

Rajdeep Sohanpall
Technical Coordinator
Bellway Homes Limited (North London)
by email only



18th February 2021

Our ref. LP2396/HG/1

Dear Rajdeep,

Re: Interim verification report for the provision of clean cover at 30-32 Blyth Road, Hayes, London

Leap Environmental Ltd (hereafter referred to as **LEAP**) has been appointed by Bellway Homes Limited (North London) (Bellway) to inspect and validate the provision of clean cover capping in soft landscaped areas at a site known as 30-32 Blyth Road, Hayes, London, UB3 1BY. This report provides an interim verification of capping works in seven soft landscaped areas to the front of low-rise residential properties at the site only. Laboratory test results from onsite subsoil/topsoil samples and confirmation of topsoil fill depths are outstanding. The interim report was requested by Bellway to support the CML certification of the development.

1 Previous Work

The following reports refer to work that has been undertaken by **LEAP** and others, which should be read in conjunction with this letter report:

- Listers, '*Ground Investigation 30-32 Blyth Road, Hayes, Middlesex, UB3 1BY*', dated May 2015 (Ref. 15-02-004);
- **LEAP**, '*Phase 2 Ground Contamination Investigation & Assessment at 30-32 Blyth Road, Hayes, Middlesex, UB3 1BY*' dated 12th June 2018 (Ref: LP1624/SI); and
- **LEAP**, '*Remediation Method Statement on Site at 30-32 Blyth Road, Hayes, UB3 1BY, for Bellway Homes (North London) Ltd*', 26 March 2019 (Ref: LP1624/RMS).

2 Introduction

The site known as 30-32 Blyth Road is located within the Blyth Road Industrial Estate, Hayes, London. The rectangular-shaped site is located to the west of Station Road, and approximately 0.12km north west from Hayes and Harlington train station. To the immediate north of the site is Blyth Road, to the east of the site are further industrial developments within the Blyth Road Industrial Estate and to the south is a railway line, aligned west to east.

Historically the site was used as an engineering works and prior to the redevelopment a disused industrial building occupied approximately two thirds of the site. All buildings on site were demolished as part of the redevelopment. The site now comprises seven two-storey residential houses in the north of the site and an L-shaped building with ground floor commercial units and apartments from the first floor and above, with associated car parking spaces in the east and central portions of site. Landscaped areas are present between Blyth Road and the residential houses in the north and along the western boundary. No private gardens are present.

The intrusive investigations identified made ground comprising concrete, asphalt with demolition materials to depths of between 0.33 m bgl and 2.2 m bgl, underlain by sandy clayey gravels of the Lynch Hill Gravel Member between 2.2 m bgl and 6.0 m bgl, and stiff clays of the London Clay Formation at depth.

Groundwater was encountered during monitoring visits on the 15th, 24th and 30th of May 2018 in BH01 at 3.08 m bgl to 3.19 m bgl and in BH02 at 3.30 m bgl to 3.40 m bgl.

No evidence of visual or olfactory evidence of contamination was noted in the soils encountered, with the exception of suspected asbestos containing materials (ACMs) in an excavation pit for one borehole (BH02) in the southwest corner of the site. Laboratory testing recorded concentrations of PAHs and lead above screening criteria in the made ground samples that were analysed. Free fibres of asbestos were also detected in one soil sample (LE02), but below levels of quantification (0.001%).

2.1 Remediation Method Statement

The remedial requirements for the development are set out in the **LEAP** remediation method statement (RMS) (Ref: LP1624/RMS dated March 2019).

The RMS required in areas of soft landscaping that made ground was to be excavated to a minimum depth of 450mm and a geomembrane/deter to dig layer placed at the base of the excavation. The levels were then required to be made up with suitable clean cover soils including 150mm minimum of topsoil as a suitable growing medium. If ACMs were encountered in vicinity of garden plots made ground was required to be excavated to either 1m below the finished level or to the natural strata and followed by validation testing of the excavation sides and bases to ensure all contaminated ground is removed.

All imported soils were subject to the test parameters appended to the RMS and a defined testing frequency of three samples per source and a further one sample per 100-150m³ of topsoil and one sample per 150-300 m³ of subsoil.

3 Plot Verification

LEAP attended site on 16th February 2020 to inspect the clean cover placed in the landscaped areas in Plots 1 to 7. Drawing 3951-BBLA-SP-00-DR-101-H dated 13/12/18 (Appendix A) illustrates the locations of the soft landscaped areas.

At the time of the visit only small areas of land approximately 1.5 m long by 0.80 m wide had been excavated in the plots, as shown by the photographic record provided in Appendix B. With the exception of plot 6 all voids had been lined with a geotextile membrane and filled with subsoil to ground level. Only the geotextile membrane had been placed in plot 6 at the time of the visit.

Bellway informed LEAP that land surrounding the landscaped excavations was to be raised by two brick levels (~130mm) to meet the requirements of the RMS and to accommodate the hardstand areas. Bellway also confirmed to LEAP that the landscaped areas as excavated at the time of the visit were the extents of the soft landscaping areas to the front of the low-rise buildings.

At the time of the visit it was not possible to inspect ground in the soft landscaped areas for the presence of ACMs due to the placement of the geotextile membrane, fill material and wooden boards covering the locations. Bellway reported to LEAP that ACM had not been observed in the plot areas. We note that during the site investigation suspected ACMs were identified to the far south of the site.

The topsoil / subsoil for use as backfill in the landscaped areas was stored on site within bulk bags, as shown in Appendix B.

It was not possible to verify the full depth of clean cover at the time of the inspection visit due the absence of topsoil within the plots. However, samples of topsoil and subsoil were taken from the bulk bags present on site, as well as a sample of subsoil in Plot 4 for verification analysis.

Bellway have provided photographic evidence of the subsoil fill depths for all locations (as Appendix B). This report will be updated on completion of the topsoil filling.

Table 1 below summarises the subsoil thicknesses provided on the Bellway photographic records.

Table 1 Details of the Clean Cover Inspection

Plot Number	Subsoil Thickness (mm)	Geotextile membrane present?	Topsoil Thickness (mm)	Overall Thickness (mm)
1	480	Yes	TBC	TBC
2	490	Yes	TBC	TBC
3	480	Yes	TBC	TBC
4	470	Yes	TBC	TBC
5	470	Yes	TBC	TBC
6	510	Yes	TBC	TBC
7	470	Yes	TBC	TBC

TBC = to be confirmed

Based on the depth of subsoil fill listed above the minimum depth requirements of the RMS have been met. The depth of fill will be increased once the topsoil layer has been placed.

