Remediation Validation Report | Commercial Development



Report prepared at
Mowlem Trading Estate, Leeside Road,
Tottenham Hale, N17 0QJ

Report prepared for
Diageo Pension Trust (Property Custodian) Limited (as Trustee Custodian of the Diageo Pension Scheme) and Diageo Pension Trust Limited (as Trustee of the Diageo Pension Scheme)

Report reference
14-126.07

Report date
February 2016

Prepared by
Aviron Associates Limited

Geotechnical and Land Contamination Specialists
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Report Quality Management

Project Name	Mowlem Trading Estate, Leeside Road, Tottenham Hale, N17 0QJ		
Project Title	Remediation Validation Report		
Client	Diageo Pension Trust (Property Custodian) Limited (as Trustee Custodian of the Diageo Pension Scheme) and Diageo Pension Trust Limited (as Trustee of the Diageo Pension Scheme)		
Project Number	14-126.07		
Version	Revision A		**Date**
Prepared by	James Burkitt BEng (Hons) CEnv MRICS	Managing Director	12/02/2016
Prepared & Checked by	Orlando Blackwell BEng (Hons) MSc (Eng)	Principal Engineer	12/02/2016

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1.0 PROJECT AND SITE INFORMATION

1.1 APPOINTMENT

Aviron Associates Limited (Aviron) was retained by Parlison Properties Limited (Parlison) on behalf of Diageo Pension Trust (Property Custodian) Limited (as Trustee Custodian of the Diageo Pension Scheme) and Diageo Pension Trust Limited (as Trustee of the Diageo Pension Scheme) (the "Client") prepare a Remediation Validation Report of the following premises:

Mowlem Trading Estate, Leeside Road, Tottenham Hale, N17 0QJ (hereafter referred to as the "site").

The purpose of this report is to document remediation and validation works completed such that it can be demonstrated that all previously encountered soil contamination has been remediated and the site and individual plots can be considered suitable for residential occupancy.

The purpose of this is report is to address the three land contamination issued raised within our previously approved 'Addendum to Phase II Geo-Environmental Risk Assessment report' (ref; 14-126.04, July 2014) which was prepared to address the London Borough of Haringey letter of 27 May 2014 "Planning Ref: HGY/2014/0460 - Approval of Detail".

Accordingly the three outstanding land contamination issues which require validation are;

1. To remove at least 450mm of made ground from soft landscaping areas and replace with 450mm of clean cover of topsoil. A geotextile barrier membrane is to be laid at the base of the topsoil cover to provide a capillary break.

2. The correct installation of barrier pipe for new water main supply.

3. The completion of Waste Acceptance Criteria (WAC) testing in order to suitably dispose of on-site waste soils.

The following three sections of the report; 2.0 to 4.0; shall address each of the points above with the objective of addressing planning condition 8 of consent HGY/2013/1792.

Additionally planning condition 9 shall be address with comment regarding the discovery of previously undiscovered 'contamination'.

1.2 THE SITE

Table 1.2 presents site details.

Table 1.2 Site Details

Site Location	The site is located on Leeside Road, off Watermead Way in a commercial area of Tottenham Hale.
Land Use	The site is near completion of a number of commercial units with parking, and small landscaped boarders. **Figure 1** is presented as a Development Plan.
Surrounding Land Use	The site is surrounded by commercial property comprising the Tottenham Marsh electricity transformer station to the south, an IKEA superstore and the Leeside Road Gasholder to the north, a bus depot (Arriva Lee Valley) to the east and the Leeside Industrial Estate to the west.

2.0 REMEDIATION TO SOFT LANDSCAPING

Excavation of soft landscaping in accordance with the approved remediation strategy is understood to have been completed by the Client's building contractor Marbank Construction Limited (Marbank).

Excavation works were completed under the instruction of the Client. Aviron were not in attendance during excavation works.

A photograph to demonstrate the construction of a 450mm cover of 'clean' Topsoil has been provided by Marbank and are enclosed as **Appendix I**. Review of the photograph suggest a depth of 450mm below final levels has been achieved and there is evidence of a 'red' geotextile membrane being laid upon the in-situ 'Made Ground' at the 450mm formation.

Figure 1 is presented as a Trial Hole Location Plan.

It is concluded the necessary 'clean cover' has be constructed to remove potential contaminative exposure risk to site occupants and end users.

The imported Topsoil was sourced by Marbank who provided a letter report prepared by Tim O'Hare Associates LLP (TOA) to demonstrate the suitability of the imported Topsoil. Review of the TOA letter report against current CLEA SGV, LQM S4ULs and C4SLs indicates the proposed Topsoil is acceptable for commercial use. TOA also indicate the Topsoil meets the criteria of a BS3882:2015 'multi-purpose Topsoil'.

The TOA letter report is enclosed as **Appendix II.**

2.1 GUIDANCE USED FOR ASSESSING SOIL CONTAMINATION

The 'Contaminated Land Exposure Assessment' (CLEA) Soil Guideline Values (SGVs) are used for generic assessment purposes for a limited number of chemical determinants. The SGVs have been derived using a combination of toxicological data and assumptions of the land-use (pathways), building stock and soils.

The CLEA Model developed by the Environment Agency can be used to derive generic guidance values for a number of chemical determinants for which SGVs are still awaited, using published TOX reports.

For chemical determinants where there are no available SGV, Aviron have applied "The LQM/CIEH S4ULs for Human Health Risk Assessment" published December 2014. The S4ULs (Suitable 4 Use Levels) replaced the previously and widely adopted Generic Assessment Criteria (GACs) that were developed by Land Quality Management (LQM)/CIEH (2nd edition, 2009). In addition the Category 4 Screening Levels (C4SLs) published in September 2015 by CL:AIRE shall be applied.

Both guides used the CLEA Model together with published chemical physical-chemical data and toxicological information to derive acceptable contaminant concentrations to be used as a screening tool to determine the limit where there would be minimal impact to human health.

LQM acknowledgement for use of S4ULs: ***"Copyright Land Quality Management Limited reproduced with permission; Publication Number S4UL3275. All rights reserved".***

3.0 WATER MAIN SUPPLY

Marbank have confirmed the installation of barrier pipe and presented as **Appendix III** are photographs of each rising main to new units.

4.0 WAC TESTING

WAC testing was completed by Environmental Scientifics Group on behalf of Marbank prior to waste disposal in August 2014 and February 2015.

Laboratory certificates of analysis for WAC testing are enclosed in **Appendix IV**.

5.0 RISK ASSESSMENT

Following interpretation of the laboratory results a revised conceptual model has been prepared and is presented within Table 5.1.

