

Eastwood & Partners, St Andrews House, 23 Kingfield Road, Sheffield, S11 9AS

Mitchell Garrington
Redrow Homes
Faraday Office Park
Basingstoke
Hampshire
RG24 8QQ

CAT/RAN/44161-008

5 October 2021

Dear Mitchell,

Barnham, Windmill Views: Required Remedial Measures

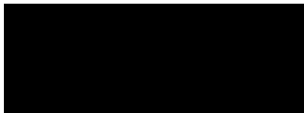
Eastwood & Partners were requested to provide a summary of the plots requiring remedial measures at the above site.

Our letter dated 22 September 2020, ref CAT/SDP/RAN/44161-005 (a copy of which is enclosed), outlines the capping requirements as a result of unsuitable topsoil encountered at the site. This confirms that plots 3-4, 6-7, 9-15, 33-42 and 47-49 require a 450 mm capping layer with a geotextile marker layer at the base.

Following the issue of this letter, asbestos fragments were encountered in the soil in the vicinity of plots 12 to 15 and as a result, the capping layer thickness was increased to 600 mm, including an anti-dig layer at the base for these plots. The attached plans show the extent of plots requiring the increased capping layer, and also a section showing the required capping layer in these plots.

No remedial measures were considered to be required in any other plots other than those listed above.

Yours sincerely



Ruth Noble

Associate

Enc. Letter ref CAT/SDP/RAN/44161-005
Drawing 44161/100 – Asbestos Affected Plots
Drawing 44161/SK02 – Section Through Proposed Capping Layer Over Asbestos Affected Soil

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CAT/SDP/RAN/44161-005

22 September 2020

Dear Mitchell,

Barnham, Windmill Views: Response to NHBC condition LQ1

Introduction

NHBC Land Quality condition 1 for this site relates to the requirement for a remediation report/strategy and verification plan.

No remediation was considered to be required as a result of chemical contamination in the topsoil, however the topsoil in some areas of the site was found to contain deleterious material including glass. This is thought to be a result of the dismantling of former greenhouses which occupied the site.

Remedial Proposals

A sketch plan showing the likely maximum extent of topsoil containing deleterious material is enclosed.

Site levels are due to be raised by at least 450 mm, it is therefore proposed that the topsoil across the affected area remains in place across gardens and landscaped areas. In these areas, a woven geotextile should be placed over the topsoil containing deleterious material, before placing the clean soil required to increase the levels to achieve the proposed finished levels. The natural ground across the site, as well as the topsoil outside the affected area is considered both chemically and physically suitable for re-use across garden and landscaped areas, and it is not therefore anticipated that additional material will need to be imported for this purpose. However, should additional soil be required, it should be from a source not expected to be contaminated and meet both physical and chemical criteria, as detailed below.

Any unsuitable topsoil which is present below areas of proposed hardstanding or plots is not considered appropriate to remain due to the potential for settlement. Therefore topsoil in these areas should be removed prior to construction. It can then be placed in garden or soft

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landscaped areas, and topped with the geotextile and at least 450 mm of clean soil, as described above.

A detailed record of the movement of unsuitable topsoil will need to be maintained.

Imported Soil

Prior to importation, certification should be obtained from the supplier detailing the source site, its previous and current land use and relevant test results. A copy of this should also be forwarded to the engineer. For the topsoil the supplier will also need to provide certification to demonstrate that it meets the criteria for classification as multi-purpose topsoil under the British Standard '*Specification for topsoil and requirements for use*', BS3882:2007.

Physical Requirements for Imported Soil

Subsoil should comprise clay or sand. Topsoil should have a maximum of 30% of fragments in excess of 2 mm, a maximum of 10% in excess of 20 mm and nothing greater than 50 mm. Subsoil should have a maximum of 60% of fragments in excess of 2 mm, a maximum of 30% in excess of 20 mm and a maximum of 10% in excess of 50 mm, with nothing in excess of 75 mm. This is to be confirmed by visual inspection of the material by a suitably qualified geo-environmental engineer.

