

Steve Manning
Newport City Council
By email

4th January 2021

Envirotrat Technologies Ltd
LCP House,
36 First Ave.,
Pensnett Trading Estate,
Kingswinford
DY6 7NA

Dear Steve,

Re: Proposed remediation Strategy Amendment, Herbert Road Newport (18/0293)

This letter sets out a proposed amendment to the existing remediation strategy for the site located on Herbert Road, Newport.

The site is being developed in three phases under planning decision notice 18/0293. We understand that phase 1 is complete and an application to discharge the remediation verification (condition 16) has been made. Garden remediation validation has also been completed by TerraFirma across Phases 2A and 2B (plots 1 through 38 and 76 through 99).

Construction works across phase 2 are well progressed, but soil remediation in gardens and POS (public open space) areas is yet to be completed. Phase 3 has not yet started. The amended remediation strategy set out herein will therefore apply to phases 2 (outstanding plots) and 3 only.

The site has a long history of assessment, remediation, and regulatory liaison. It is not the intention to review that in detail. It is our understanding that circa 45,000m³ of soil was imported to raise site levels to alleviated flooding risk. TerraFirma validated this material and concluded that it presented a risk to human health. They recommended that such risks be mitigated through laying of 600mm clean capping and a basal deter to dig layer. This was recommended for gardens and POS (public open space).

The purpose of this addendum is to amend these recommendations. In brief, we seek to reduce the thickness of clean cover in POS to 300mm, revise the chemical specification for clean cover soils and allow the reuse of chemically suitable, validated site-won subsoil. No changes to the proposed ground gas mitigation measures are proposed and thus ground gas is beyond the remit of this report.

Relevant Contaminant Linkages and Proposed Remediation Strategy

Remediation is required where potential contaminant linkages have been identified, assessed and concluded to be relevant¹. Remediation options for relevant contaminant linkages should be appraised and agreed with the regulator.

TerraFirma completed site investigation in 2013, prior to level raising. Soil conditions identified are little pertinence due to the thickness of imported cover placed over them. Fill materials were validated by TerraFirma, with their validation report issued in 2017.

¹ <https://www.gov.uk/guidance/land-contamination-how-to-manage-the-risks>

Human health impacts from fill materials emplaced below 8.65mAOD were to be mitigated through the subsequent cover material. A condition of the bespoke environmental permit was that fill material laid at between 8.65mAOD and 8.95mAOD should be asbestos free. TerraFirma produced a specification for this material based on published GAC (generic assessment criteria) for a residential without plant uptake end use (2015 Remediation Strategy, Table 3.1).

TerraFirma note that Engie are to raise the site further, to 9.95mAOD. They have provided a soil specification for the top 0.6m of this 1m raise to be used in gardens and areas of soft landscaping (201 Remediation Strategy, Table 3.3). The specification provided broadly comprises CIEH (Chartered Institute of Environmental Health) GAC.

No justification has been provided for either the thickness of clean cover or the GAC adopted. It is these aspects that will be discussed, along with our proposed amendments. It should be noted that the clean cover is not intended to mitigate a specific, quantified relevant contaminant linkage.

Clean Cover Thickness

TerraFirma recommended 600mm of clean cover be laid in all areas of soft landscaping. Given the absence of a quantified relevant contaminant linkage, this has been based on calculated mixing zones, for example as set out by the BRE (Building Research Establishment)². However, the clean cover thickness for residential gardens is accepted herein due to the sensitivity of the land use. However, 600mm of clean cover in POS areas is considered to be overly conservative. Turn over or excavation of surficial soils in POS areas is unlikely to occur and the deter to dig layer will prohibit biogenic turnover. Therefore, we consider 300mm over a deter to dig layer to be sufficient and this measure is commonly employed on other projects.

The clean cover will comprise a minimum of 100mm of topsoil, with any remaining cover comprising chemically suitable subsoil. It is anticipated that this will be imported to allow compliance with BS3882³ and BS8601⁴.

Adopted GAC

TerraFirma presented GAC based on a residential with homegrown produce end use for all soils in gardens and soft landscaped areas. The end use is considered appropriate for gardens, but overly conservative for soft landscaping.