5.1 CONCEPTUAL SITE MODEL

Following interpretation of the laboratory results, site dynamics and the aforementioned risk assessment a refined conceptual model has been prepared and is presented in table 5.1

Table 5.1 Refined Conceptual Site Model (for pertinent pollutant linkage pathways)

Source	Pathway	Receptor	Risk	Justification
Previously encountered on-site soil contaminants.	Direct contact Ingestion Inhalation of fugitive dust	Human health – end users.	LOW	Previously encountered elevated concentrations of metals and PAH have been removed from soft landscaping areas or constructed upon. This has been confirmed by physical inspection and photography. Remediated soft landscaped have been backfilled with 'clean' imported Topsoil.
	Direct contact	Flora and fauna	LOW	Remediation has been successful. Plant growth within BS3882:2015 'multi-purpose Topsoil' should be successful.
	Entering new water supply main (direct contact)	Human Health	LOW	Barrier pipe installed

5.2 RISK RATING

The plausible pollutant linkages have been subject to risk classification, which is designed to consider environmental risk in the context of the current proposals for the site that may involve redevelopment or a change of use as discussed within Section 2.0.

Table 5.2 Risk Classification

Risk	Description
Low	Little risk of encountering contamination and causes of pollution and harm. Further assessment and site investigation is unlikely but may be required to confirm the absence of risk. Remediation very unlikely.
Medium	Reasonable risk of encountering contamination and causes of pollution and harm. Further assessment and site investigation may be required to further develop and refine the CSM. There is also low probably that site remediation shall be required.
High	Significant risk of encountering contamination and causes of pollution and harm. Further assessment and site investigation shall be required to further develop and refine the CSM. There is also the possibility that site remediation shall be required.

The overall environmental risk classification (following remediation and validation works) for the proposed commercial use is **LOW**.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

The remediation excavation and soil validation sampling exercise has confirmed the following;

- The previously encountered metals and PAH contaminated soils notably at near surface levels within overlying Made Ground have been removed from the identified remediation areas/landscaping.
- A suitable 450mm clean cover of BS3882:2015 'clean' multi-purpose Topsoil has been installed upon a red geotextile membrane.
- Barrier pipe has been installed to prevent chemical attack of new water supply mains and subsequent ingestion risks to human health.
- The site is considered fit for commercial occupancy and an LOW risk is considered to future site occupants.
- Marbank have also confirmed (planning condition 9) that they encountered no previously undiscovered contamination and abnormally stained our odorous soils during their groundworks.

5.2 RECOMMENDATIONS

Waste transfer notes to demonstrate disposal of waste soils should be provided as an addendum to this report. These are currently held by the Client's project team and were not available at the time of reporting. In any event Aviron can confirm the waste soils no longer exist on-site.

7.0 PROJECT INSTRUCTION AND LIMITATIONS

7.1 SCOPE OF WORKS

The following scope of work was undertaken to an agreed proposal prior to works and involves the following;

- Review validation information.
- Prepare a Validation Report to document the exercise and determine the site is fit for purpose.

Aviron has relied upon information received from the Client and their agents as accurate, unless contradicted by written documentation or site observations.

7.2 PUBLISHED GUIDANCE

This report follows the technical approach presented in Contaminated Land Report 11 (CLR11) "Model Procedures for the Management of Land Contamination" prepared by the Environment Agency in 2004. CLR11 provides guidance on the application of management processes when assessing potentially contaminated land.

This project and report have been designed to fulfil the information requirements set out in the Environment Agency Guidance on Requirements for Land Contamination Reports prepared by the Environment Agency in 2005.

Notwithstanding the above this report is additionally prepared in accordance with current guidance notes, standards and practices as set out by the Environment Agency and statutory organisations in order to establish potential and significant pollutant linkages as defined in Part IIA of the Environmental Protection Act 1990.

7.3 LIMITATIONS

Aviron's scope of work has been designed to meet the timeframe and has been prepared within the benefit of information supplied.

Should changes in legislation, statutory requirements or industry practices occurred following issue of this report, this report should be viewed in light of these changes.

Should a notable time period elapse between the date issue of this report and the date of application of this

report changes to site dynamics may occur and in particular the site inspection notes may no longer be applicable should any change of use occur to the site in the interim.

8.0 REFERENCES AND OTHER SOURCES OF INFORMATION

Aviron Associates Limited. Phase II Geo-Environmental Risk Assessment and Addendum to Phase II Geo-Environmental Risk Assessment. References 14-126.02 and 14-126.03.

DEFRA and Environment Agency, 2004. Model Procedures for the Management of Land Contamination, Contaminated Land Report 11.

NHBC (2010). National House Building Council Standards. Chapter 4.

BS EN ISO 22475-1 Geotechnical investigation and testing - sampling methods and groundwater measurements

BS10175. British Standards Institute. 2011, Investigation of Potentially Contaminated Land - Code of Practice.

LQM/CIEH: Paul Nathanail, Caroline McCaffrey, Andy Gillett, Richard Ogden and Judith Nathanail. 2014. The LQM/CIEH S4ULs for Human Health Risk Assessment. Land Quality Press, Nottingham. ISBN 978-0-9931084-0-2. "Copyright Land Quality Management Limited reproduced with permission; Publication number S4UL3275. All rights reserved"

SP1010 - Development of Category 4 Screening Levels for Land Affected by Contamination. Final Project Report (Revision 2). Contaminated Land : Applications In Real Environmental (CL:AIRE). September 2014.

SR2: Human health toxicological assessment of contaminants in soil, Science Report SC050021/SR2, Environment Agency, August 2008.

SR7: Compilation of Data for Priority Organic Pollutants for Derivation of Soil Guideline Values, Science Report SC050021/SR7, Environment Agency, November 2008.

Environment Agency. July 2005. *Guidance on Requirements for Land Contamination Reports.*

Building Research Establishment (BRE). *Report, BRE465 (2004) Cover systems for land regeneration*