Topsoil should be free of fragments of glass, brick, concrete, wire or other potentially hazardous foreign material which could cause traumatic injury. Reasonable judgement should be taken with respect to their presence in subsoil. In addition, all materials should be free from propagules of aggressive weeds and bulk vegetative growth, in order to ensure negligible risk of subsequent weed problems.

Chemical Requirements for Imported Soil

At least three samples should be tested for each stockpile, although may be reduced to two samples for stockpiles of less than 50 m³ for topsoil and 100 m³ for subsoil. This is to be undertaken by a suitably qualified geo-environmental engineer and depending on the source or variability of imported material, the engineer may, at their discretion, request additional testing to be undertaken. If constant sources are to be used for the topsoil and subsoil and the results recorded are consistently low, consideration may be given to reducing the number of samples tested.

Testing should be carried out for the following general suite of contaminants:

Arsenic	Mercury	Zinc
Chromium	Nickel	Speciated Polycyclic Aromatic Hydrocarbons
Copper	Cadmium	Water soluble sulphate (Subsoil only)
Lead	Selenium	pH

The results are to be compared with the current contaminated land assessment criteria for residential development. Tables of all of the assessment concentrations applicable are enclosed.

If any of the assessment concentrations are exceeded the material shall be considered to be unsuitable unless further testing and risk assessment shows it to be satisfactory.

Verification of the Capping Installation

Upon completion of the capping layer in plots located across the area of unsuitable topsoil, as well as any plots where the unsuitable topsoil was placed following removal from below plots or areas of hardstanding, verification pits shall be dug by an independent engineer in order to measure the thickness of clean soil, and confirm the presence of the geotextile marker layer. These pits should be excavated at a rate of one pit per three plots for private dwellings. Some of the pits will be completed in the landscaped areas to the front of the properties as well as the rear gardens. Any communal landscaped areas should also be covered at a rate of one per 300 m².

If the capping is deemed to be insufficient, the site manager will be informed and advised on how much more material is needed for the capping to be adequate. Verification of capping can only be carried out on areas where the capping has been completed.

A verification report is to be produced by the engineer, which includes:

- Information on the source of any imported soil;

-
- The chemical test results for the samples taken from the stockpiles of topsoil and subsoil and confirmation that the material is visually consistent with that tested or the chemical test results for samples taken once the capping has been placed;
 - Confirmation of the capping thicknesses, including photographs of the verification pits with a scaled marker;
 - Confirmation of the physical suitability of the material

The verification reports detailing the capping of garden and landscaped areas will be submitted to the NHBC to enable Land Quality Conditions to be lifted as plots are completed, and will be issued to the Local Authority at the same time.