4 Topsoil and Subsoil

Bellway reported that the topsoil imported to site was a manufactured topsoil provided by Freeland Horticulture Ltd. Topsoil was described on conformance certificates provided by Bellway, as a dark brown friable sandy loam with small stones and no reported visual or odorous evidence of contamination.

Bellway reported that the subsoils imported to site were provided by Bourne Amenity Ltd.

Laboratory test certificates assessing the physical and chemical quality of the topsoil and subsoil prior to importing to site were provided by Bellway (see Appendix C). The test certificates provided by Bellway meet the chemical acceptability criteria for use as topsoil / subsoil in private gardens listed in the RMS.

Approximately 4.0 m³ of subsoil has been placed in the seven soft landscaped areas inspected by LEAP and it is estimated that approximately 1.3 m³ of topsoil will be used in these areas. In total three subsoil and three topsoil samples have been collected for laboratory analysis. This is compliant with the sampling density specified in the RMS. At the time of writing the test results have not been received, the report will be updated when the testing has been completed.

5 Conclusion

Based on the site inspection by LEAP and the photographic records provided by Bellway, it is considered Plots 1 to 7 have met the depth of fill requirements outlined in the RMS. This will be further increased when the topsoil is placed. Based laboratory test certificates provided by the subsoil / topsoil suppliers to Bellway and visual inspection of the subsoil/topsoil by LEAP it is likely that the material will meet the chemical acceptability criteria listed in the RMS. This letter will be updated once the topsoil depths have been confirmed and the onsite topsoil/subsoil laboratory verification tests have been received.

If you have any questions, please do not hesitate to contact the undersigned.

Yours faithfully,



Hannah Gutteridge

Enc.

Appendix A – Figures

Appendix B – Photographs

Appendix C – Bellway Supplied Laboratory Certificates

Appendix D – RMS Chemical Acceptability Criteria

This letter report has been prepared by Leap Environmental Ltd on the basis of information received from a variety of sources which Leap Environmental Ltd believes to be accurate. Nevertheless, Leap Environmental Ltd cannot and does not guarantee the authenticity or reliability of the information it has obtained from others.

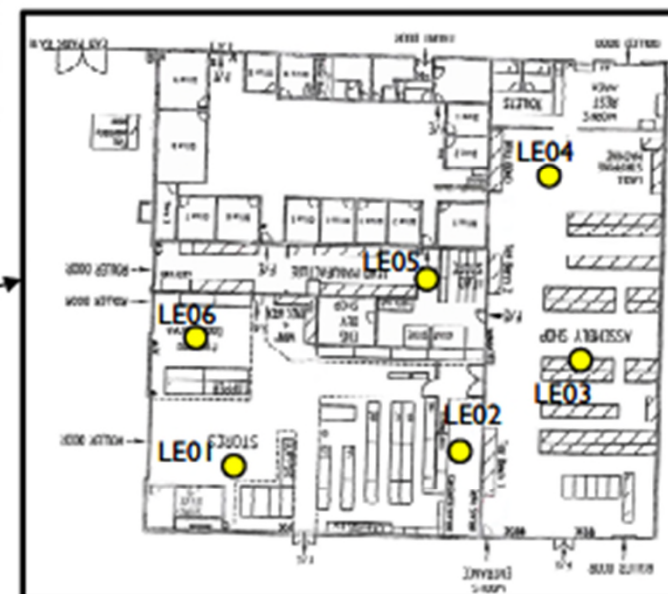
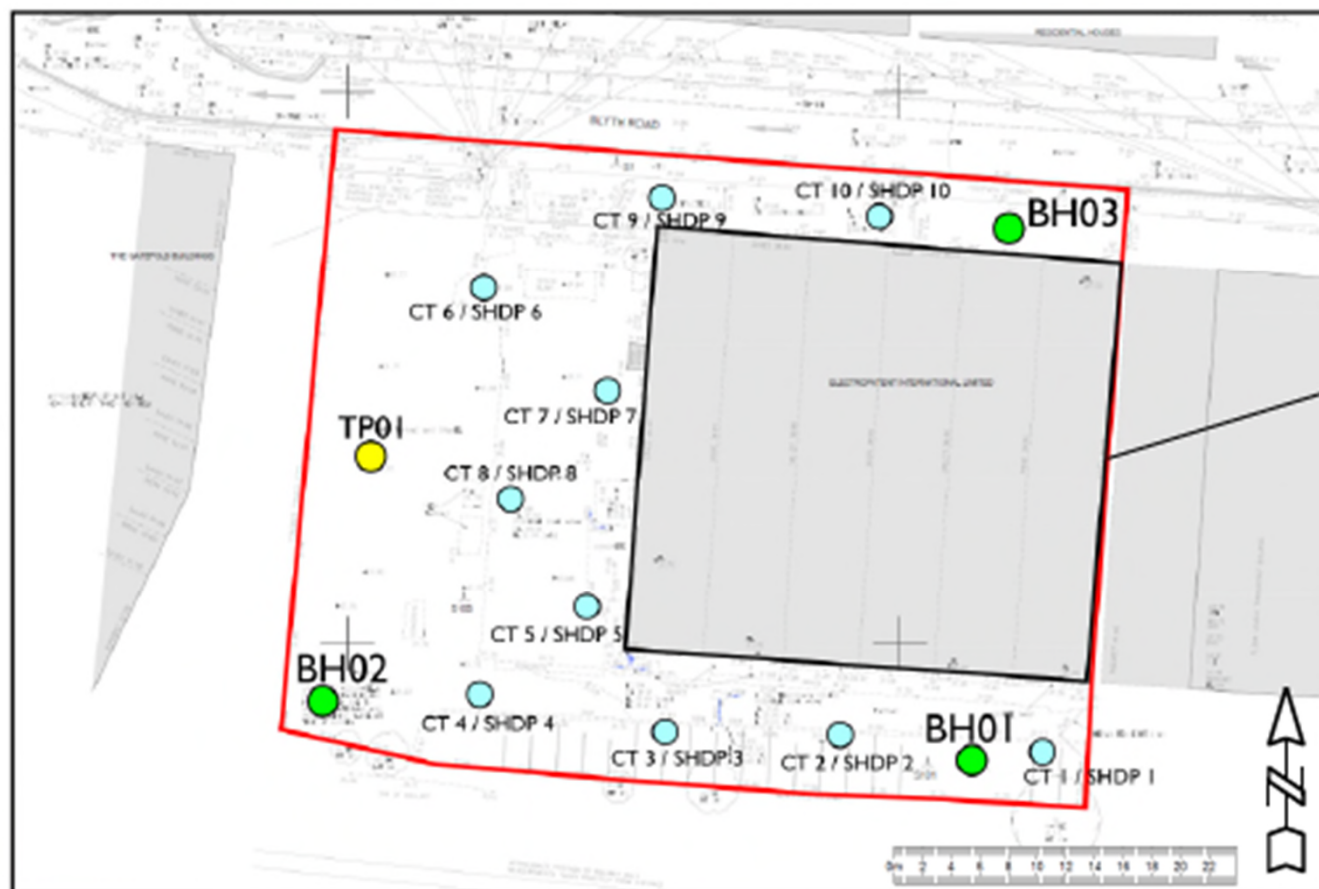
Leap Environmental Ltd has used all reasonable skill, care and diligence in the design and execution of this report, taking into account the manpower and resources devoted to it in agreement with the Client. Although every reasonable effort has been made to obtain all relevant information, all potential contamination, environmental constraints or liabilities associated with the site may not necessarily have been revealed.

