporting the relevant aspects of the planning application.

RPS Health, Safety and Environment (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 these reports. This Formal Second Opinion letter should be read in conjunction with the submitted reports themselves. No comments have been made regarding geotechnical or drainage design issues as these fall outside the remit of this review.

Document Summary (*with RPS comments in non-bold italics*):

Geo-environmental Assessment, Idom Merebrook Ltd, Ref: GEA-17436AI-15-193, May 2017

- The Geo-environmental assessment by Idom Merebrook Ltd comprised a combined Phase 1 preliminary assessment and a Phase 2 investigation.
- The site was identified as a historical landfill, which received inert and commercial waste between 1946 and 1974.
- Idom Merebrook referenced and appended two previous reports by Ground Solutions Group Limited (GSG) for a Phase 1 Desk Study and Walkover and Phase 2 site investigation, both undertaken in 2002. The GSG Phase 1 was summarised by Idom Merebrook and in the subsequent Environmental Statement (by Peter Radmall Associates) as follows:
    - Shepway District Council had confirmed that the landfill on site closed in 1975 and the depth was reported to be 5.00m;
    - Reference made to a previous site investigation (two cable percussion boreholes) undertaken by Weeks Consulting prior to the construction of a play area in the west of the site; Made Ground was encountered to a maximum depth of 4.60m and elevated concentrations of metals were encountered in a soil sample from 2.00m below ground level (bgl);
    - Dredgings from the canal were considered likely to have been deposited on the site; and
    - A soil spike survey (87 positions) was undertaken across the site.

  The GSG Phase 2 site investigation was summarised by Idom Merebrook and Peter Radmall Associates as follows:
    - Comprised three cable percussion boreholes (to 7.50m bgl), 30 trial pits (to a maximum depth of 5.00m bgl) and ten static cone penetration tests. 173 soil samples and three groundwater samples were recovered and sent for laboratory chemical analysis;

- 13 peizometers and three borehole wells were monitored on one occasion (15 August 2002);
- Evidence of household waste was noted in all the trial pits;
- Landfill odours were encountered at four locations and a slight hydrocarbon odour was encountered at a further location;
- Groundwater levels in the boreholes ranged from 5.14m to 6.47m bgl;
- Made ground was proven to a maximum depth of 4.80m bgl, underlain by possible made ground (potentially dredged material) / marine alluvium;
- Concentrations of metals (arsenic, nickel, lead, boron, copper) and localised polycyclic aromatic hydrocarbons (PAH) compounds were detected in soil samples from the top 5.00m exceeding the adopted residential assessment criteria (CLEA SGVs, ICRCL values and Dutch Limits) protective of human health (for a residential with plant uptake scenario). A pipe composed of asbestos containing material (ACM) was encountered at 2.10m bgl at one location. *RPS notes that although the assessment criteria used were industry standard at the time of this site investigation, they have subsequently been superseded.*
- The groundwater chemical analysis results generally did not exceed the adopted groundwater screening criteria (Dutch intervention Values and Leachate Quality Threshold Concentrations) protective of controlled waters receptors. *RPS notes that although these criteria were industry standard at the time of this site investigation, they have subsequently been superseded.*
- Ground gas monitoring detected concentrations of carbon dioxide exceeding 5% v/v in five location, elevated methane concentrations in three locations (up to 60% v/v) and volatile hydrocarbons up to 15.6ppm.

The GSG reports have not been reviewed in full by RPS due to their age and the presence of more recent investigation information.

- A conceptual site model (CSM) was produced for the site based on the proposed change of use of the site. A number of potential on site sources of contamination were identified associated with the historical land uses of the site and surroundings. These were summarised as follows:
  - Elevated concentrations of metals, PAH and Total Petroleum Hydrocarbons (TPH) from historical infilling across the site and the potential for associated ground gas / vapour generation;
  - Soil and groundwater contamination associated with the site's former use as a landfill;
  - Asbestos within the fill material imported to the site;
  - Soil and groundwater contamination associated with the historical off-site sources, including the Royal Military Canal (3m north) and a gasworks (50m north).
- The investigation by Idom Merebrook was undertaken in 2015, comprising of seven window sample boreholes (to a maximum depth of 5.45m bgl) and five trial pits (to a maximum depth of

3.00m bgl). 18 soil samples were obtained and sent for laboratory analysis. The investigation was stated to target areas of suspected landfill material as well as providing broad spatial coverage of the site. Access and ecological restrictions were noted, including steep slopes and a bund surrounding the site, dense vegetation and the presence of nesting birds and possible badger sites.

