

BW Architecture
104 Great Lime Road
Westmoor
Newcastle Upon Tyne
NE12 7DQ

17th December 2015

Dear Sirs,

DETAILED REMEDIATION STRATEGY, BELESFIELD GARDENS (30919)

1. This document is to serve as a Remediation Strategy for the development at Belesfield Gardens, Jarrow, to ensure that the development is fit for purpose and would not be classified as Contaminated Land under Part IIA (EPA, 1990). The development comprises five detached houses with associated hardstanding and landscaping / private gardens.
2. The letter follows our Report on Phase 2 Site Investigation, issued in April 2014, an Updated Risk Assessment dated 28th October 2015 and a technical note entitled Excavated/Capping Soils, dated 23rd November 2015. Subsequent to the issue of these documents, both verbal and email communications from the Local Authority confirmed that the Updated Risk Assessment had not been accepted and as such, a Remediation Strategy would still be required and would also now need to consider the soils which had been moved on site.
3. The Local Authority disagreed with IFA's consideration that the thickness of the Made Ground present was "very thin" (300mm to <450mm in thickness) and our conclusions that in light of the revised guidance and screening levels, metal and PAH contaminant concentrations were negligible and would not represent any significant risk to human health without further risk assessment.
4. Following the uncontrolled movement of soil material, the Local Authority have also requested clarity in reporting on the movement of this material and some additional testing to confirm it is fit for purpose.

Contamination Identified

5. Both the original and updated IFA assessments highlighted slightly elevated levels of heavy metals and polycyclic aromatic hydrocarbons in the near surface soil (the Made Ground layer) within WS1 and WS3, depending on the screening levels used. No elevated concentrations were observed in the equivalent sample from WS2.



6. IFA will therefore determine the capping thickness based on the elevated contaminants in relation to the current screening levels ($C4SL^1/S4UL^2$), namely beryllium, dibenzo(a,h)anthracene and lead, utilising guidance provided by the BRE³.

Soil Movements

7. On the basis of the Updated Risk Assessment, soil excavated from Plots 1 and 1A to facilitate the foundations and building footprints was deposited in the rear garden areas of Plots 3 and 4 in order to build up levels by up to 700mm (levels of 500mm to 600mm were recorded by IFA as HP1 to HP5 during the site visit recorded in the Excavated/Capping Soils technical note). This was undertaken by the client in good faith that no remedial works were required, as stated in the URA, although prior to its review and subsequent rejection by the Local Authority.
8. No soil material has been transported to site from elsewhere for use in gardens or areas of landscaping. Only stone and Type 1 materials have been brought to site for use as engineering materials under roads/pavements.
9. WS2 indicated no elevated contaminant concentrations (the nearest location to Plots 1 & 1A) within the Made Ground. As such, the mixing of the near surface materials with the underlying natural soil should not represent any significant issue. However, IFA agree that confirmation of this, by testing of representative samples from the filled gardens, should be undertaken. Taking into account the elevated contaminant concentrations observed on site, it is considered that the testing should comprise of metals and speciated PAH, as previously tested.
10. Proposed sampling locations are shown on the appended Figure 1, together with clarification of excavations and the deposition of said material. The locations of the hand excavations from the technical note are also shown, and the drawing from the Client showing the areas of landscaping is also appended.

Capping Layer

11. On the basis of Paragraph 6, it is recommended that a minimum of 300mm clean imported topsoil is used as the capping layer within all areas of landscaping. The calculation spreadsheet is appended as Figure 2.
12. In terms of the rear gardens of Plots 3 and 4, provided contaminant concentrations on completion of the supplementary testing are similar to those previously encountered in WS1 and WS3, the same topsoil cover layer will be suitable. Should the capping in these areas