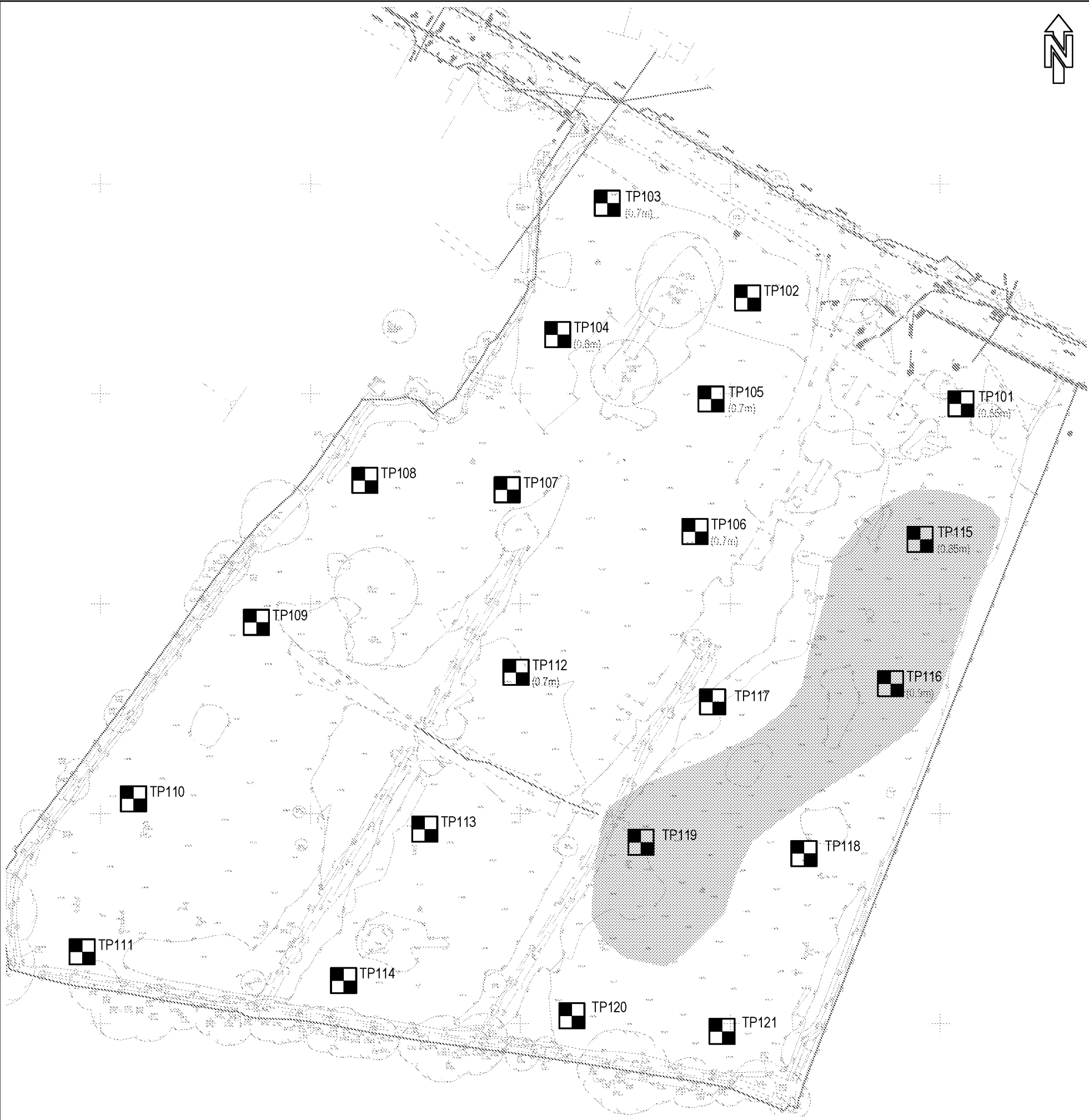
Regards,



Stephen Preston

Consultant

Enc. Sketch plan – ‘Exploratory Hole Location Plan Showing Deleterious Topsoil
 Assessment Criteria – Residential with Homegrown Produce



INFORMATION WITHIN THIS DRAWING IS NOT NECESSARILY PRODUCED TO SCALE.
ALWAYS USE FIGURED DIMENSIONS AND CO-ORDINATES - IF IN DOUBT, ASK.

KEY:

-  Approximate location of topsoil / made ground sampling location carried out by Eastwood & Partners on 16.12.19.
-  (0.7m) Approximate depth of made / re-worked ground.
-  (0.7m) Approximate depth of possible made / re-worked ground.
-  Approximate maximum extent of topsoil containing deleterious material.

A	First Issue.			
REV	DESCRIPTION	SIG	CHK	DATE

REDROW HOMES LTD

ANGEL'S & HYDE NURSERIES,
YAPTON ROAD, BARNHAM

EXPLORATORY HOLE LOCATION PLAN
SHOWING DELETERIOUS TOPSOIL

Eastwood & Partners
CONSULTING ENGINEERS



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SCALE WHEN PLOTTED AT AS 1:1000			DRAWING STATUS INFORMATION		
SKETCH ONLY			NUMBER	REV	
DRAWN	CHECKED		44161 / 050	A	
RH	RAN	21.01.20			

Inorganic Compounds	Human Health - Residential with Homegrown Produce (mg/kg)
Arsenic	37
Cadmium	11
Chromium (III)	910
Chromium (VI)	6
Lead	200
Mercury	1.2
Nickel	180
Selenium	250
Copper	2400
Zinc	3700