- The Idom Merebrook site investigation encountered Made Ground / landfilled material over superficial Tidal Flat Deposits and Storm Beach deposits, underlain by the Weald Clay Formation. Made Ground thicknesses ranged from 0.20 to >3.00m and this strata pronominally comprised topsoil over brown sandy gravelly silt / clay with frequent rootlets, underlain by compacted silty clayey gravelly sand / sandy gravel with frequent anthropogenic materials (brick, concrete, wood, metal, bituminous inclusions etc). Infilled material was noted as having been encountered across the site, with landfill waste predominately encountered in locations away from the site boundaries. *On-site screening of soil samples for ionisable volatile organic compounds (iVOCs) using a portable photo-ionisation detector (PID) was not reported to have been undertaken.*
- The range of determinants analysed for included asbestos, heavy metals, speciated total petroleum hydrocarbons (TPH-CWG incl. BTEX and MTBE) and speciated polycyclic aromatic hydrocarbons (PAH). *RPS consider that volatile organic compounds (VOCs) should be included as a potential contaminant of concern and therefore should have been analysed for in soil and groundwater.*
- The site was characterised as Characteristic Situation 2 (CS2), as a result of soil gas monitoring between June 2015 and October 2016 (with a maximum carbon dioxide concentration of 9.3% v/v), such that gas protection measures (to achieve a score of 3.5 points) would be required for any new buildings on the site. Gas protection measures could include the flitting of a gas resistant membrane (installed to the requirements of BS 8485:2015) and a passive sub floor dispersal layer. *RPS notes that the monitoring data was limited (one well monitored on four occasions, one well monitored on three occasions, and two wells monitored on one occasion) and it was not reported to have captured the worst case atmospheric conditions. The coverage / frequency of ground gas monitoring is considered insufficient for the sensitivity of the proposed development. However, it is acknowledged that further ground gas monitoring is recommended later in the report.*
- Groundwater was encountered during drilling of the window sample boreholes between 2.30m and 3.60m bgl. Groundwater was not subsequently encountered during monitoring of installed wells (four wells screened to 4.00m bgl) and therefore was not sampled. Groundwater was considered likely to be tidally influenced. Noting that the level in the canal does not fluctuate, the conclusion was reached that this water feature is not in hydraulic continuity with groundwater and is likely clay lined.

- The human health generic quantitative risk assessment (GQRA) made use of soil assessment criteria in line with current industrial standards (including S4ULs by LQM/CIEH) to screen all the data for three different land use scenarios (residential public open space, residential with homegrown produce and residential without homegrown produce). Localised PAH and heavy metals (lead, arsenic, copper and zinc) were noted. Asbestos was detected in all five Made Ground samples analysed, with quantifications recorded to be <0.1%.
- A refined CSM was produced for the site based on the results of the results of the site investigation. *RPS note that a robust assessment of the risks to off-site human health users is not included within the Idom Merebrook report. However, the subsequent Environmental Statement (by Peter Radmall Associates) included some further consideration of these risks.*
- Idom Merebrook concluded that clean cover would be required in areas of soft landscaping, comprising of the following:
    - 600mm soil or 300mm shingle and a geotextile marker in private gardens;
    - 300mm soil or 150mm shingle and a geotextile marker in communal areas; and
    - 150mm soil and a geotextile marker or 300mm soil without a geotextile marker in areas of public open space.
- Idom Merebrook recommended that further site investigation be undertaken once the vegetation across the site had been cleared. They also stated that further gas monitoring (at least six additional visits) may negate the need for gas protection measures, or limit the areas where it is required.
- It was concluded that, although hydrocarbon contamination was recorded in Made Ground, these contaminants were not considered to be sufficiently mobile to pose a risk to controlled waters.

Investigation Of The Northern Boundary (Adjoining The Royal Military Canal), Letter Report, Idom Merebrook Ltd, Ref: L-17436ai-2.4.2-17-S235-NTD, 10th March 2017

- The *Letter report* by Idom Merebrook Ltd (report reference: L-17436ai-2.4.2-17-S235-NTD, dated 10th March 2017) detailed ten hand dug pits undertaken along the northern boundary of the site (the proposed buffer area).
- The encountered ground conditions were similar to that previously recorded.
- Eight soil samples were sent for laboratory analysis and the results were compared to GQRA (including S4ULs by LQM/CIEH) for a public open space scenario. Concentrations of PAH compounds, several metals were noted to exceed the assessment criteria. Asbestos was detected in two samples in the form of insulation lagging and loose fibres, however concentrations were recorded to be less than 0.1%. In summary, the results were consistent with the previous Idom Merebrook Ltd investigation.

