

REF: 2398/VHC/ES

7th October 2020

Dear John,

RE: Vicarage Hill Court, Minera – Soakaway and Chemical Testing.

1.0 Introduction

WREXRENT & DMR (North Wales Ltd) (W&D) are planning to develop a small plot of land at Vicarage Hill Court, Minera for residential use, the site location is presented in Figure 1. The site is currently open grassland adjacent to the current residential building at Vicarage Hill Court. The proposed development is a two-story bungalow. W&D have subsequently appointed GroundSolve Ltd to excavate a trial pit and carry out permeability testing. The report presents the findings of this initial investigation.

2.0 Site Investigation

The investigation was undertaken by a Geotechnical Engineer from GSL. It comprised:

- One Trial Pit to 2.00m
- Permeability Test
- Three samples taken for chemical testing, taken at 0.10m, 0.30m and 0.60m.

Trial Pit 1 was supervised and logged in general accordance with BS 5930. The permeability testing was carried out in accordance with BRE Digest 365, which involved filling the trial pit quickly with water and monitoring the subsequent fall in water level.

The location of the trial pit/permeability test is presented on Figure 2.

Chemical Testing:

Samples for chemical testing were taken from the made ground from hand-dug pits, placed in the appropriate containers and a cool box, and taken immediately to the laboratories of Derwentside Environmental Testing Services (DETS) Limited for the following testing:

Metals & Non-metals - Arsenic (As), Boron (B), Cadmium (Cd), Chromium (hexavalent), Chromium (Trivalent), Copper (Cu), Lead (Pb), Mercury (Hg), Nickel (Ni), Phenol, Selenium (Se), and Zinc (Zn).

Petroleum Hydrocarbons - Benzene, Toluene, Ethylbenzene, o-xylene, m-xylene, p-xylene, Aliphatics >C5 – C44, Aromatics >EC5 – EC44.

Polyaromatic Hydrocarbons (PAH) – Acenaphthene, Acenaphthylene, Anthracene, Benz (a) anthracene, Benzo (a) pyrene, Benzo (b) fluoranthene, Benzo (g, h, i) perylene, Benzo (k) fluoranthene, Chrysene, Dibenzo (a, h) anthracene, Fluorene, Fluoranthene, Indeno (1,2,3-cd) pyrene, Naphthalene, Phenanthrene, Pyrene.

Other Contaminants – Sulphide (easily liberated), Water soluble Sulphate (2:1 extract), Cyanide, pH, Soil Organic Matter (SOM).

In addition, asbestos screening was carried out on all samples.

3.0 Ground Conditions

The ground conditions encountered in the boreholes typically comprised 0.60m of made ground overlying glacial till (clay) which was proved to a depth of 2.00m.

The made ground was described as firm, brown slightly sandy, gravelly clay with low cobble content. Gravel is subangular to angular fine to coarse of brick, concrete and Limestone. Cobbles are angular of brick.

The underlying glacial till was described as stiff, light brown mottled grey slightly gravelly clay with low cobble content. Gravel is subangular to subrounded fine to coarse of limestone. Cobbles are subrounded of limestone.

No groundwater was encountered during the trial pit excavation.

One permeability test was carried out within the trial pit in the glacial till. Over a monitoring period of 110 minutes, no drop in water level could be recorded, therefore it was not possible to calculate a permeability for the clay.

The trial pit log is presented in Appendix A, with the soakaway test result presented in Appendix B.

4.0 Chemical Testing

The results of the soil analyses are presented below, where they have been compared to suitable generic assessment criteria (GACs), in order to allow a generic quantitative risk assessment (GQRA) to be carried out for the site and the proposed development. Full results are presented in Appendix C.

The Category 4 Screening Levels (C4SLs) published by DEFRA (2014) have been adopted in the first instance, which have been published for six substances to date. Where a C4SL is unavailable, the “Suitable 4 Use Levels” (S4ULs) published by LQM/CIEH (2015) have been adopted.

These criteria have been derived using the CLEA model for a range of standard end-use scenarios and a range of soil organic matter (SOM) contents. It should be noted that the C4SL values are derived on the basis of a “low level of toxicological concern”, while the S4UL values are based on a “tolerable” or “minimal” level of risk. As such, the S4ULs describe a lower level of risk than the C4SLs, and are equivalent to the former Soil Guideline Values (SGVs, published by the Environment Agency) and the previous editions of the LQM/CIEH GAC values.

The final end use of the land is regarded as “residential with gardens”, which is the most sensitive end use.