Organic Compounds	Human Health - Residential with Homegrown Produce (mg/kg)		
	1% SOM	2.5% SOM	6% SOM
Naphthalene	2.3	5.6	13
Acenaphthene	210	510	1100
Acenaphthylene	170	420	920
Fluorene	170	400	860
Phenanthrene	95	220	440
Anthracene	2400	5400	11000
Fluoranthene	280	560	890
Pyrene	620	1200	2000
Benzo(a)anthracene	7.2	11	13
Chrysene	15	22	27
Benzo(b)fluoranthene	2.6	3.3	3.7
Benzo(k)fluoranthene	77	93	100
Benzo(a)pyrene	2.2	2.7	3.0
Dibenz(a,h)anthracene	0.24	0.28	0.3
Indeno(1,2,3-cd)pyrene	27	36	41
Benzo(g,h,i)perylene	320	340	350
Benzene	0.087	0.17	0.37
Toluene	130	290	660
Ethylbenzene	47	110	260
o-Xylene	60	140	330
m-Xylene	59	140	320
p-Xylene	56	130	310

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Prepared	RAN	Checked	CAT	Date	20/01/20	Job No	44161
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 23 Kingfield Road
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ANGEL'S & HYDE NURSERIES, BARNHAM

REDROW HOMES

ASSESSMENT CRITERIA – RESIDENTIAL WITH
HOMEGROWN PRODUCE

Contaminant	Phytotoxicity			
	pH 5.0 to 5.5	pH 5.5 to 6.0	pH 6.0 to 6.5	pH >7.0
Arsenic	50			
Cadmium	3			
Chromium	400			
Lead	300			
Mercury	1			
Nickel	50	60	75	110
Copper	80	100	135	200
Zinc	200	200	200	300

The assessment concentration for lead is the Category 4 Screening Level produced by Contaminated Land: Applications in Real Environments (CL:AIRE) and outlined in Appendix H of their report SP1010. The others have been taken from Nathanail, C. P., McCaffrey, C., Gillett, A., Ogden, R., and Nathanail, J., 2015, *'The LQM/CIEH S4ULs for Human Health Risk Assessment'*, Land Quality Press, Nottingham. The metals/metalloids are based on a sandy loam soil and 6% soil organic matter. The assessment values are not intended to be applied to individual sample results where materials are similar, as the levels of contaminants will have a natural variability across the site. Instead, the modified mean value should be compared with the assessment concentration.

The assessment values for phytotoxicity are the levels at which plant growth is thought to be affected. They are taken from the maximum permissible and advisable concentrations in soil after application of soil sludge given in the *'The Code of Good Agricultural Practice for the Protection of Soil'*, MAFF, 1998.

The assessment of sulphate, water soluble sulphate, elemental sulphur and sulphide is to determine the aggressive nature of the ground with respect to concrete and consequently the results are compared with BRE Special Digest 1:2005 *'Concrete in Aggressive Ground'*.

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Prepared	RAN	Checked	CAT	Date	20/01/20	Job No	44161
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 Eastwood & Partners CONSULTING ENGINEERS St Andrew's House 23 Kingfield Road Sheffield S11 9AS	ANGEL'S & HYDE NURSERIES, BARNHAM REDROW HOMES ASSESSMENT CRITERIA – RESIDENTIAL WITH HOMEGROWN PRODUCE
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INFORMATION WITHIN THIS DRAWING IS NOT NECESSARILY PRODUCED TO SCALE.
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NOTES

LEGEND:



Plots requiring a 600mm capping layer, including anti-dig layer,
due to identified presence of asbestos in underlying soil.

REV	DESCRIPTION	SIG	CHK	DATE
A	First Issue.			