This report is generally consistent with the Eurocode requirements for a Ground Investigation Report, noting the limitations on brief to provision of pile design information only. However, the laboratory testing has been carried out on samples which do not comply with the Eurocode classifications as identified in tables 2 and 3 of EN ISO 22475-1. This report should not be deemed as a Geotechnical Design Report, and where any calculations have been made, these are not Eurocode compliant and are for indicative purposes only.

The conclusions reached in this report are necessarily restricted to those which can be determined from the information consulted, and may be subject to amendment in the light of additional information becoming available. These conclusions may not be appropriate for alternative schemes.

This report is confidential to the Client, and Leap Environmental Ltd accepts no responsibility whatsoever to third parties to whom this report, or any part thereof, is made known, unless formally agreed by Leap Environmental Ltd beforehand. Any such party relies upon the report at their own risk.

Figures



- Site Boundary
- Trial Pits (LEAP)
- Cable Percussion Boreholes (LEAP)
- Continuous Tube Sampler Borehole / Super Heavy Dynamic Probe (Listers)



Client: Bellway

Project: 30-32 Blyth Road

Date: 18th February 2021

Title: Borehole Location Plan

Project ID: LP2396

Fig. No. 3

APPENDIX B – SITE PHOTOGRAPHS

Site Photographs



Plate 1: Plot 3 shrub planting area (Provided by Bellway).



Plate 2: Plot 6 shrub planting area (Provided by Bellway).



Plate 3: Plot 2 shrub planting area measurement (Provided by Bellway).



Plate 4: Plot 4 shrub planting area measurement (Provided by Bellway).



Plate 5: Plot 3 shrub planting area (Provided by Bellway).

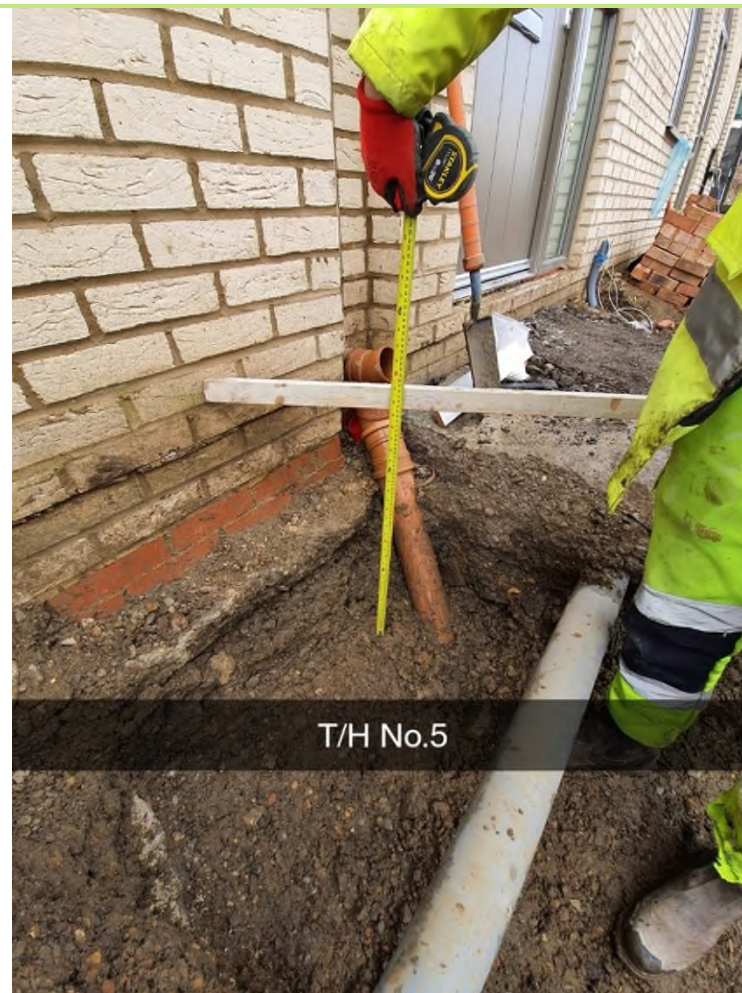


Plate 6: Plot 5 shrub planting area measurement (Provided by Bellway).



Plate 7: Plot 4 with geotextile wrap around subsoil within shrub planting area from which an environmental sample was taken (Taken by LEAP Engineer).