Figures

1 Development and Trial Hole Inspection Plan

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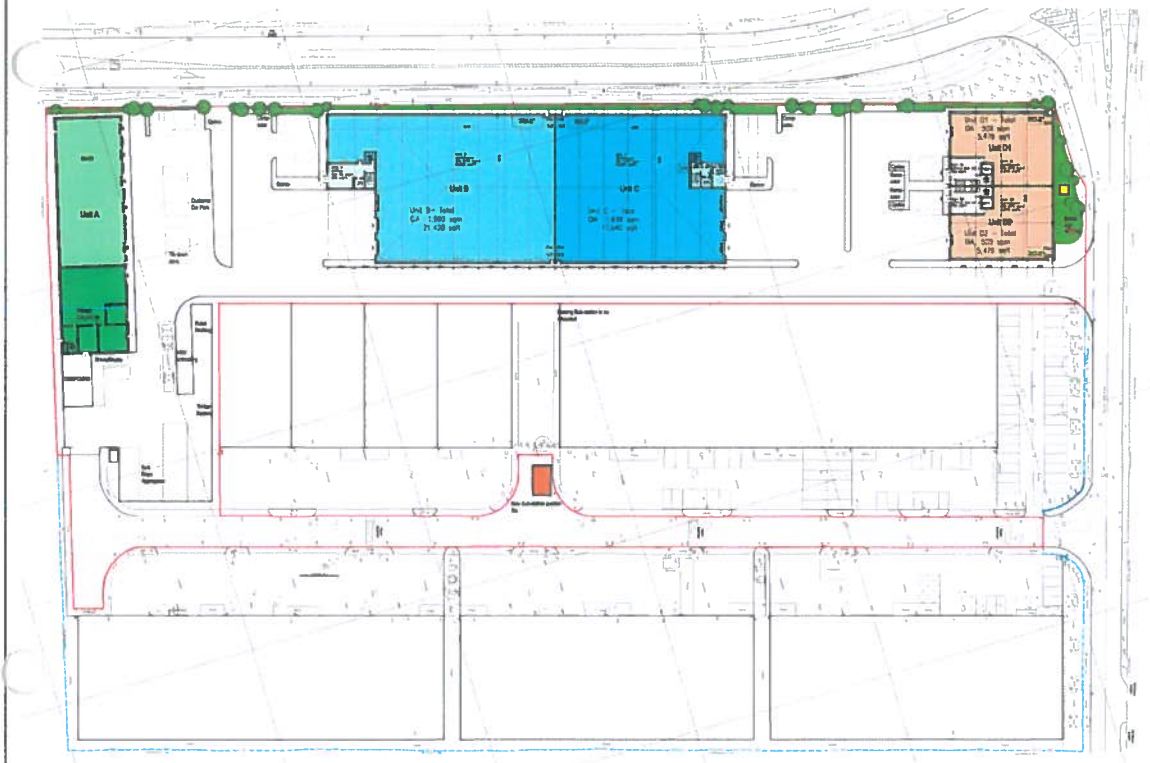

Legend

Trial Hole Location

Notes

Figure 1

Drawing Title	Proposed Development and Trial Hole Location Plan
Project Number	14-126.07
Project Title	Mowlem Trading Estate, Leeside Road, Tottenham Hale, N17 0QJ
Drawn by	JB
Checked by	OB
Scale	NTS

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Appendices

I Trial Hole Photographs

II Topsoil Import Certificate

III Barrier Pipe Installation Photos

IV Laboratory WAC Test Results

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I Trial Hole Photographs

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PHOTOGRAPHIC LOG

SITE	Mowlem	**DATE**	
PROJECT	14-126.07	**TAKEN BY**	Marbank



TH1
Topsoil on red geotextile

Appendix

II Topsoil Import Certificate

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MCM
Approved Selling Agent

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Mr Ryan Geere
H. Sivyer Transport Ltd
160 Sydenham Road
London
SE26 5JZ

16th November 2015
Our Ref: TOHA/15/6512/SS
Your Ref: 1510/3631SR

Dear Sirs

Topsoil Analysis: Trugrow Topsoil – November 2015

We have completed the analysis of the soil sample recently submitted from the Victoria Deep site, referenced *Trugrow – November 2015,* and have pleasure reporting our findings.

The purpose of the analysis was to determine the suitability of the sample for general landscape purposes. In addition, this sample has been assessed to determine its compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil).*

This report presents the results of analysis for the sample submitted to our office, and it should be considered 'indicative' of the topsoil source. The report and results should therefore not be used by third parties as a means of verification or validation testing or waste designation purposes, especially after the topsoil has left the H Sivyer Transport Ltd site.

SAMPLE EXAMINATION

The sample was described as a light olive brown (Munsell Colour 2.5YR 5/6) slightly moist, friable SANDY LOAM with single grain and weakly developed fine granular structure*. The sample was slightly stony and contained very occasional organic fines. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

* This appraisal of soil structure was made from examination of a disturbed sample(s). Structure is a key soil characteristic that may only be accurately assessed by examination in an in-situ state.

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ANALYTICAL SCHEDULE

The sample was submitted to a UKAS and MCERTS accredited laboratory for a range of physical and chemical tests to confirm the composition and fertility of the soil, and the concentration of selected potential contaminants. The following parameters were determined:

- detailed particle size analysis (% 5 sands, silt, clay);
- pH and electrical conductivity values;
- exchangeable sodium percentage;
- major plant nutrients (N, P, K, Mg);
- organic matter content;
- C:N ratio;
- heavy metals (As, B, Cd, Cr, Cu, Pb, Hg, Ni, Se, Zn);
- total cyanide and total (mono) phenols;
- speciated PAHs (US EPA16 suite);
- aromatic and aliphatic TPH (C5-C35 banding);
- benzene, toluene, ethylbenzene, xylene (BTEX).

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

RESULTS OF ANALYSIS

Particle Size Analysis and Stone Content

The sample fell into the *sandy loam* texture class. Further detailed particle size analysis revealed the sample to have a large proportion of sand falling into the *very fine sand* fraction (0.005-0.15mm), which has similar physical properties to *silt* (eg. slow drainage rate). We recommend placing this soil to a maximum depth of 300mm, which is in line with *BS3882:2015*, Annexe A.3.

The stone content of the sample was low and, as such, stones should not restrict the use of the soil for general landscape purposes.

pH and Electrical Conductivity Values

The sample was alkaline in reaction (pH 7.7). This pH value would be considered suitable for general landscape purposes providing species with a wide pH tolerance or those known to prefer alkaline soils are selected for planting, turfing and seeding.

The electrical conductivity (salinity) value (water extract) was low, which indicates that soluble salts were not present at levels that would be harmful to plants.

The electrical conductivity value by $CaSO_4$ extract (*BS3882* requirement) fell below the maximum specified value (3300 µS/cm) given in *BS3882:2015 – Table 1*.

Organic Matter and Fertility Status

The sample was adequately supplied with organic matter and all major plant nutrients.

The C:N ratio of the sample was acceptable for general landscape purposes.

Potential Contaminants

With reference to *BS3882:2015 - Table 1*: Notes 3 and 4, there is a recommendation to confirm levels of potential contaminants in relation to the topsoil's proposed end use. This includes human health, environmental protection and metals considered toxic to plants. In the absence of site-specific assessment criteria, the concentrations that affect human health have been compared with the *residential with homegrown produce* land use in the Suitable For Use Levels (S4ULs) presented in *The LQM/CIEH S4ULs for Human Health Risk Assessment* (2015) and the DEFRA SP1010: *Development of Category 4 Screening Levels* (C4SLs) *for Assessment of Land Affected by Contamination – Policy Companion Document* (2014).

Of the potential contaminants determined, none was found at levels that exceed their guideline values.

Phytotoxic Contaminants

Of the phytotoxic (toxic to plants) contaminants determined (copper, nickel, zinc), none was found at levels that exceeded the maximum permissible levels specified in *BS3882:2015 – Table 1*.

CONCLUSION

The purpose of the analysis was to determine the suitability of the topsoil sample for general landscape purposes. The analysis has also been undertaken to determine the sample's compliance with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for Topsoil – Table 1, Multipurpose Topsoil)*.