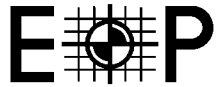
REDROW HOMES

WINDMILL VIEWS, BARNHAM

ASBESTOS AFFECTED PLOTS

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SCALE WHEN PLOTTED AT A1

1:2500 / 1:100

DRAWING STATUS

PRELIMINARY

DRAWN	CHECKED
RH	RAN

DATE
07.01.21

DRAWING NUMBER
44161 / 100

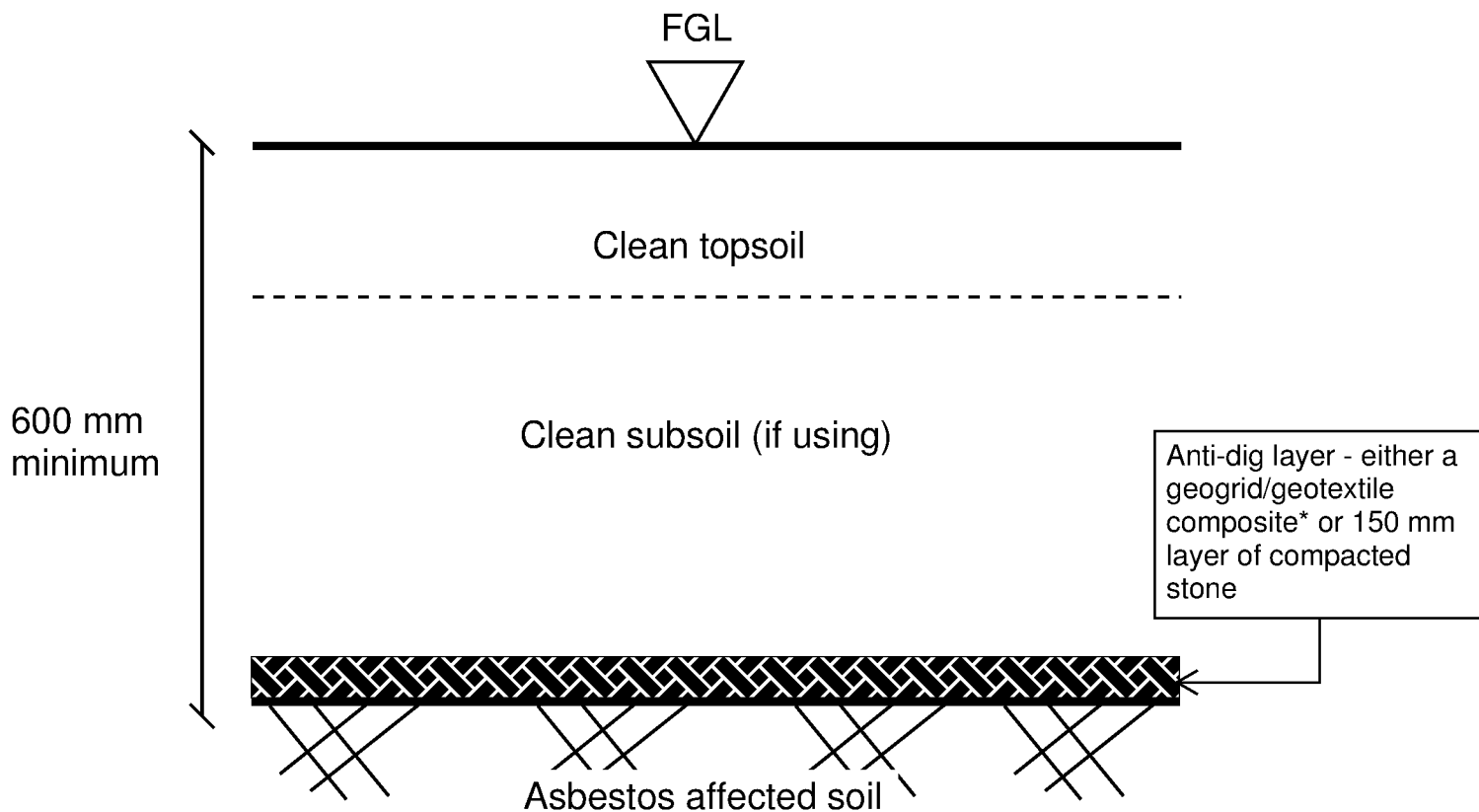
REV
A

Section Through Proposed Capping Layer over Asbestos Affected Soil

Site: Windmill Views, Barnham

Client: Redrow Homes

E&P Ref: 44161/SK02



*Geogrid/geotextile composite is a polypropylene extruded biaxial geogrid with a non-woven geotextile bonded to one side.