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Our Ref 4292L05-1 TerraConsult The Oaks WCBC & NRW Queries

22nd June 2021

Cefn Park Developments Ltd
Cefn Rd
Wrexham
LL13 9TT

By e-mail only: archie@cefnpark.co.uk

For the attention of Archie Graham-Palmer

Dear Archie,

RE: Response to Wrexham County Borough Council and Natural Resources Wales Queries

Following your email dated 16th June 2021, Cefn Park Developments Ltd requested that TerraConsult (TCL) provided a response to a number of queries raised by Wrexham County Borough Council and Natural Resources Wales, in relation to contaminated land issues for the proposed development at The Oaks, Wrexham.

TerraConsult's collective responses to these queries are listed below:

Wrexham County Borough Council (Memorandum Ref. P/2021/0471):

Opus International Consultants (UK) Ltd, Phase 1 (Desk Study) Investigation Report, The Oaks, Oak Road, Wrexham Industrial Estate Wrexham, LL13 9RG. Dated March 2017

1. The Contaminated Land Team reviewed this report in February 2018 and was generally satisfied with the report, however it was recommended within the desk study that a detailed UXO desk study is undertaken prior to any intrusive investigation on site, please can you advise if this was undertaken?
 - *TCL Response: The Opus Desk Study highlighted the fact that the site was a munitions storage site, and therefore recommended a Detailed UXO desk study report be undertaken. Our proposal to the applicant for the Phase 2 GI stated, "We note that the UXO risk is low, so no specific precautions are required for the investigation". This assessment was based on reviewing online UXO resources (i.e., Zetica Bomb Map). As such, no Detailed UXO desk study was undertaken, and we remain of this opinion.*

2. Sampling strategy-controlled waters:

- Please can you provide a detailed explanation / justification for the groundwater sampling and monitoring strategy and why only one round of groundwater samples were taken and sent for analysis?
 - *TCL Response: The fieldwork showed the ground conditions on site generally comprise thin Made ground <1.0m overlying stiff glacial clay understood to be >60m thick. The clay is of very low permeability and was proven to below the depth of the Brook and River to the south of the site. Groundwater strikes were encountered within 3 or the 42 exploratory holes and generally limited to the perched water at the base of the Made Ground / Glacial Clay.*
 - Section 9.4.8 of the report states the following:
"9.4.8 The groundwater testing has shown elevated concentrations of certain chemicals within the perched Groundwater located within the Made Ground and/or upper horizons of the cohesive glacial superficial deposits. Subject to agreement with the NRW, TerraConsult does not believe the site poses a significant risk to Controlled Waters because:
 - *there is no evidence to suggest the presence of a continuous shallow groundwater body and it is unlikely that there is a significant lateral migration of contamination;*
 - *the perched groundwater at and in the vicinity of the site are not abstracted for human consumption;*
 - *the proposed development will be predominantly hard landscaped. Post construction the majority of the development area and surface run-off will be limited and controlled through drains and drainage ditches so the development will reduce infiltration; and*
 - *there are three licensed groundwater abstractions from the Kinnerton Sandstone located to the east of the site used for process water. The Glacial Clay deposits are understood to be >60m thick and any potential shallow contaminants in the perched groundwater will not be in hydraulic continuity with the water in the bedrock".*
 - Section 9.4.9 of the report states the following:
"9.4.9 TerraConsult recommends that discussion with NRW is entered into at the earliest opportunity".
- Please can you provide a detailed explanation / justification for why no surface water sampling was undertaken at the nearest surface watercourse, The Redwither Brook, which runs alongside the site or at River Clywedog?
 - *TCL Response: Same reasoning as above – no significant source or pathway identified on site.*

3. Section 9.2.3 – It is stated that the PAH and B(a)P result from HD13 is an outlier, has this been proven via statistical analysis? Furthermore, are you certain that it is not a hotspot of potential contamination that may require further delineation?

- *TCL Response: Section 9.2.3 of the report stated that the majority of the samples tested for PAH (70%) were below the laboratory detection limit (0.4 mg/kg). No exceedances of the applicable PAH GACs were encountered within the development area. As such, PAH concentrations within the development area were not considered*

to represent a significant increased risk to long term human health and therefore gave no cause for concern.