Environmental Statement for Proposed Leisure Centre and Mixed-Use Development, Peter Radmall Associates, Ref: 2539, August 2017

- The Geo-Environment chapter of the Environmental Statement (ES) by Peter Radmall Associates (report reference: 2539, dated August 2017) summarises the above reports as well as providing further consideration of their findings.
- The ES included an assessment of potential risks for each of the following sensitive receptors:
    - Human health, including future site users (workers and visitors), construction workers and maintenance personnel, and off-site land users (surrounding residents, pedestrians, golf course, public park etc);
    - Controlled waters, including the Royal Military Canal and the underlying groundwater aquifers;
    - Ecological systems (including the Royal Military Canal and Hythe Bay); and
    - Buried structures and services, including foundations, concrete and water supply pipes.
- The following pertinent conclusions and recommendations were made within the ES:
    - Validated clean cover required (for protection of human health) in soft landscaped areas, in line with recommendations by Idom Merebrook;
    - Given the history of the site and levels of carbon dioxide encountered to date it was anticipated that low level gas protection would be required in some parts of the development. Further gas monitoring was recommended in order to establish which areas of the site would need mitigation measures. On the basis that significant flow had not been encountered to date, it was considered that residents of neighbouring properties would be at low risk of gas ingress;
    - Although hydrocarbon contamination was recorded in Made Ground at concentrations which could pose a risk to human health, the concentrations were not considered sufficiently mobile to pose a risk to controlled waters. The PAH contamination and heavy TPH (C>16) contamination encountered were generally categorised as having low solubility and high organic partition coefficient;
    - Following completion of the development and implementation of mitigation measures, the potential risks to off-site users, from contaminants of concern arising from the site, were not anticipated to be significant.
    - Compaction and consolidation resulting from the proposed development was noted to have the potential to mobilise contamination and it was recommended that this should be the subject of further assessment;
    - Ecological constraints have limited the scope of intrusive investigations to date and therefore further investigations were recommended following vegetation removal.

- Contamination with the potential to permeate polymeric services was noted to have been identified and it was recommended that the utility provider be consulted with respect to their requirements for water supply pipes;
- A Construction Environmental Management Plan (CEMP) and a Dust Management Plan (DMP) should be prepared and implemented during the construction of the development. This should include procedures for protection of construction workers (in line with COSHH and CDM regulations);
- A Site Waste Management Plan (SWMP) should be produced and implemented. A Materials Management Plan (MMP) was also considered likely to be required, under the CL:AIRE Code of Practice; and
- Following the implementation of remedial measures, a verification report will be produced which should include validation of gas protection measures, clean cover and material use in service corridors as well as details of any unforeseen contamination encountered during groundworks.

Risk Management Recommendations:

The recommendations for further works as set out within the above reports by Idom Merebrook and Peter Radmall Associates were as follows:

- Further site investigation following vegetation clearance;
- Further assessment of potential mobilisation of contamination due to compaction and consolidation resulting from the proposed development;
- Further monitoring of ground gasses to further assess requirements for gas protection measures (characterised as CS2 on the basis of existing information);
- Production and implementation of a CEMP, DMP and SWMP in relation to the development phase;
- Validated clean cover in soft landscaped areas; and
- The utility provider should be consulted with respect to their requirements for water supply pipes.

Additional recommendations from RPS are as follows:

- Further assessment / discussion of any alteration to the gas regime resulting from the proposed development. This should include consideration to effects of limiting surface gassing in areas of proposed building and hardstanding cover (potentially inducing lateral migration off site) and the application of additional loading (potentially inducing a temporary increase in gassing);

- Although ground gas is still considered to pose a potential risk to future site users (with further monitoring recommended) there is considered to have been insufficient consideration of potential risks from volatile contaminants of concern within soil and groundwater. A more robust explanation as to why these pathways will not be active upon completion of the redevelopment, using available and future site investigation data, shall be necessary;
- On the basis of the previous reports, the EA are likely to have an ongoing interest with regards to controlled water receptors associated with the site and therefore should be consulted with regards to the current development proposals (including any requirements for further investigations and assessments); and
- The scope for any future investigation / assessment works should be submitted to the Local Authority for approval. The following recommendations are made with regards to the scope of future site investigations:
    - Potential contamination sources introduced since the previous investigations should be targeted.
    - Previously identified contamination hotspots should be targeted;
    - The environmental coverage of the site should be improved in order to supersede the 2002 investigations, the data from which cannot be relied upon based on the time elapsed and improvements in laboratory analysis standards;
    - Further monitoring wells (for ground gas and groundwater monitoring) should be installed, to enable suitable coverage with consideration to potential source areas (e.g. areas of the greatest thickness of landfilled waste material and previously recorded elevated ground gas concentrations) and the location of proposed buildings;
    - On-site screening of soil samples for iVOCs, should be undertaken using a PID;
    - Laboratory analysis of soil and groundwater samples should include the previously analysed determinants, as well as VOCs; and
    - Evaluation of the site investigation results, including further assessment of risks to the sensitive receptors identified in the ES.

The recommendations above could either be dealt with prior to the planning application determination (by submission of suitable revised / additional assessments) or through the imposing of suitable planning conditions. Further requirements for regulatory approval of a remediation strategy and verification reporting, as well as notification of any unforeseen contamination encountered during groundworks, should be dealt with through the imposing of suitable planning conditions. These planning conditions should seek to ensure that, on completion of the development, the site is suitable for the proposed use.

If any of the issues raised in this letter require clarification, please do not hesitate to contact me.

Yours sincerely

for RPS Health, Safety & Environment

Tomos Kidd

Principal Consultant