Our Ref: 17-179.04L

FAO [redacted]
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28th February 2019

Dear [redacted]

RE: Methodology for Verification of Imported Soils for Proposed Residential Development, Former West Boldon Primary School.

Introduction

Following the production of a Phase 2: Ground Investigation Report (Ref. No. 17-179, May 2016) and supplementary investigation works following demolition of the former building (Ref: 17-179.03L November 2018), produced by Arc Environmental Ltd., further information is required to allow discharge of a pre-commencement condition.

Validation Requirements

From the findings of the Phase 2 Ground Investigation Report, there are no specific requirements for site remediation / validation, in terms of residual contamination. However, where occasional fragments of ash were recorded in BH8 and a bituminous layer was recorded below the existing building floor slab, these materials will not be suitable for reuse in areas of proposed soft landscaping and should be either removed from site or if site levels allow, be placed below areas of hardstanding (i.e. buildings / access roads).

From the supplementary works undertaken following demolition of the building and initial site strip, the bituminous layer below the former building has been removed from site and therefore no longer represents a potential risk.

A Remediation Strategy was deemed to be required by the Local Authority prior to site redevelopment to ensure that areas of proposed landscaping are provided with a suitable growing medium and that unsuitable granular made ground is not present in these areas (i.e. ash around location of BH8).

Therefore, as the site will be importing topsoil for use in proposed garden areas, this should be certified as suitable for use by validation testing.

Validation screening will be undertaken on all materials brought onto site for the areas of grassed and soft landscaping to ensure they are suitable for use on this site. The number of samples screened will be dependent upon the final volumes brought to site and the origin of the imported materials. Once the source of imported materials has been determined, the sampling regime will be agreed with the LA. We would propose to adopt the Yorkshire and Lincolnshire Pollution Advisory Group (YALPAG) 'Verification Requirements for Cover Systems', November 2017, and the sampling frequency as follows:

> Virgin Quarried Material – The suite of screening will include standard metals and metalloids. Sampling numbers 1 or 2 to confirm the inert nature of the material
>
> Crushed Hardcore, Stone, Brick – The suite of screening will include standard metals and metalloids, speciated PAH's, asbestos and leachate analysis. Sampling numbers minimum of 1 per 1000m^3.
>
> Greenfield Soils – The suite of screening will include heavy metals, speciated PAH's and asbestos. Sampling numbers minimum 3 or 1 per 250m^3 (whichever is the greater).

RE: Methodology for Verification of Imported Soils for Proposed Residential Development, Former West Boldon Primary School (Cont'd).

Validation Requirements (Cont'd)

Brownfield Source – The suite of screening will include heavy metals, speciated TPH's, speciated PAH's and asbestos and any additional analysis depending on history of donor site. Sampling numbers minimum 6 or 1 per 100m^3 (whichever is the greater).

All validation screening will be assessed against the appropriate Validation Screening Assessment Values, based on the current Level 1 Critical Concentrations (C_C) values for residential without homegrown produce end use, as shown in Table 1 below:

Table 1 - (Assessment Criteria for Imported Soils)

Analyte	Critical Conc. (C_C) mg/kg			Analyte	Critical Conc. (C_C) mg/kg		
Metals/Metalloids				**Speciated PAH's (Cont'd)**	1% SOM	2.5% SOM	6% SOM
Arsenic	37(1)			Fluoranthene	280(1)	560(1)	890(1)
Cadmium	11(1)			Fluorene	170(1)	400(1)	860(1)
Chromium III	910(1)			Indeno(123cd)pyrene	27(1)	36(1)	41(1)
Chromium VI	6(1)			Naphthalene	2.3(1)	5.6(1)	13(1)
Copper	2,400(1)			Phenanthrene	95(1)	220(1)	440(1)
Lead	200(2)			Pyrene	620(1)	1,200(1)	2,000(1)
Mercury	40(1)			**Speciated TPH**	1% SOM	2.5% SOM	6% SOM
Nickel	130(1)			Aliphatic EC5-EC6	42(1)	78(1)	160(1)
Selenium	250(1)			Aliphatic EC6-EC8	100(1)	130(1)	530(1)
Zinc	3,700(1)			Aliphatic EC8-EC10	27(1)	65(1)	150(1)
Cyanide	34(3)			Aliphatic EC10-EC12	130(1)	330(1)	760(1)
Asbestos	None Present			Aliphatic EC12-EC16	1,100(1)	2,400(1)	4,300(1)
Speciated PAH's	1% SOM	2.5% SOM	6% SOM	Aliphatic EC16-EC35	65,000(1)	92,000(1)	110,000(1)
Acenaphthene	210(1)	510(1)	1,100(1)	Aliphatic EC35-EC44	65,000(1)	92,000(1)	110,000(1)
Acenaphthylene	170(1)	420(1)	920(1)	Aromatic EC5-EC7	70(1)	140(1)	300(1)
Anthracene	2,400(1)	5,400(1)	11,000(1)	Aromatic EC7-EC8	130(1)	290(1)	660(1)
Benzo(a)anthracene	7.2(1)	11(1)	13(1)	Aromatic EC8-EC10	34(1)	83(1)	190(1)
Benzo(a)pyrene	2.2(1)	2.7(1)	3.0(1)	Aromatic EC10-EC12	74(1)	180(1)	380(1)
Benzo(b)fluoranthene	2.6(1)	3.3(1)	3.7(1)	Aromatic EC12-EC16	140(1)	330(1)	660(1)
Benzo(ghi)perylene	320(1)	340(1)	350(1)	Aromatic EC16-EC21	260(1)	540(1)	930(1)
Benzo(k)fluoranthene	77(1)	93(1)	100(1)	Aromatic EC21-EC35	1,100(1)	1,500(1)	1,700(1)
Chrysene	15(1)	22(1)	27(1)	Aromatic EC35-EC44	1,100(1)	1,500(1)	1,700(1)
Dibenz(ah)anthracene	0.24(1)	0.28(1)	0.30(1)				

(1) = LQM CIEH Suitable 4 Use Levels (S4UL Nov 2014 (Revised August 2015)) – *Residential with home grown produce,* (2) = C4SL Values (*Residential with home grown produce*), (3) = ATRISK^{SOIL} SSV.

It should be noted that the depth of the clean cover system should be a minimum of 0.15m.

Following importation of any materials to site, a final Validation Report will be submitted confirming all the works undertaken and verification that any imported materials are suitable for the site and the minimum 0.15m thickness has been achieved, and any waste disposal documentation for soils removed from site, including all details relating to the identification and remediation of any unforeseen or unknown ground contamination (if present).

We trust the above comments, and enclosures are to your satisfaction, however, if you require any further information or clarification, please do not hesitate to contact us.

Yours Sincerely

[redacted]

For and on behalf of Arc Environmental Ltd

[redacted]

Director

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