From the soil examination and subsequent laboratory analysis, the sample was described as an alkaline, non-saline, very fine sandy loam with a weakly developed structure and low stone content. The organic matter content and fertility status of the sample were moderate. Of the potential contaminants determined, none exceeded their guideline values.

To conclude, based on our findings, the topsoil represented by this sample would be considered suitable for general landscape purposes, provided:

- species selected for planting are tolerant of moisture retentive soil and have a wide pH tolerance;
- the physical condition of the soil is satisfactory;
- the soil is placed to a maximum depth of 300mm;

The topsoil was compliant with the requirements of the British Standard for Topsoil *(BS3882:2015 – Specification for topsoil– Table 1, Multipurpose Topsoil)*.

RECOMMENDATIONS

Soil Handling Recommendations

It is important to maintain the physical condition of the soil and avoid structural damage during all phases of soil handling (e.g. stockpiling, respreading, cultivating, planting, seeding or turfing). As a consequence, soil handling operations should be carried out when soil is reasonably dry and non-plastic (friable) in consistency.

It is important to ensure that the soil is not unnecessarily compacted by trampling or trafficking by site machinery, and soil handling should be stopped during and after heavy rainfall and not continued until the soil is friable in consistency. If the soil is structurally damaged and compacted at any stage during the course of soiling or landscaping works, it should be cultivated appropriately to relieve the compaction and to restore the soil's structure prior to any planting, turfing or seeding.

Further details on soil handling are provided in Annex A of *BS3882:2015*.

Further guidance on the management, preparation and handling of soils is provided in the DEFRA publication *Construction code of practice for the sustainable use of soils on construction sites*, 2009.

We hope this report meets with your approval and provides the necessary information. Please do not hesitate to contact the undersigned if we can be of further assistance.

Yours faithfully

Iain Gould
BSc MSc PhD
Soil Scientist

Ceri Spears
BSc MSc MISoilSci
Senior Associate

For & on behalf of Tim O'Hare Associates LLP

MCM
Approved Selling Agent

TIM O'HARE ASSOCIATES
SOIL & LANDSCAPE CONSULTANCY

Client:	H Sivyer Transport Ltd
Project	Victoria Deep -Trugrow
Job:	Topsoil Analysis - BS3882:2015
Date:	16/11/2015
Job Ref No:	TOHA/15/6512/SS

Sample Reference			Trugrow Topsoil (November 2015)
		Acreditation	
Clay (<0.002mm)	%	UKAS	11
Silt (0.002-0.05mm)	%	UKAS	11
Very Fine Sand (0.05-0.15mm)	%	UKAS	47
Fine Sand (0.15-0.25mm)	%	UKAS	19
Medium Sand (0.25-0.50mm)	%	UKAS	7
Coarse Sand (0.50-1.0mm)	%	UKAS	3
Very Coarse Sand (1.0-2.0mm)	%	UKAS	2
Texture Class (UK Classification)	--	UKAS	SL
Stones (2-20mm)	% DW	GLP	4
Stones (20-50mm)	% DW	GLP	0
Stones (>50mm)	% DW	GLP	0
pH Value (1:2.5 water extract)	units	UKAS	7.7
Electrical Conductivity (1:2.5 water extract)	uS/cm	UKAS	528
Electrical Conductivity (1:2 $CaSO_4$ extract)	uS/cm	UKAS	2435
Exchangeable Sodium Percentage	%	UKAS	3.0
Organic Matter (LOI)	%	UKAS	3.3
Total Nitrogen (Dumas)	%	UKAS	0.16
C : N Ratio	ratio	UKAS	12
Extractable Phosphorus	mg/l	UKAS	46
Extractable Potassium	mg/l	UKAS	578
Extractable Magnesium	mg/l	UKAS	146
Total Arsenic (As)	mg/kg	MCERTS	2.4
Total Cadmium (Cd)	mg/kg	MCERTS	< 0.2
Total Chromium (Cr)	mg/kg	MCERTS	18
Hexavalent Chromium (Cr VI)	mg/kg	MCERTS	< 4.0
Total Copper (Cu)	mg/kg	MCERTS	12
Total Lead (Pb)	mg/kg	MCERTS	25
Total Mercury (Hg)	mg/kg	MCERTS	< 0.3
Total Nickel (Ni)	mg/kg	MCERTS	10
Total Selenium (Se)	mg/kg	MCERTS	< 1.0
Total Zinc (Zn)	mg/kg	MCERTS	31
Water Soluble Boron (B)	mg/kg	MCERTS	1.4
Total Cyanide (CN)	mg/kg	MCERTS	< 1
Total (mono) Phenols	mg/kg	MCERTS	< 1.0
Naphthalene	mg/kg	MCERTS	< 0.05
Acenaphthylene	mg/kg	MCERTS	< 0.10
Acenaphthene	mg/kg	MCERTS	< 0.10
Fluorene	mg/kg	MCERTS	< 0.10
Phenanthrene	mg/kg	MCERTS	< 0.10
Anthracene	mg/kg	MCERTS	< 0.10
Fluoranthene	mg/kg	MCERTS	< 0.10
Pyrene	mg/kg	MCERTS	< 0.10
Benzo(a)anthracene	mg/kg	MCERTS	< 0.10
Chrysene	mg/kg	MCERTS	< 0.05
Benzo(b)fluoranthene	mg/kg	MCERTS	< 0.10
Benzo(k)fluoranthene	mg/kg	MCERTS	< 0.10
Benzo(a)pyrene	mg/kg	MCERTS	< 0.10
Indeno(1,2,3-cd)pyrene	mg/kg	MCERTS	< 0.10
Dibenzo(a,h)anthracene	mg/kg	MCERTS	< 0.10
Benzo(g,h,i)perylene	mg/kg	MCERTS	< 0.05
Total PAHs (sum USEPA16)	mg/kg	MCERTS	< 1.60
Aliphatic TPH >C5 - C6	mg/kg	MCERTS	< 0.1
Aliphatic TPH >C6 - C8	mg/kg	MCERTS	< 0.1
Aliphatic TPH >C8 - C10	mg/kg	MCERTS	< 0.1
Aliphatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aliphatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aliphatic TPH >C16 - C21	mg/kg	MCERTS	< 8.0
Aliphatic TPH >C21 - C35	mg/kg	MCERTS	< 8.0
Aliphatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Aromatic TPH >C5 - C7	mg/kg	MCERTS	< 0.1
Aromatic TPH >C7 - C8	mg/kg	MCERTS	< 0.1
Aromatic TPH >C8 - C10	mg/kg	MCERTS	< 0.1
Aromatic TPH >C10 - C12	mg/kg	MCERTS	< 1.0
Aromatic TPH >C12 - C16	mg/kg	MCERTS	< 2.0
Aromatic TPH >C16 - C21	mg/kg	MCERTS	< 10
Aromatic TPH >C21 - C35	mg/kg	MCERTS	< 10
Aromatic TPH (C5 - C35)	mg/kg	MCERTS	< 10
Benzene	mg/kg	MCERTS	< 0.001
Toluene	mg/kg	MCERTS	< 0.001
Ethylbenzene	mg/kg	MCERTS	< 0.001
o-xylene	mg/kg	MCERTS	< 0.001
MTBE (Methyl Tertiary Butyl Ether)	mg/kg	MCERTS	< 0.001

SL = SANDY LOAM

Visual Examination

The sample was described as a light olive brown (Munsell Colour 2 5YR 5/6) slightly moist, friable SANDY LOAM with a single grain and weakly developed fine granular structure. The sample was slightly stony and contained very occasional organic fines. No unusual odours, deleterious materials, roots or rhizomes of pernicious weeds were observed.