Plate 8: Plot 1 hand dug pit with thickness of subsoils indicated (Provided by Bellway)



Plate 9: Plot 2 hand dug pit with thickness of subsoils indicated (Provided by Bellway)



Plate 10: Plot 3 hand dug pit with thickness of subsoils indicated (Provided by Bellway)



Plate 11: Plot 4 hand dug pit with thickness of subsoils indicated (Provided by Bellway)



Plate 12: Plot 5 hand dug pit with thickness of subsoils indicated (Provided by Bellway)



Plate 13: Plot 6 hand dug pit with thickness of subsoils indicated (Provided by Bellway)



Plate 14: Plot 7 hand dug pit with thickness of subsoils indicated (Provided by Bellway)



Plate 15: Topsoil bulk bag 3 from which an environmental sample was taken (Taken by LEAP Engineer)



Plate 16: Topsoil bulk bags 1 and 2 from which environmental samples were taken (Taken by LEAP Engineer).



Plate 17: Subsoil bulk bags 1 and 2 from which environmental samples were taken (Taken by LEAP Engineer).

APPENDIX C – SOIL LABORATORY CERTIFICATES

Soil Laboratory
Certificates



Freeland Horticulture Ltd
Rosedale Nursery
College Road
Hextable
Kent
BR8 7LT

Attention: Philippa Lambourne

Our Ref: 0862-SA

26 August 2020

Dear Philippa

Topsoil Analysis Report : Potters Bar – August 2020

We have completed the analysis of the topsoil sample recently taken from the above site and have the pleasure of reporting our findings. The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes.

SOIL SAMPLING & EXAMINATION

At the time of our sampling visit the topsoil was stored in a stockpile. A series of 10 hand augered trial holes were constructed across the stockpile for the purpose of soil examination and sample collection. As the soil examination confirmed a consistent topsoil composition, the ten samples were combined to form one composite sample for analysis purposes. The soil was described as a dark brown, friable *sandy loam* with a moderately developed, medium to coarse granular structure. The soil contained a low fraction of small stones and no deleterious materials (eg. building waste materials, glass, etc) or unusual odours (eg. hydrocarbons) were recorded.

LABORATORY ANALYSIS

The topsoil sample was submitted to a UKAS accredited laboratory for routine physical and chemical parameters to confirm the composition and fertility of the soil. The following parameters were determined:

- ⊕ pH & electrical conductivity values;
- ⊕ major plant nutrients (N, P, K, Mg) & organic matter content;
- ⊕ particle size distribution and stone content;
- ⊕ heavy metals & potentially toxic elements (As, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn, B);
- ⊕ sulphate, sulphur, sulphide;
- ⊕ total cyanide and total (mono) phenols;
- ⊕ speciated PAHs (US EPA16);
- ⊕ banded aromatic and aliphatic petroleum hydrocarbons (C₅-C₃₅).
- ⊕ Asbestos.

The results are presented on the attached Certificate of Analysis and an interpretation of the results is given below.

COMMENTS

Phone: 01322 619161

pH & Electrical Conductivity (salinity) Values

The sample was alkaline in nature (pH 8.5) with a pH value that would be considered suitable for general landscaping purposes.

The electrical conductivity value using the soil:water extract was moderate (1066µS/cm) indicating that soluble salts are not present at levels that would be harmful to plants.

Organic Matter & Nutrient Status

The sample contained adequate levels of organic matter and all major plant nutrients. No further additions of compost or fertiliser are required, or indeed recommended, for at least the first growing season.

Particle Size Distribution & Stone Content

The sample contained 85% sand and fell into the *loamy sandy* texture class. This particle size distribution is considered suitable for a broad range of landscape applications, including tree and shrub planting, turfing and seeding.

The sample was free from stones of 50 mm and upwards in diameter and only contained a slight fraction of smaller stones (21.6%). As such, stones will not restrict the use of the soil for landscaping purposes.

Potential Contaminants

We are not aware of any specified contaminant levels set for the proposed end-use of this topsoil so the following comments are based on the Soil Guideline Values (SGVs) for residential end-use presented in the Contaminated Land Exposure Assessment (CLEA) Model (EA/DEFRA:2002). The SGVs currently only consider a limited range of parameters so where a potential contaminant is not covered by the CLEA Model other relevant schedules for contamination assessment, such as the Dutch Guidelines, and professional judgement have been used.

Of the potential contaminants determined, none was found at levels that would indicate significant contamination.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil for general landscaping purposes. From the soil examination and laboratory analysis, the soil is described as an alkaline, non-saline, sandy loam. The organic matter and nutrient levels are acceptable, and no significant contamination was found with respect to the parameters determined. This soil would adhere to all aspects of the current BS3882 specification for 'multipurpose grade'.

To conclude, based on our findings, the topsoil would be considered well-suited to general landscaping purposes provided the physical condition of the soil is maintained.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if you have any queries or comments.

George Longmuir MSc Soil Sci. M.I Soil Sci.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Potters Bar, Hertfordshire
Month/Year	August 20
Our Ref	0862-SA
Date	26 August 2020

Composite sample

pH Value & Salinity

pH value (1:2.5 soil/water ext)	units	8.5
Electrical Conductivity (1:2.5 soil/water ext)	µS/cm	1066
Neutralising Value (CaCO ₃ equivalent)	%	1.4
Neutralising Value (CaO equivalent)	%	<1

Organic Matter & Nutrient Status

Organic Matter (LOI)	%	6.2
Organic Carbon (Derived)	%	3.6
Total Nitrogen	%	0.258
Carbon:Nitrogen Ratio	:1	14
Available Phosphorus	mg/l	68.4
Available Potassium	mg/l	1282
Available Magnesium	mg/l	138

Particle Size Analysis & Stones

Clay (<0.002mm)	%	7
Silt (0.063-0.002mm)	%	8
Sand (2.0-0.063mm)	%	85
Texture Class	UK Class	Sandy Sand

Stones 2-20mm	% by DW	21.6
Stones 20-50mm	% by DW	0.0
Stones >50mm	% by DW	0.0

Potential Contaminants

Total Arsenic (As)	mg/kg	16.7
Total Cadmium (Cd)	mg/kg	0.39
Total Chromium (Cr)	mg/kg	17.0
Hexavalent Chromium (Cr ^{VI})	mg/kg	0.3
Total Copper (Cu)	mg/kg	20.6
Total Lead (Pb)	mg/kg	22.5
Total Mercury (Hg)	mg/kg	<0.2
Total Nickel (Ni)	mg/kg	23.3
Total Selenium (Se)	mg/kg	0.32
Total Zinc (Zn)	mg/kg	125
Total Beryllium (Be)	mg/kg	<1
Total Barium (Ba)	mg/kg	47.8
Total Vanadium (V)	mg/kg	30.4
Hot Water Soluble Boron (B)	mg/kg	1.6
Total Cyanide (CN)	mg/kg	<1
Elemental Sulphur (S)	mg/kg	<5
Easily Liberated Sulphide (S ²⁻)	mg/kg	<1
Water Soluble Sulphate (SO ₄ ²⁻)	mg/l	105
Total Phenols Index	mg/kg	<1
Asbestos Screen	-	N.D.