GAC have been published by both DEFRA and LQM for POS (public open space) areas, including those situated within residential developments (POS resi). Current CLEA software includes a POS (resi) default setting. It excludes the consumption of homegrown produce and associated soil and the inhalation of indoor air exposure pathways included in the residential setting. However, it includes tracking back of soil and dust, followed by exposure indoors.

² BRE465 Cover systems for land regeneration – the thickness of cover systems for land contamination. Tedd *et al*, 2004. Building Research Establishment.

³ BS3882 Specification for topsoil. 2015. British Standards Institute.

⁴ BS8601 Specification for subsoil and requirement for use. 2013. British Standards Institute.

The source of the chosen GAC is not justified. It is not clear why, for example, a GAC for cadmium of 10mg/kg has been chosen when the LQM S4UL is 11mg/kg and the C4SL is 22mg/kg. The report references 'CLEA', so this may be an in-house GAC. Irrespective of the source, Envirotreat proposes adopting GAC based on the following rationale.

Proposed GAC

Defra and the EA have published a limited number of SGV (soil guideline values⁵) that represent minimal chronic risk to human health. CL:AIRE, on behalf of DEFRA, has published a limited number of C4SL⁶ that represent a low, but still strongly precautionary, level of chronic risk to human health. Both the SGV and C4SL have both been derived for a SOM (soil organic matter) content of 6% and a sandy loam soil type. Following their publication, confirmation was issued that C4SL are suitable for use in a planning situation (Lord de Mauley, 2014).

LQM responded to the demand for a more comprehensive set of screening values for a wider range of SOM and produced S4UL⁷, which are a hybrid of SGVs and C4SLs. The S4ULs have been endorsed by the CIEH (Chartered Institute of Environmental Health).

Envirotreat has adopted C4SLs, where available, as GAC to quantitatively assess the potential chronic risks to human health and suitability for use. This is in accordance with DEFRA and DCLH guidance and subsequent government clarification.

The assumptions underpinning the C4SL have been reviewed to ensure that they are applicable to the subject site. It is noted that the use of 6% SOM and a sandy loam soil has a significant effect of the benzene exposure model. However, we note that benzene is not included in the TerraFirma validation suite. The identified contaminants, comprising metals and benzo(a)pyrene, are not sensitive to SOM. The use of a sandy loam soil type is standard across human health risk assessment and underpins the derivation of the old SGVs (soil guideline values) and LQM/CIEH (Land Quality Management and Chartered Institute of Environmental Health) GAC as well as the S4UL. The use of a sandy loam soil is noted to be a precautionary approach by LQM.

On the basis of the above, Envirotreat considers that C4SL are applicable on this site and is fully in accordance with guidance issued for England and Wales. As mentioned above, C4SL have only been issued for 6no contaminants. Where C4SLs are not available, the S4ULs are used. It is noted that S4ULs are not equivalent to C4SLs in all their exposure assumptions but are generally more conservative in their assumptions.

SOM Values

S4ULs for organic contaminants have been derived for three SOM values; 1%, 2.5% and 6%. In the context of this site, this affects the S4UL to be selected for naphthalene and phenol. It does not affect inorganic contaminants. SOM is calculated from the TOC content of soils

⁵ Environment Agency Science Report SC050021 series.

⁶ CL:AIRE Final Project Report. SP1010 – Development of Category 4 Screening Levels for assessment of land affected by contamination. CL:AIRE, December 2013

⁷ The LQM/CIEH S4ULs for Human Health Risk Assessment, Nathaniel P et al, 2015. Copyright Land Quality Management Ltd, reproduced with permission: Publication Number S4UL3509

analysed during this phase of work. Given that the SOM of cover materials will not be known until tested it is proposed the most precautionary SOM value be adopted, i.e. 1%.

PAH Proxy Assessment

According to current PHE (Public Health England) guidance⁸, the assessment of PAHs should be carried out using a surrogate marker approach, whereby the assessment of risk from benzo(a)pyrene also captures potential risks from other carcinogenic PAHs that may be present. The alternative approach for PAHs using the toxic equivalent factor approach have not been used because this approach is likely to under predict the true carcinogenicity of PAHs and is not advocated by PHE. The threshold PAHs have been assessed similarly, by using naphthalene as a marker compound due to its volatility relative to other PAHs. PHE note that benzo(a)pyrene is a suitable proxy for genotoxic PAH in each of the 52no contaminated sites included in their study.