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	HP1	HP2	HP3			
	0.10	0.30	0.6	Adopted Guideline (mg/kg)	Source	Exceedances
Metals & Non-Metals						
Arsenic	7.20	11.00	9.5	79	C4SL	0
Boron, Water Soluble	0.30	0.20	< 0.2	21000	S4UL	0
Cadmium	0.80	0.40	0.3	220	C4SL	0
Chromium III	10.00	18.00	25	1500	S4UL	0
Chromium, Hexavalent	< 1.0	< 1.0	< 1.0	21	C4SL	0
Copper	28.00	33.00	30	12000	S4UL	0
Lead	190.00	170.00	130	630	C4SL	0
Mercury	0.06	0.06	< 0.05	16	S4UL	0
Nickel	12.00	28.00	21	230	S4UL	0
Phenol - Monohydric	0.40	< 0.3	< 0.3	440	S4UL	0
Selenium	< 0.5	< 0.5	< 0.5	1100	S4UL	0
Zinc	210.00	120.00	90	81000	S4UL	0

No exceedances encountered.

	HP1	HP2	HP3			
	0.10	0.30	0.6	Adopted Guideline (mg/kg)	Source	Exceedances
Petroleum Hydrocarbons						
Aliphatic C5-C6	< 0.01	< 0.01	< 0.01	570000	S4UL	0
Aliphatic C6-C8	< 0.01	< 0.01	< 0.01	600000	S4UL	0
Aliphatic C8-C10	< 0.01	< 0.01	< 0.01	13000	S4UL	0
Aliphatic C10-C12	< 1.5	< 1.5	< 1.5	13000	S4UL	0
Aliphatic C12-C16	< 1.2	< 1.2	< 1.2	13000	S4UL	0
Aliphatic C16-C21	< 1.5	< 1.5	-	250000	S4UL	0
Aliphatic C21-C35	< 3.4	< 3.4	< 3.4	250000	S4UL	0
Aliphatic C35-C40	< 3.4	< 3.4	< 3.4	56000	S4UL	0
Aromatic C5-C7	< 0.01	< 0.01	< 0.01	56000	S4UL	0
Aromatic C7-C8	< 0.01	< 0.01	< 0.01	5000	S4UL	0
Aromatic C8-C10	< 0.01	< 0.01	< 0.01	5000	S4UL	0
Aromatic C10-C12	< 0.9	< 0.9	< 0.9	5100	S4UL	0
Aromatic C12-C16	< 0.5	< 0.5	< 0.5	3800	S4UL	0
Aromatic C16-C21	< 0.6	< 0.6	< 0.6	3800	S4UL	0
Aromatic C21-C35	< 1.4	< 1.4	< 1.4	3800	S4UL	0

No exceedances encountered.

Polyaromatic Hydrocarbons (PAH)	HP1	HP2	HP3	Adopted Guideline (mg/kg)	Source	Exceedances
	0.10	0.30	0.6			
Acenaphthene	< 0.03	< 0.03	< 0.03	15000	S4UL	0
Acenaphthylene	< 0.03	< 0.03	< 0.03	15000	S4UL	0
Anthracene	< 0.03	< 0.03	< 0.03	74000	S4UL	0
Benzo(a)anthracene	< 0.03	< 0.03	< 0.03	29	S4UL	0
Benzo(a)pyrene	< 0.03	< 0.03	< 0.03	10	C4SL	0
Benzo(b)fluoranthene	< 0.03	< 0.03	< 0.03	7.1	S4UL	0
Benzo(g,h,i)perylene	< 0.03	< 0.03	< 0.03	640	S4UL	0
Benzo(k)fluoranthene	< 0.03	< 0.03	< 0.03	190	S4UL	0
Chrysene	< 0.03	< 0.03	< 0.03	57	S4UL	0
Dibenzo(a,h)anthracene	< 0.03	< 0.03	< 0.03	0.57	S4UL	0
Fluoranthene	0.03	< 0.03	< 0.03	3100	S4UL	0
Fluorene	< 0.03	< 0.03	< 0.03	9900	S4UL	0
Indeno(1,2,3-c,d)pyrene	< 0.03	< 0.03	< 0.03	82	S4UL	0
Naphthalene	< 0.03	< 0.03	< 0.03	4900	S4UL	0
Phenanthrene	< 0.03	< 0.03	< 0.03	3100	S4UL	0
Pyrene	< 0.03	< 0.03	< 0.03	7400	S4UL	0

No exceedances encountered.

Other Contaminants / Testing	HP1	HP2	HP3
	0.10	0.30	0.6
Organic matter	4.00	0.90	1.1
pH	8.00	8.00	8.1
Sulphide	12.00	20.00	32
Cyanide, Total	0.60	< 0.1	< 0.1
Sulphur (free)	< 0.75	< 0.75	< 0.75
Sulphate Aqueous Extract as SO4	< 10	< 10	< 10

In addition, no Asbestos was detected in any of the samples.

Should you have any queries, please call me on 01244661361.

Yours sincerely

Elizabeth Smith