Client	Freeland Horticulture Ltd
Job Name	Topsoil Analysis
Site	Potters Bar, Hertfordshire
Month/Year	August 20
Our Ref	0862-SA
Date	26 August 2020

Polyaromatic Hydrocarbons

Naphthalene	mg/kg	<0.05
Acenaphthylene	mg/kg	<0.05
Acenaphthene	mg/kg	<0.05
Fluorene	mg/kg	<0.05
Phenanthrene	mg/kg	0.1
Anthracene	mg/kg	<0.05
Fluoranthene	mg/kg	0.2
Pyrene	mg/kg	0.2
Benzo[a]anthracene	mg/kg	0.1
Chrysene	mg/kg	0.1
Benzo[b]fluoranthene	mg/kg	<0.1
Benzo[k]fluoranthene	mg/kg	<0.1
Benzo[a]pyrene	mg/kg	<0.1
Indeno[1,2,3-cd]pyrene	mg/kg	<0.1
Dibenzo[a,h]anthracene	mg/kg	<0.1
Benzo[g,h,i]perylene	mg/kg	<0.1
Total PAHs sum US EPA 16	mg/kg	<1

Banded Petroleum Hydrocarbons

Aliphatic TPH >C ₅ -C ₆	mg/kg	1.2
Aliphatic TPH >C ₆ -C ₈	mg/kg	<0.4
Aliphatic TPH >C ₈ -C ₁₀	mg/kg	<4
Aliphatic TPH >C ₁₀ -C ₁₂	mg/kg	<4
Aliphatic TPH >C ₁₂ -C ₁₆	mg/kg	<4
Aliphatic TPH >C ₁₆ -C ₂₁	mg/kg	10.2
Aliphatic TPH >C ₂₁ -C ₃₅	mg/kg	36.2
Aliphatic TPH >C ₃₅ -C ₄₄	mg/kg	<12

Aromatic TPH >C ₅ -C ₇	mg/kg	<0.02
Aromatic TPH >C ₇ -C ₈	mg/kg	<0.02
Aromatic TPH >C ₈ -C ₁₀	mg/kg	<0.02
Aromatic TPH >C ₁₀ -C ₁₂	mg/kg	<4
Aromatic TPH >C ₁₂ -C ₁₆	mg/kg	<4
Aromatic TPH >C ₁₆ -C ₂₁	mg/kg	7.1
Aromatic TPH >C ₂₁ -C ₃₅	mg/kg	14.8
Aromatic TPH >C ₃₅ -C ₄₄	mg/kg	<0.2

Total Petroleum Hydrocarbons (C ₅ -C ₄₄)	mg/kg	68.3
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BTEX

Benzene	mg/kg	<0.02
Toluene	mg/kg	<0.2
Ethyl Benzene	mg/kg	<0.04
m- & p-Xylene	mg/kg	<0.2
o-Xylene	mg/kg	<0.1



Certificate of Analysis

Client: PHILIPPA LAMBOURNE
(G281) FREELAND HORTICULTURE LTD
ROSEDALE NURSERY
COLLEGE ROAD
HEXTABLE
KENT BR8 7LT

Originator: BAT AND BALL SUBSOIL
SOIL

Lab ID: 44695 - 424605
Sample ID: SUBSOIL 20/02/19
Fresh Sample Weight: 1506 (g)

Date Received: 20/02/2019
Date Reported: 27/02/2019

BS 8601 : 2013 SPECIFICATION FOR SUBSOIL Multipurpose Grade

				Compliant with range (Y/N)		
		Unit	Result	Multi-P	Acid	Calc
Texture:	Clay	% w/w	18	See area of permitted soil textural classes in Fig. 1.		
	Silt	% w/w	6			
	Sand	% w/w	76			
	Textural Class	Sandy Loam				
Mass Loss on Ignition:		% w/w	0.9	Y	Y	Y
Coarse	>2 mm	% w/w	0.3	Y	Y	Y
Fragment	>20 mm	% w/w	0.0	Y	Y	Y
Content:	>75 mm	% w/w	0.0	Y	Y	Y
Soil pH:			7.8	Y	N	Y
Carbonate:		% w/w	<1			N
Exchangeable Sodium Percentage:		%	0.5	Y	Y	Y
Phytotoxic	Total Zinc	mg/kg	33.5	Y	Y	Y
Contaminants:	Total Copper	mg/kg	4.2	Y	Y	Y
	Total Nickel	mg/kg	25.6	Y	Y	Y
Visible Contaminants:	> 2mm	% w/w	0.00	Y	Y	Y
	Plastics	% w/w	0.00	Y	Y	Y
	Sharps	% w/w	0.00	Y	Y	Y
	Weight of Sharps	g	0.0			
Available	Phosphorus	mg/l	13.8 (1)*			
Plant	Potassium	mg/l	81.8 (1)*			
Nutrients:	Magnesium	mg/l	157.3 (3)*			
Additional Analysis:	Available Sodium	mg/l	8.1			
	Available Calcium	mg/l	988.5			
	Conductivity	uS/cm	2068			
	Conductivity CaSO4 Adj.	uS/cm	108			
Compliance:				Y	N	N

Results are expressed on a dry matter basis.

* Soil indices from RB209

Released by:

Darren Whitbread

Date: 27/02/2019

DECLARATION:

I certify that this sample has been analysed by NRM Ltd. in accordance with BS 8601 Specification for Subsoil (2013).