Iain Gould
BSc MSc PhD
Soil Scientist

Results of analysis should be read in conjunction with the report they were issued with.

The contents of this certificate shall not be reproduced without the express written permission of Tim O'Hare Associates LLP.

Appendix

III Barrier Pipe Installation Photos

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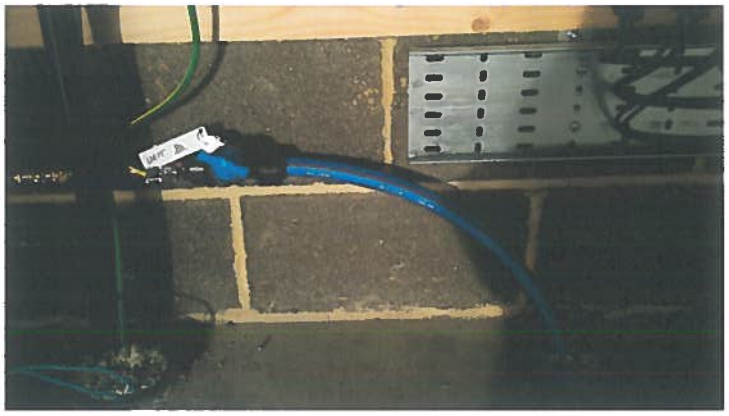
T; 01491 413 722 - M: 07787 771 686 - F: 01491 413 722 - E: james@aviron.co.uk - W: www.aviron.co.uk

PHOTOGRAPHIC LOG

SITE	Mowlem	**DATE**	
PROJECT	14-126.07	**TAKEN BY**	Marbank



Barrier pipe to unit B



Barrier pipe to unit D1



Barrier pipe to unit D2

Appendix

IV Laboratory WAC Test Results

Aviron Associates Limited - Head Office
Badgemore House - Badgemore Park - Gravel Hill - Henley on Thames - RG9 4NR
Contacts
T; 01491 413 722 - M; 07787 771 686 - F; 01491 413 722 - E; james@aviron.co.uk - W; www.aviron.co.uk

Our Ref: EFS/145242 (Ver. 1)
Your Ref: UXB0266971

September 8, 2014

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Mr C Shepherd
Marbank Construction Ltd
St George House
24 Queens Road
Weybridge
Surrey
KT13 9UX

For the attention of Mr C Shepherd

Dear Mr Shepherd

Sample Analysis - Mowlem Industrial Estate

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 07/10/14 when they will be discarded. Please call 01283 554458 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Laboratory and Analytical) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

D Simpson
Project Co-ordinator
01283 554458

TEST REPORT

UKAS TESTING
1252

Report No. EFS/145242 (Ver. 1)

Marbank Construction Ltd
St George House
24 Queens Road
Weybridge
Surrey
KT13 9UX

Site: Mowlem Industrial Estate

The 2 samples described in this report were registered for analysis by ESG on 26-Aug-2014. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 08-Sep-2014

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited
Any opinions or interpretations expressed herein are outside the scope of any UKAS accreditation held by ESG.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (80) Results (Pages 4 to 5)
Table of PCB Congener Results (Page 6)
GC-FID Chromatograms (Pages 7 to 8)
Table of WAC Analysis Results (Pages 9 to 10)
Analytical and Deviating Sample Overview (Page 11)
Table of Method Descriptions (Page 12)
Table of Report Notes (Page 13)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Operations Director
Laboratory and Analytical Business

Date of Issue: 08-Sep-2014

Tests marked '^' have been subcontracted to another laboratory.
Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
ESG accepts no responsibility for any sampling not carried out by our personnel.

		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	pH Units	mg/kg	mg/kg	Mol/kg	%	µg/kg
		Method Codes :	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	MICROTMSS	PHSOIL	TPHFIDUS	TPHFIDUS	ANC	LOI(%MM)	PCBUSECDAR
		Method Reporting Limits :	0.3	0.1	0.5	0.5	0.5	0.1	0.5	0.5	3	0.2		10	10	0.04	0.2	
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
ID Number CLU	Client Sample Description	Sample Date	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	Tot.Moisture @ 105C	pH units (AR)	TPH Band (>C10-C40)	TPH by GCFID (AR)	Acid Neut. Capacity	L.O.I. % @ 450C	PCB-7 Congeners Analysis
1422866	23225136 - Stockpile	20-Aug-14	13.2	<0.1	16	16.4	9	<0.1	10.1	<0.5	39	9.29	12.5	96	99	4.88	4.6	Req
1422867	23225137 - Stockpile	20-Aug-14	20.8	0.41	31.7	24.9	43.6	0.14	22.3	<0.5	83.1	12.47	10.0	169	170	4.32	4.3	Req

ESG Environmental Scientifics Group
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Burton-on-Trent, Staffordshire, DE15 0YZ
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Client Name	Marbank Construction Ltd
Contact	Mr C Shepherd

Mowlem Industrial Estate

Sample Analysis

Date Printed	08-Sep-2014
Report Number	EFS/145242
Table Number	1

Where individual results are flagged see report notes for status

		Units :	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg							
		Method Codes :	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	PAHMSUS							
		Method Reporting Limits :	0.02	10	10	10	20	30	20	10								
		UKAS Accredited :	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
ESG Number CLU	Client Sample Description	Sample Date	Total Organic Carbon	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes	m/p Xylenes	o Xylene	PAH (17) by GCMS							
1422866	23225136 - Stockpile	20-Aug-14	0.45	<10	<10	<10	<20	<30	<20	<10	Req							
1422867	23225137 - Stockpile	20-Aug-14	1.19	<10	<10	<10	<20	<30	<20	<10	Req							

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Client Name	Marbank Construction Ltd
Contact	Mr C Shepherd