Based on the above technical details, the following chemical soil specifications are proposed.

Table 1: Chemical specification for subsoil/ topsoil (0-0.6mbgl) – residential gardens

Determinant	Criteria (mg/kg)	Criteria Derivation
Arsenic	37	Residential w/ HGP C4SL
Boron	290	Residential w/ HGP S4UL
Cadmium	26	Residential w/ HGP C4SL
Trivalent Chromium	910	Residential w/ HGP S4UL
Hexavalent Chromium	21	Residential w/ HGP C4SL
Copper ¹	100/200	Residential w/ HGP S4UL
Lead	200	Residential w/ HGP C4SL
Mercury	40	Residential w/ HGP S4UL
Nickel ¹	60/100	Residential w/ HGP S4UL
Selenium	250	Residential w/ HGP S4UL
Zinc ¹	200/300	Residential w/ HGP S4UL
Naphthalene	2.3	Residential w/ HGP S4UL (1% SOM)
Benzo(a)Pyrene	5	Residential w/ HGP C4SL
Phenol	120	Residential w/HGP S4UL (1% SOM)
Asbestos	<0.001%	Undetectable fibre content

Notes to table

1. Phytotoxic limits taken from BS3882/ BS8601. Value is dependent on type of topsoil (low fertility, calcareous or acid).

⁸ HPA Contaminated Land Information Sheet. Risk Assessment Approaches for Polycyclic Aromatic Hydrocarbons (PAHs). Public Health England, 2017.

Table 2: Chemical specification for subsoil/ topsoil (0-0.3mbgl) – POS

Determinant	Criteria (mg/kg)	Criterion Derivation
Arsenic	79	POS (resi) C4SL
Boron	21000	POS (resi) S4UL
Cadmium	220	POS (resi) C4SL
Trivalent Chromium	1500	POS (resi) S4UL
Hexavalent Chromium	21	POS (resi) C4SL
Copper ¹	100/200	POS (resi) S4UL
Lead	630	POS (resi) C4SL
Mercury	120	POS (resi) S4UL
Nickel ¹	60/110	POS (resi) S4UL
Selenium	1100	POS (resi) S4UL
Zinc ¹	200/300	POS (resi) S4UL
Naphthalene	4900	POS (resi) S4UL
Benzo(a)Pyrene	10	POS (resi) C4SL (1% SOM)
Asbestos	<0.001%	Undetectable fibre content
Phenols	120	POS (resi) S4UL (1% SOM)

Notes to table

1 Phytotoxic limit taken from BS3882/ BS8601. Value is dependent on type of topsoil (low fertility, calcareous or acid).

The risk to controlled waters from the previously imported fill material has been assessed by TerraFirma and agreed by NRW (Natural Resources Wales, previously the EA) as acceptable. As such, reuse of any existing material will not constitute an unacceptable risk. Likewise, importation of less contaminated clean cover material will not present an unacceptable risk to controlled waters.

Soil Re-use

The current Remediation Strategy does not cover the re-use of soils. This amendment includes a proposal to reuse soils in Phase 3 under the CL:AIRE Definition of Waste: Code of Practice.

The reuse of soils will be completed in accordance with a MMP (Materials Management Plant) and declared by an independent QP. As such, only materials that are chemically and geotechnically suitable for use will be reused in the required quantities.

Conclusion

This addendum sets out revised proposals for the clean cover layer recommended in the 2015 TerraFirma Remediation Strategy. It sets out thicknesses and chemical compositions for private residential gardens and areas of soft landscaping (POS).

This addendum also covers the reuse of suitable soils under an MMP in accordance with the CL:AIRE DoW:CoP.

We trust that the enclosed proposals are suitable and gain your approval.



Yours sincerely

A handwritten signature in blue ink, appearing to be "Andy Norman", with a long horizontal stroke extending to the right.

Andy Norman

Envirotreat Technologies Limited