- The maximum total PAH concentration recorded was 2,100 mg/kg from HD13, which was taken from the wall/bund created from demolition material from the magazine buildings and located outside the proposed development area. This total concentration includes a number of individual PAH compounds (e.g., Benz(a)anthracene, Chrysene, Benzo(b)fluoranthene, Benzo(a)pyrene, Indeno(123cd)pyrene and Dibenzo(ah)anthracene which exceeded the PAH GACs, and C4SL for Benzo(a)pyrene.
 - Appendix I (Chemical Statical Analysis) shows the statistical analysis and comparison of laboratory soil testing to the assessment criteria. The statistical analysis shows that the average Total PAH concentration was 34 mg/kg, with individual compounds showing average concentrations ranging between 1 mg/kg and 3 mg/kg. As such, the sample HD13 was considered to be an outlier.
 - In addition, the sample location HD13 was located outside of proposed development Zone (i.e., within the ecological zone), which was not to be disturbed as part of the proposed development.
 - TCL recommended that further investigations should be undertaken if the development proposal were to change to include this area.
4. Section 9.2.9 – The removal of the suspected asbestos containing corrugated roof sheeting will need to be included within the verification report for the site demonstrating that the material has been removed to an appropriately licensed waste facility.
- *TCL Response: Agreed, this will need to be included within verification report.*
5. Section 9.3.3 – It is stated that ‘in landscaped areas the marginally elevated levels of contamination may not be acceptable for the proposed end use’ is it correct that this is in relation to flora and fauna and not to human health?
- *TCL Response: Section 9.3.3 relates to "Risk to Plant Life"; therefore, the above comment is in relation to flora and fauna, and not to human health.*
 - *TCL recommended that appropriate advice be sought from a Local Authority Ecological Consultant, as well as either replacement with appropriate clean inert materials or provision of a suitable capping system to protect end-users.*
6. Section 9.4 – I have not provided comments in relation to the assessment of controlled waters as I am in agreement that discussions with NRW are required. Should NRW not take the lead with respect to the controlled waters risk assessment then I will provide comments thereafter. Please can the Council be copied into all correspondence with the NRW?
- *TCL Response: Please see NRW queries below.*
7. Section 9.6 – It is recommended that you take professional advice, from a suitably qualified person, regarding the risks to the below ground structures from the elevated sulphates identified within the groundwater. The resulting advice should be incorporated into the remediation strategy for the proposed development, outlining the concrete design and how it will be independently validated. This must be submitted to the Council for written approval prior to development works commencing.
- *TCL Response: Agreed, this will need to be incorporated into the remediation strategy.*

8. Section 9.7 – I am in agreement that Characteristic Situation 2 gas protection measures are adopted for the development. The design of these measures, including drawings and the specification of the gas membrane, should be included within the remediation strategy for the proposed development. It should also include details of how the installation of the gas protection measures are going to be independently verified by an appropriately qualified third party and this verification should be in accordance with CIRIA C735. This must be submitted to the Council for written approval prior to development works commencing.
- *TCL Response: Agreed, this will need to be incorporated into the remediation strategy and verification report.*
9. Section 11 – As previously stated I have not provided comments on the geotechnical assessment within the report as this is not within the remit of the Contaminated Land Team.
- *TCL Response: No response required.*

Natural Resources Wales (Memorandum Ref: CAS-151997-F0H1):

The site has been identified as being of higher sensitivity due to its location over a Principal Aquifer and within Source Protection Zone 3, its close proximity to two water courses (Redwither Brook at 3m south-west and the River Clywedog at 15m south-east) and the presence of three groundwater abstraction points immediately to the east of the Site. It is noted, however, that a considerable thickness of cohesive superficial deposits is present which significantly limited the vertical migration of groundwater (and any entrained contamination) into the underlying aquifer. In addition, the abstraction licence relates to process water and not a potable water supply.

The desk study has not identified historical land uses which may result in significant contamination (noting the main ordnance works were outside of the Site area); this was also confirmed by the results of the subsequent site investigation, whereby concentrations of contaminants of potential concern were not identified in concentrations which have the potential to cause significant pollution to Controlled Waters receptors.

In general, we are satisfied with the results presented and the conclusion that the Site does not pose a significant risk to Controlled Waters. However, we require clarification on the following:

- Clarification of whether surface water sampling has been undertaken. This should form part of a Site Investigation when a site is in such close proximity to a surface water course (or two in this case).
 - *TCL Response: No surface water sampling has been undertaken. See below rationale for further details.*
- We understand that six post-investigation gas and groundwater monitoring visits were completed but note that only one round of groundwater samples was recovered. Clarification is therefore required on the rationale behind not taking further samples.
 - *TCL Response: The fieldwork showed the ground conditions on site generally comprise thin Made ground <1.0m overlying stiff glacial clay understood to be >60m thick. The clay is of very low permeability and was proven to below the*

depth of the Brook and River to the south of the site. Groundwater strikes were encountered within 3 or the 42 exploratory holes and generally limited to the perched water at the base of the Made Ground / Glacial Clay.

- Section 9.4.8 of the report states the following:
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 - *there is no evidence to suggest the presence of a continuous shallow groundwater body and it is unlikely that there is a significant lateral migration of contamination;*
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- Section 9.4.9 of the report states the following:
"9.4.9 TerraConsult recommends that discussion with NRW is entered into at the earliest opportunity".

We much hope that you find the above responses are considered acceptable. If you have any queries or need any further information, then please do not hesitate to get in touch.

Yours sincerely
for and on behalf of TerraConsult Ltd



Mark Wilson
Senior Geo-environmental Consultant