NRM Coopers Bridge, Braziers Lane, Bracknell, Berkshire RG42 6NS

Tel: +44 (0) 1344 886338 **Fax:** +44 (0) 1344 890972 **Email:** enquiries@nrm.uk.com **www:** nrm.uk.com



Analytical Report

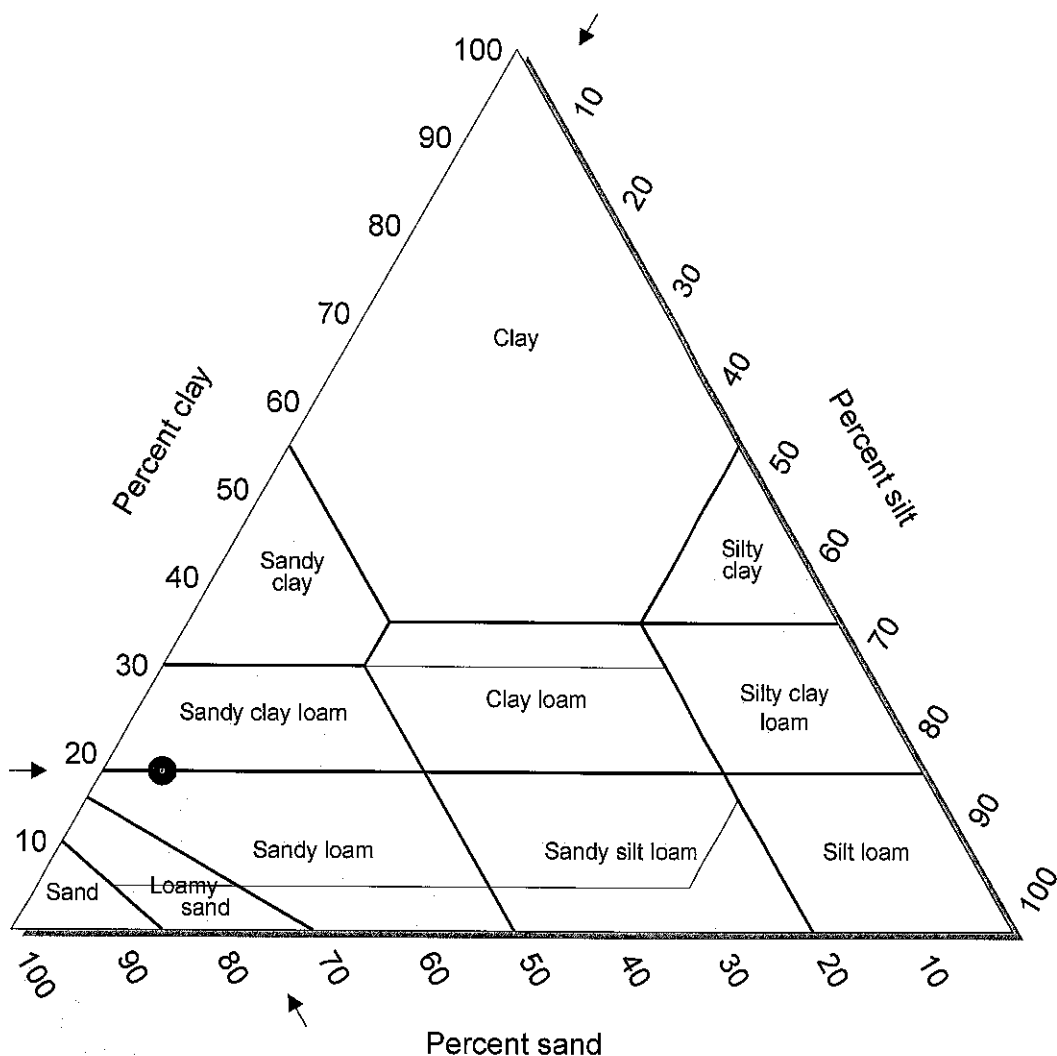
Client: PHILIPPA LAMBOURNE
(G281) FREELAND HORTICULTURE LTD
ROSEDALE NURSERY
COLLEGE ROAD
HEXTABLE
KENT BR8 7LT

Originator: BAT AND BALL SUBSOIL
SOIL

Lab ID: 44695 - 424605
Sample ID: SUBSOIL 20/02/19
Fresh Sample Weight: 1506 (g)

Date Received: 20/02/2019
Date Reported: 27/02/2019

Fig. 1. Textural Class: Sandy Loam (compliant)



Key



Area within which texture of subsoil is required to fall.



Analytical Report

Client: PHILIPPA LAMBOURNE
(G281) FREELAND HORTICULTURE LTD
ROSEDALE NURSERY
COLLEGE ROAD
HEXTABLE
KENT BR8 7LT

Originator: BAT AND BALL SUBSOIL
SOIL

Lab ID: 44695 - 424605
Sample ID: SUBSOIL 20/02/19
Fresh Sample Weight: 1506 (g)

Date Received: 20/02/2019
Date Reported: 27/02/2019

		Unit	Result
Additional Analysis:	Very Coarse Sand 1.0 - 2.0mm	% w/w	1
	Coarse Sand 0.5 - 1.0mm	% w/w	13
	Medium Sand 0.25 - 0.50mm	% w/w	42
	Fine Sand 0.15 - 0.25mm	% w/w	15
	Very Fine Sand 0.05 - 0.15mm	% w/w	5
	Silt 0.002 - 0.05mm	% w/w	6

Results are expressed on a dry matter basis unless otherwise specified.

Released by:

Darren Whitbread

Date: 27/02/2019

Material: Subsoil
Source: Bourne Amenity Ltd
Date Tested: 04/08/2020
Tested Against: BS8601:2013
Tested By: Tim O'Hare Associates (Report ID TOHA/20/9575/2/SS)