- require increasing, a technical note to cover this will be submitted to the Local Authority for approval prior to the capping taking place. If no further change is required, the Local Authority will also be notified to that effect with a copy of the test results.
13. Prior to importing to site, a source certificate for the topsoil should be provided to IFA to confirm that the material is fit for purpose and free from contamination. Once confirmed, material should be imported to site and once in-situ, the thickness of emplaced topsoil should be confirmed by IFA to be a minimum of 300mm in thickness, with samples obtained for validation testing. Proposed sampling locations are shown on Figure 1 to provide suitable coverage across the site.
 14. Both source certification and validation testing should comprise the following as a minimum requirement: Metals (Arsenic, Beryllium, Cadmium, Chromium (total & VI) Copper, Lead, Mercury, Nickel, Selenium and Zinc), pH, polycyclic aromatic hydrocarbons (USEPA 16 speciated), hydrocarbons (TPHCWG aromatic and aliphatic bandings), total cyanide, total phenol and asbestos screening. Results will be compared to C4SL/S4UL screening levels for a residential with plant uptake end-use, with asbestos results to be below the Level of Detection.

Reporting

15. Confirmation of all of the above should be presented in a Verification Report for the site, to be submitted for Regulatory approval. Should some plots be completed for sale in advance of others, it is considered reasonable that, provided all of the above is completed for each of the properties in question, the Verification Report may be issued initially for completed plots and updated as further plots near completion.
16. Should any changes to this Remediation Strategy be required, they must be submitted for approval by the Regulators in advance.

This Remediation Strategy must be approved by the Regulators prior to implementation. We trust this is satisfactory to your requirements at this time, but should you have any queries please do not hesitate to contact us.

Yours Sincerely
For Ian Farmer Associates (1998) Limited



A.C Owen
Principal Environmental Geologist
MESci(Hons.) MRes FGS





References

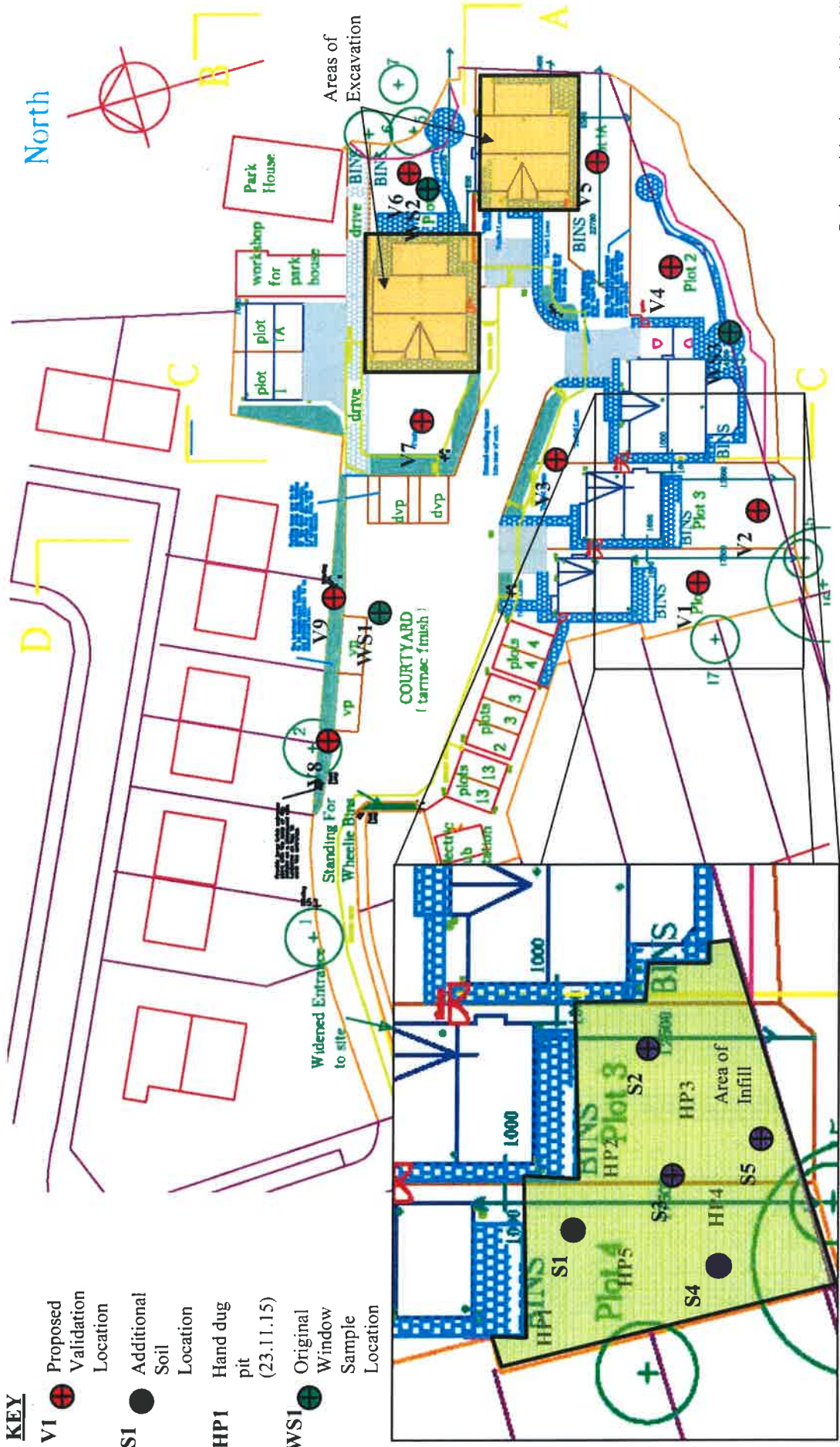
1. DEFRA. SP1010: Development of Category 4 Screening Levels for the Assessment of Land Affected by Contamination, published March 2014
2. Nathanail, C.P., McCaffery, C., Gillett A.G., Ogden R.C. and Nathanail J.F. 2015. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham. Publication Number S4UL3208
3. BRE 465 2004. Cover systems for land regeneration. Thickness of cover systems for contaminated land. BRE Bookshop ISBN 1 860816843