Mowlem Industrial Estate

Sample Analysis

Date Printed	08-Sep-2014
Report Number	EFS/145242
Table Number	1

Where individual results are flagged see report notes for status

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Marbank Construction Ltd: Mowlem Industrial Estate		
Sample Details:	23225136 - Stockpile	**Job Number:**	S14_5242
LIMS ID Number:	CL1422866	**Date Booked in:**	26-Aug-14
QC Batch Number:	140730	**Date Extracted:**	02-Sep-14
Quantitation File:	Initial Calibration	**Date Analysed:**	04-Sep-14
Directory:	0414PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	-	< 0.08	-
Acenaphthylene	208-96-8	-	< 0.08	-
Acenaphthene	83-32-9	-	< 0.08	-
Fluorene	86-73-7	-	< 0.08	-
Phenanthrene	85-01-8	-	< 0.08	-
Anthracene	120-12-7	-	< 0.08	-
Fluoranthene	206-44-0	7.54	0.11	81
Pyrene	129-00-0	7.84	0.09	79
Benzo[a]anthracene	56-55-3	-	< 0.08	-
Chrysene	218-01-9	-	< 0.08	-
Benzo[b]fluoranthene	205-99-2	-	< 0.08	-
Benzo[k]fluoranthene	207-08-9	-	< 0.08	-
Benzo[a]pyrene	50-32-8	-	< 0.08	-
Indeno[1,2,3-cd]pyrene	193-39-5	-	< 0.08	-
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-
Benzo[g,h,i]perylene	191-24-2	-	< 0.08	-
Coronene	191-07-1 *	-	< 0.08	-
Total (USEPA16) PAHs	-	-	< 1.32	-

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	87
Acenaphthene-d10	81
Phenanthrene-d10	82
Chrysene-d12	71
Perylene-d12	56

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	107
Terphenyl-d14	74

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Marbank Construction Ltd: Mowlem Industrial Estate		
Sample Details:	23225137 - Stockpile	**Job Number:**	S14_5242
LIMS ID Number:	CL1422867	**Date Booked in:**	26-Aug-14
QC Batch Number:	140730	**Date Extracted:**	02-Sep-14
Quantitation File:	Initial Calibration	**Date Analysed:**	04-Sep-14
Directory:	0414PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	3.59	0.18	96
Acenaphthylene	208-96-8	4.67	0.51	100
Acenaphthene	83-32-9	-	< 0.08	-
Fluorene	86-73-7	5.21	0.53	100
Phenanthrene	85-01-8	6.12	2.04	100
Anthracene	120-12-7	6.18	1.76	98
Fluoranthene	206-44-0	7.54	1.67	98
Pyrene	129-00-0	7.84	1.30	99
Benzo[a]anthracene	56-55-3	9.58	0.65	96
Chrysene	218-01-9	9.63	0.55	99
Benzo[b]fluoranthene	205-99-2	11.14	0.51	78
Benzo[k]fluoranthene	207-08-9	11.17	0.20	88
Benzo[a]pyrene	50-32-8	11.58	0.38	98
Indeno[1,2,3-cd]pyrene	193-39-5	13.02	0.20	91
Dibenzo[a,h]anthracene	53-70-3	-	< 0.08	-
Benzo[g,h,i]perylene	191-24-2	13.37	0.16	86
Coronene	191-07-1 *	-	< 0.08	-
Total (USEPA16) PAHs	-	-	< 10.80	-

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	85
Acenaphthene-d10	79
Phenanthrene-d10	80
Chrysene-d12	71
Perylene-d12	56

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	106
Terphenyl-d14	73

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polychlorinated Biphenyls (congeners)

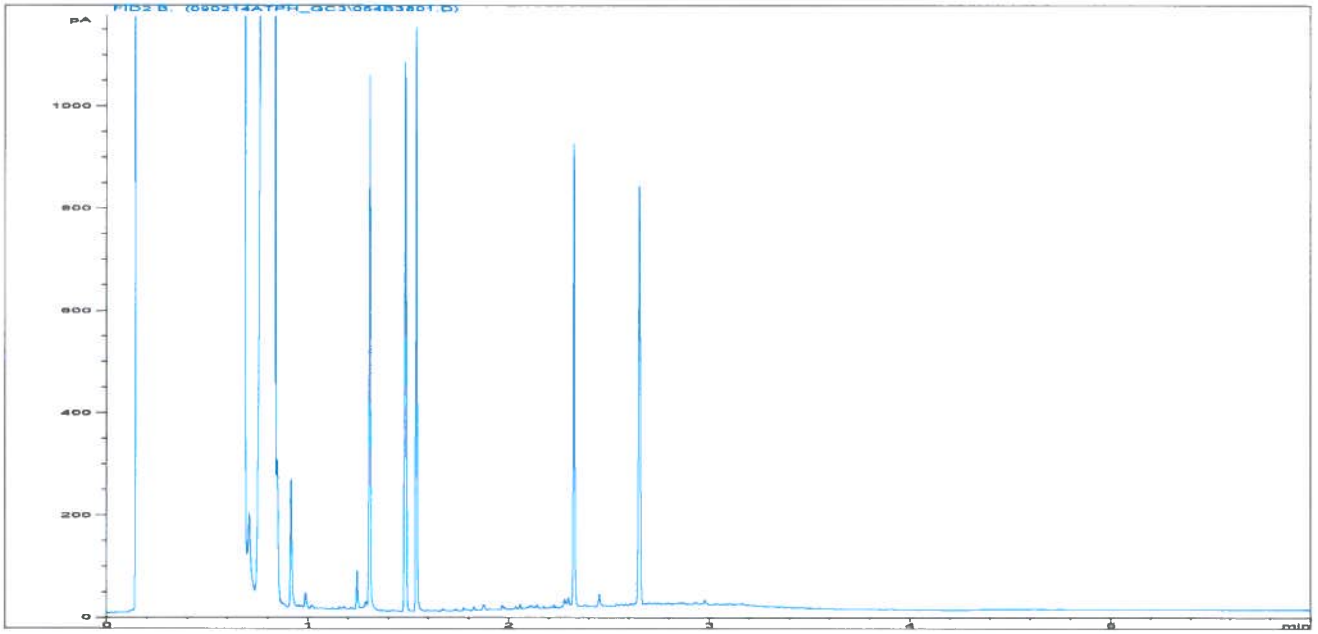
Customer and Site Details:	Marbank Construction Ltd: Mowlem Industrial Estate	**Matrix:**	SOIL
Job Number:	S14_5242	**Date Booked in:**	26-Aug-14
QC Batch Number:	140258	**Date Extracted:**	02-Sep-14
Directory:	0902PCB.GC8	**Date Analysed:**	04-Sep-14
Method:	Ultrasonic		

*** This sample data is not UKAS accredited.**

			Concentration, (µg/kg)						
	Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
*	CL1422866	23225136 - Stockpile	<5.25	<5.25	<5.25	<5.25	<5.25	<5.25	<5.25
*	CL1422867	23225137 - Stockpile	<5.25	<5.25	<5.25	<5.25	<5.25	<5.25	<5.25

Where individual results are flagged see report notes for status.