Parameter	Unit	BS8601:2013 Range	Result	Compliance
Texture:				
Clay (<0.002mm)	% w/w	5 - 30%	5	Yes
Silt (0.002 - 0.05mm)	% w/w	0 - 65%	2	Yes
Sand (0.063 - 2.0mm)	% w/w	20 - 90%	93	Yes*
Textual Class:				
Sand				
Stones (2 - 20mm)	% w/w DW	40%	2	Yes
Stones (20-75mm)	% w/w DW	20%	0	Yes
Stones (>75mm)	% w/w DW	0%	0	Yes
Sand Fraction (USGA Sieve Sizes):				
Very Fine Sand (0.05 - 0.15mm)	% w/w	n/a	2	--
Fine Sand (0.15 - 0.25mm)	% w/w	n/a	7	--
Medium Sand (0.25 - 0.50mm)	% w/w	n/a	46	--
Coarse Sand (0.50 - 1.0mm)	% w/w	n/a	34	--
Very Coarse Sand (1.0 - 2.0mm)	% w/w	n/a	4	--
Organic Matter (LOI)	% w/w	0.0 - 2.0	<0.5	Yes
Ph		5.5 - 8.5	7.9	Yes
Exchangeable Sodium Percentage	%	< 15%	1.5	Yes
Phytotoxic Contaminants:				
Total Zinc	mg/kg	0 - 200	14	Yes
Total Copper	mg/kg	0 - 135	4	Yes
Total Nickel	mg/kg	0 - 75	<1.0	Yes
Available Nutrients:				
Phosphorus	mg/l	n/a	8	--
Potassium	mg/l	n/a	9	--
Magnesium	mg/l	n/a	7	--
Additional Analysis:				
Electrical Conductivity (1:2:5 water extract)	µS/cm	n/a	48	--
Electrical Conductivity (CaSO4 extract)	µS/cm	n/a	2013	--
Saturated Hydraulic Conductivity	mm/hr	n/a	66	--
Visible Contaminants:				
>2.0mm	% w/w	< 0.5	0.0	Yes
Plastics	% w/w	< 0.25	0.0	Yes
Sharps	% w/w	0.0	0.0	Yes

Parameter	Unit	Guidelines	Value	Result	Compliance
Heavy Metals and Hydrocarbons					
Total Antimony (Sb)	mg/kg	S4UL	<500	<1.0	Yes
Total Arsenic (As)	mg/kg	S4UL	<37	7	Yes
Total Barium (Ba)	mg/kg	S4UL	<1300	11	Yes
Total Beryllium (Be)	mg/kg	S4UL	<1.7	0.3	Yes
Total Cadmium (Cd)	mg/kg	S4UL	<11	<0.2	Yes
Total Chromium III (Cr)	mg/kg	S4UL	<910	12	Yes
Hexavalent Chromium (Cr Vi)	mg/kg	S4UL	<6	<4.0	Yes
Total Cyanide (Cn)	mg/kg	Dutch Action Value (DAV)	<20	<1	Yes
Total Lead (Pb)	mg/kg	SP1010 (Defra Category 4)	<200	1.7	Yes
Total Mercury (Hg)	mg/kg	S4UL	<1.2	<0.3	Yes
Total (mono) Phenols	mg/kg	S4UL^	<550	<1.0	Yes
Total Selenium (Se)	mg/kg	S4UL	<250	<1.0	Yes
Total Vanadium (V)	mg/kg	S4UL	<410	26	Yes
Water Soluble Boron (B)	mg/kg	S4UL	<290	0.3	Yes
Water Soluble Sulphate (SO4)	g/l	BRE Special Digest 1:2005 (BRE)	<1.2	0.0042	Yes
Acenaphthylene	mg/kg	S4UL^	<420	<0.05	Yes
Acenaphthene	mg/kg	S4UL^	<510	<0.05	Yes
Anthracene	mg/kg	S4UL^	<5400	<0.05	Yes
Benzo (a) Anthracene	mg/kg	S4UL^	<11	<0.05	Yes
Benzo (a) Pyrene	mg/kg	S4UL^	<2.7	<0.05	Yes
Benzo (b) Fluoranthene	mg/kg	S4UL^	<3.3	<0.05	Yes
Benzo (g,h,i) Perylene	mg/kg	S4UL^	<340	<0.05	Yes
Benzo (k) Fluoranthene	mg/kg	S4UL^	<93	<0.05	Yes
Chrysene	mg/kg	S4UL^	<22	<0.05	Yes
Dibenzo (a,h) Anthracene	mg/kg	S4UL^	<0.28	<0.05	Yes
Fluoranthene	mg/kg	S4UL^	<560	<0.05	Yes
Fluorene	mg/kg	S4UL^	<400	<0.05	Yes
Indeno (1,2,3-cd) Pyrene	mg/kg	S4UL^	<36	<0.05	Yes
Naphthalene	mg/kg	S4UL^	<5.6	<0.05	Yes
Phenanthrene	mg/kg	S4UL^	<220	<0.05	Yes
Pyrene	mg/kg	S4UL^	<1200	<0.05	Yes
Aliphatic TPH (C5 - C6)	mg/kg	S4UL^	<78	<0.001	Yes
Aliphatic TPH (C6 - C8)	mg/kg	S4UL^	<230	<0.001	Yes
Aliphatic TPH (C8 - C10)	mg/kg	S4UL^	<65	<0.001	Yes
Aliphatic TPH (C10 - C12)	mg/kg	S4UL^	<330	<1.0	Yes
Aliphatic TPH (C12 - C16)	mg/kg	S4UL^	<2400	<2.0	Yes
Aliphatic TPH (C16 - C21)	mg/kg	S4UL^	<92000	<8.0	Yes
Aliphatic TPH (C21 - C35)	mg/kg	S4UL^		<8.0	Yes
Aliphatic TPH (C5 - C35)	mg/kg	S4UL^	<92000	<10	Yes
Aromatic TPH (C5 - C7)	mg/kg	S4UL^	<140	<0.001	Yes
Aromatic TPH (C7 - C8)	mg/kg	S4UL^	<290	<0.001	Yes
Aromatic TPH (C8 - C10)	mg/kg	S4UL^	<83	<0.001	Yes
Aromatic TPH (C10 - C12)	mg/kg	S4UL^	<180	<1.0	Yes
Aromatic TPH (C12 - C16)	mg/kg	S4UL^	<330	<2.0	Yes
Aromatic TPH (C16 - C21)	mg/kg	S4UL^	<540	<10	Yes
Aromatic TPH (C21 - C35)	mg/kg	S4UL^	<1500	<10	Yes
Aromatic TPH (C5 - C35)	mg/kg	S4UL^	<1500	<10	Yes
Benzene	mg/kg	S4UL^	<0.17	<0.001	Yes
Toluene	mg/kg	S4UL^	<290	<0.001	Yes
Ethylbenzene	mg/kg	S4UL^	<110	<0.001	Yes
O-xylene	mg/kg	S4UL^	<140	<0.001	Yes
M-xylene	mg/kg	S4UL^	<140	<0.001	Yes
P-xylene	mg/kg	S4UL^	<130		Yes
MTBE	mg/kg	Sail Guideline Values	<470	<0.001	Yes
Asbestos	mg/kg	Control of Asbestos Regulations 2006	Absent	Absent	Yes

APPENDIX D – IMPORTED SOIL SPECIFICATION

Imported Soil
Specification

LEAP SPECIFICATION FOR PLACEMENT OF IMPORTED FILLS AND PROCUREMENT OF IMPORTED TOPSOIL AND SUBSOIL.