30919

Belesfield Gardens, Jarrow

KEY

- V1  Proposed Validation Location
- S1  Additional Soil Location
- HP1  Hand dug pit (23.1.1.15)
- WS1  Original Window Sample Location



Background drawing provided by Client

Site Plan

Scale: NTS

Figure 1



Calculations based on mixed zone (M)	450	mm
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Contaminant	Site Data				Expressed as a Factor of Target Guideline Value				Cover Thickness Required for Compliance to Specified Target Guideline Value	
	Contamination of Ground (Cg)	Contamination of Cover (Cc)	Target Guideline Value 1	Target Guideline Value 2	Target Guideline Value	Target Guideline Value	Target Guideline Value	Target Guideline Value	Target Guideline Value 1	Target Guideline Value 2
					Soil / 1	Cover / 1	Soil / 2	Cover / 2		
Units		Units		Fraction				(mm)		
Beryllium	2.4	0.9	1.7		1.4	0.5	No TV	No TV	210	No TV
Dibenzo(a,h)anthracene	0.3	0.14	0.28		1.1	0.5	No TV	No TV	56	No TV
Lead	260	100	200		1.3	0.5	No TV	No TV	169	No TV

Summary		
	Target Guideline Value 1	Target Guideline Value 2
Number of contaminants	3	3
Number of contaminants with no thickness calculation	0	3
Breakdown - Number for which no TV specified	0	3
Breakdown - Number for which no soil specified	0	0
Breakdown - Number for which no cover specified	0	0
Breakdown - Number for which cover > TV	0	0
Number of contaminants with thickness calculation	3	0
Breakdown - Number for which no cover required	0	0
Breakdown - Number for which cover required	3	0
Overall thickness of cover required	210	0

Notes
Mixed zone thickness reduced to 450mm to match maximum thickness of Made Ground recorded
Contamination of Cover taken as 0.5 x Target Guideline Value as per guidance

Figure 2