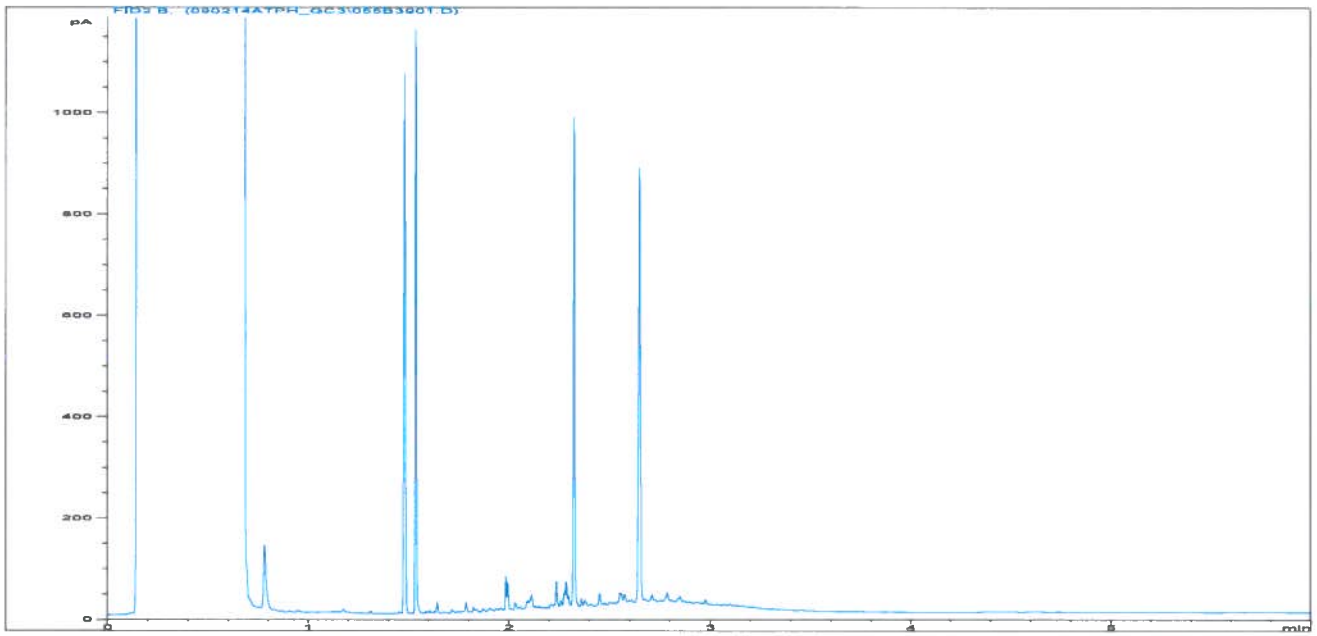
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1422866	**Job Number:**	S14_5242
Multiplier:	8	**Client:**	Marbank Construction Ltd
Dilution:	1	**Site:**	Mowlem Industrial Estate
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	23225136 - Stockpile
Acquisition Date/Time:	02-Sep-14		
Datafile:	D:\TES\DATA\Y2013\02\090214ATPH_GC3\054B3801.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1422867	**Job Number:**	S14_5242
Multiplier:	8	**Client:**	Marbank Construction Ltd
Dilution:	1	**Site:**	Mowlem Industrial Estate
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	23225137 - Stockpile
Acquisition Date/Time:	02-Sep-14		
Datafile:	D:\TES\DATA\Y2013\02\090214ATPH_GC3\055B3901.D		

Where individual results are flagged see report notes for status.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

					Leaching Data	
Client	Marbank Construction Ltd				Weight of sample (kg)	0.247
Contact	Mr C Shepherd				Moisture content @ 105℃ (% of Wet Weight)	9.29
					Equivalent Weight based on drying at 105℃ (kg)	0.225
Site	Mowlem Industrial Estate				Volume of water required to carry out 2:1 stage (litres)	0.428
					Fraction of sample above 4 mm %	71.000
Sample Description		Report No	Sample No	Issue Date	Fraction of non-crushable material %	0.000
23225136 - Stockpile		s14_5242	CL/1422866	08-Sep-14	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	0.46	3	5	6
	LOI450	Loss on Ignition (%)	4.8			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.03794	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	106	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<1.5	100		
U	PHSOIL	pH (pH units)	12.5		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	5.04		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	12.2	12.2	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	5860	6140					
U	ICPMSW	Arsenic	<0.001	0.003	<0.002	<0.03	0.5	2	25
U	ICPWATVAR	Barium	0.32	0.66	0.64	6.1	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.033	0.037	0.066	0.36	0.5	10	70
U	ICPMSW	Copper	0.006	0.013	0.012	0.12	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.002	0.002	0.004	0.02	0.5	10	30
U	ICPMSW	Nickel	0.004	0.005	0.008	0.05	0.4	10	40
U	ICPMSW	Lead	0.012	0.007	0.024	0.08	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	0.001	0.002	0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.047	0.15	0.094	1.36	4	50	200
U	KONENS	Chloride	18	58	36	527	800	15000	25000
U	ISEF	Fluoride	<0.5	<0.2	<1	<2	10	150	500
U	ICPWATVAR	Sulphate as SO4	3	6	6	56	1000	20000	50000
N	WSLM27	Total Dissolved Solids	4570	4790	9140	47607	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	3.9	12	7.8	109	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

					Leaching Data	
Client	Marbank Construction Ltd				Weight of sample (kg)	0.256
Contact	Mr C Shepherd				Moisture content @ 105℃ (% of Wet Weight)	12.47
					Equivalent Weight based on drying at 105℃ (kg)	0.225
Site	Mowlem Industrial Estate				Volume of water required to carry out 2:1 stage (litres)	0.419
					Fraction of sample above 4 mm %	71.900
Sample Description		Report No	Sample No	Issue Date	Fraction of non-crushable material %	0.000
23225137 - Stockpile		s14_5242	CL/1422867	08-Sep-14	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	1.23	3	5	6
	LOI450	Loss on Ignition (%)	4.4			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.03801	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	193	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	<12.43	100		
U	PHSOIL	pH (pH units)	10		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	4.46		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except [oo]		mg/kg (dry weight)				
U	WSLM3	pH (pH units) [oo]	10.9	10.7	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) [oo]	2110	2510					
U	ICPMSW	Arsenic	0.004	0.005	0.008	0.05	0.5	2	25
U	ICPWATVAR	Barium	0.11	0.11	0.22	1.1	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.035	0.238	0.07	2.11	0.5	10	70
U	ICPMSW	Copper	0.009	0.027	0.018	0.25	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.014	0.076	0.028	0.68	0.5	10	30
U	ICPMSW	Nickel	0.004	0.007	0.008	0.07	0.4	10	40
U	ICPMSW	Lead	0.004	0.001	0.008	0.01	0.5	10	50
U	ICPMSW	Antimony	0.001	0.001	0.002	0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.001	0.004	0.002	0.04	0.1	0.5	7
U	ICPMSW	Zinc	0.009	0.012	0.018	0.12	4	50	200
U	KONENS	Chloride	5	38	10	336	800	15000	25000
U	ISEF	Fluoride	0.2	0.3	0.4	3	10	150	500
U	ICPWATVAR	Sulphate as SO4	1280	1550	2560	15140	1000	20000	50000
N	WSLM27	Total Dissolved Solids	1650	1950	3300	19100	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	5.1	17	10.2	154	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S145242

Customer Marbank Construction Ltd
Site Mowlem Industrial Estate
Report No S145242

Consignment No S43212
Date Logged 26-Aug-2014

Report Due 08-Sep-2014

ID Number	Description	MethodID / Sampled	ANC Acid Neut. Capacity	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	CEN Leac(P)1	CEN Leac(P)2	Report B	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	L.O.I. % @ 450C	Tot.Moisture @ 105C	PAH (17) by GCMS	PCB-7 Congeners Analysis	pH units (AR)	TPH Band (>C10-C40)	TPH by GCFID (AR)	Total Organic Carbon
				✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	
CL/1422866	23225136 - Stockpile	20/08/14		E	E																				
CL/1422867	23225137 - Stockpile	20/08/14		E	E																				

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
A	Analysis Subcontracted - **Note: due date may vary**

Where individual results are flagged see report notes for status.