I FILLS

I.1 Filling Generally

Filling shall be carried out in accordance with the recommendations of BS 6031: 1981.

Fill shall be maintained and protected in a satisfactory condition at all times until final completion.

Any material rendered unsuitable or unsatisfactory after being placed in the works shall be repaired or replaced as appropriate so that all the completed filling is in accordance with the specification.

I.2 Dimensions

Fills shall be constructed to backfill the excavations made to remove unacceptable material in order to reinstate the ground to finished levels with an allowance for shrinkage and consolidation of the fill material subsequent to completion, and in order that the minimum clean cover as specified in the remediation method statement is achieved.

The excavated levels shall be recorded before the commencement of filling. The level of the filled areas shall be taken and recorded after filling.

2 Types of Fill

There are potentially two types of fill to be used. These are as follows:

- Topsoil
- Subsoil

The capping of landscaped areas will comprise a minimum of 150 mm of topsoil to finished garden level. Underlying subsoil thicknesses will be as required to achieve the overall finished levels and to provide the required cover layer thicknesses as detailed in the main body of this report.

2.1 Topsoil

It is recommended that imported topsoil complies with the requirements of BS 3882: 2015 for a Premium or General Purpose Grade material.

The topsoil shall be free from fragments of glass, bricks, concrete, wire or other potentially hazardous matter.

The topsoil will be subject to the additional limitations set out below.

2.2 Subsoil

Imported manufactured or modified subsoil shall comprise certified clean material which satisfies the conditions set out in BS8601:2013. Subsoil arising from site or from a certified direct transfer (e.g. under CL:AIRE Code of Practice) shall comprise clean natural arisings from construction activities which have been confirmed acceptable by the Engineer.

2.3 Sources of Materials

Imported materials may be obtained from any source unless otherwise stated in the Drawings or in the Specification.

It shall remain the responsibility of the Contractor to obtain only fill material complying with the Specification and Method Statement, notwithstanding any tests which may be accepted by the Engineer.

The Contractor shall demonstrate to the Validation Engineer's satisfaction that his fill materials from each source are uncontaminated by submitting to the Validation Engineer a chemical analysis of material or evidence of such other tests as the Validation Engineer may require for all proposed sources of fill, and if necessary sampling and analysing materials as they are delivered to stockpiles or the fill location on site.

Sampling rates shall be a minimum of one sample per 150 cubic metres of imported soil, unless otherwise agreed with the Engineer. Such tests for chemical composition as may be agreed by the Engineer shall be carried out on each sample and the results of tests shall be forwarded to the Engineer. Testing for contamination on samples taken shall be carried out at a testing laboratory approved by the Engineer and shall be to appropriate MCERTS standards. The Contractor shall maintain records of the location in the Works of fill from each source and the date of delivery to the site, and shall submit these records to the Engineer as requested. Chemical analysis on the imported fill material shall include testing for the contaminants listed in Tables B1 as a minimum. Contaminant concentrations shall be below those listed in Tables B1 and B2, which are attached, unless agreed otherwise by the Engineer. Additional analyses may be requested depending on the source and nature of the material.

In addition, the following shall be deemed as unacceptable for replacement fills:

- Peat, materials from swamps, marshes and bogs.
- Logs, stumps and perishable material.
- Materials in a frozen condition.

- Clay having a liquid limit determined in accordance with BS1377; Part 2, exceeding 90% or plasticity index determined in accordance with BS1377; Part 2, exceeding 65%.
- Material susceptible to spontaneous combustion.

Should the Contractor proceed with stockpiling or spreading and fill prior to receiving approval from the Engineer of results of the above tests, and the results of such tests show that the fill is contaminated above acceptable levels, the Contractor shall remove all contaminated material and replace it with acceptable material at his own cost as part of the main contract.

TABLE BI: CHEMICAL ACCEPTABILITY CRITERIA FOR MATERIALS TO BE IMPORTED FOR USE AS TOPSOIL OR SUBSOIL IN PRIVATE GARDENS

Determinant	Assessment Criteria mg/kg
pH	6.5-9.5
Arsenic	32
Cadmium	10
Trivalent Chromium	3000
Hexavalent Chromium	4.3
Copper	2330
Lead	200
Mercury	170 ¹
Nickel	130
Zinc	3700 ²
Selenium	350
Naphthalene	2.3
Acenaphthylene	170
Acenaphthene	210
Fluorene	170
Phenanthrene	95

Anthracene	2400
Fluoranthene	280
Pyrene	620
Benzo(a)Pyrene	0.5/ 5 ³
Asbestos	Not detected

Notes to table

1. *Assessment criterion based on inorganic mercury.*
2. *Assessment criterion based on oral pathway only.*
3. *Lower value to be used where soils comprise cover layer over contaminated material. Higher value to be used where material used over uncontaminated soils.*

TABLE B2: CHEMICAL ACCEPTABILITY CRITERIA FOR MATERIALS TO BE IMPORTED FOR USE AS TOPSOIL OR SUBSOIL IN PUBLIC OPEN SPACE

Determinant	Assessment Criteria mg/kg
pH	6.5-9.5
Arsenic	79
Cadmium	220
Trivalent Chromium	1500
Copper	12000
Lead	630
Mercury	120 ¹
Nickel	230
Zinc	81000
Selenium	1100
Naphthalene	4900
Acenaphthylene	15000

Acenaphthene	15000
Fluorene	9900
Phenanthrene	3100
Anthracene	74000
Fluoranthene	3100
Pyrene	7400
Benzo(a)Pyrene	10
Asbestos	<0.001 wt%

Notes to table

1. *Assessment criterion based on inorganic mercury.*
2. *Assessment criterion based on oral pathway only.*