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ANC	Oven Dried @ < 35℃	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	ICPMSS	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	LOI(%MM)	Oven Dried @ < 35℃	Determination of loss on ignition for soil samples at specified temperature by gravimetry
Soil	MICROTMSS	As Received	Determination of the Total Moisture content at 105°C by loss on oven drying gravimetric analysis utilising a microwave moisture meter
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35℃	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile
CR Denotes Crocidolite
AM Denotes Amosite
TR Denotes Tremolite
AC Denotes Actinolite
AN Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined
N.Det Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
* All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Marbank Construction Ltd

Site : Mowlem Industrial Estate

Report Number : S14_5242

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1422866	23225136 - Stockpile	Brown Gravel SAND
CL/1422867	23225137 - Stockpile	Brown MADE GROUND

Our Ref: EFS/151669 (Ver. 1)
Your Ref: UXB0286808

March 11, 2015

Environmental Chemistry
ESG
Bretby Business Park
Ashby Road
Burton-on-Trent
Staffordshire
DE15 0YZ

Telephone: 01283 554400
Facsimile: 01283 554422

Mr C Shepherd
Marbank Construction Limited
Marbank Construction Ltd
St George House
24 Queens Road
Weybridge
Surrey
KT13 9UX

For the attention of Mr C Shepherd

Dear Mr Shepherd

Sample Analysis - Mowlem Trading Estate

Samples from the above site have been analysed in accordance with the schedule supplied.
The sample details and the results of analyses for these samples are given in the appended report.

An invoice for this work will follow under a separate cover.

Where appropriate the samples will be kept until 14/04/15 when they will be discarded. Please call 01283 554458 for an extension of this date.
Please be aware that our policy for the retention of paper based laboratory records and analysis reports is 6 years.

The work was carried out in accordance with Environmental Scientifics Group Ltd (Multi-Sector Services) Standard Terms and Conditions of Contract.

If I can be of any further assistance please do not hesitate to contact me.

Yours sincerely

for ESG

D Simpson
Project Co-ordinator
01283 554458

TEST REPORT

UKAS TESTING
1252

Report No. EFS/151669 (Ver. 1)

Marbank Construction Limited
Marbank Construction Ltd
St George House
24 Queens Road
Weybridge
Surrey
KT13 9UX

Site: Mowlem Trading Estate

The 2 samples described in this report were registered for analysis by ESG on 03-Mar-2015. This report supersedes any versions previously issued by the laboratory.
The analysis was completed by: 11-Mar-2015

Tests where the accreditation is set to N or No, and any individual data items marked with a * are not UKAS accredited. Opinions and interpretations expressed herein are outside the scope of UKAS accreditation.

The following tables are contained in this report:

Table 1 Main Analysis Results (Pages 2 to 3)
Table of PAH (MS-SIM) (80) Results (Pages 4 to 5)
Table of PCB Congener Results (Page 6)
GC-FID Chromatograms (Pages 7 to 8)
Table of WAC Analysis Results (Pages 9 to 10)
Analytical and Deviating Sample Overview (Page 11)
Table of Method Descriptions (Page 12)
Table of Report Notes (Page 13)
Table of Sample Descriptions (Appendix A Page 1 of 1)

On behalf of
ESG :
Declan Burns

Managing Director
Multi-Sector Services

Date of Issue: 11-Mar-2015

Tests marked '^' have been subcontracted to another laboratory.
Where samples have been flagged as deviant on the Analytical and Deviating Sample Overview, for any reason, the data may not be representative of the sample at the point of sampling and the validity of the data may be affected.
ESG accepts no responsibility for any sampling not carried out by our personnel.

Where individual results are flagged see report notes for status.

		Units :	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	%	pH Units	mg/kg	mg/kg	Mol/kg	%	µg/kg
		Method Codes :	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	ICPMSS	MICROTMSS	PHSOIL	TPHFIDUS	TPHFIDUS	ANC	LOI(%MM)	PCBUSECDAR
		Method Reporting Limits :	0.3	0.1	0.5	0.5	0.5	0.1	0.5	0.5	3	0.2		10	10	0.04	0.2	
		UKAS Accredited :	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No
LAB ID Number CL/	Client Sample Description	Sample Date	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	Tot.Moisture @ 105C	pH units (AR)	TPH Band (>C10-C40)	TPH by GCFID (AR)	Acid Neut. Capacity	L.O.I. % @ 450C	PCB-7 Congeners Analysis
1541276	23453352 - Stockpile B	26-Feb-15	20.8	0.84	31.5	161.7	827.9	0.48	32.9	<0.5	615.6	11.06	10.5	534	535	2.40	4.4	Req
1541277	23453353 - Stockpile C	26-Feb-15	20.9	0.38	25.7	102.3	458.5	0.45	24.4	<0.5	274.3	7.36	11.6	1889	1893	2.40	5.4	Req

ESG

Bretby Business Park, Ashby Road

Burton-on-Trent, Staffordshire, DE15 0YZ

Tel +44 (0) 1283 554400

Fax +44 (0) 1283 554422

Client Name	Marbank Construction Limited
Contact	Mr C Shepherd

Mowlem Trading Estate

Sample Analysis

Date Printed	09-Mar-2015
Report Number	EFS/151669
Table Number	1

Where individual results are flagged see report notes for status

		Units :	% M/M	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	µg/kg	mg/kg							
		Method Codes :	WSLM59	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	BTEXHSA	PAHMSUS							
		Method Reporting Limits :	0.02	10	10	10	20	30	20	10								
		UKAS Accredited :	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes							
LAB ID Number CU	Client Sample Description	Sample Date	Total Organic Carbon	Benzene	Toluene	Ethyl Benzene	MTBE	Xylenes	m/p Xylenes	o Xylene	PAH (17) by GCMS							
1541276	23453352 - Stockpile B	20-Feb-15	3.98	<10	<10	<10	<20	<30	<20	<10	Req							
1541277	23453353 - Stockpile C	20-Feb-15	5.44	<10	<10	<10	<20	<30	<20	<10	Req							

ESG

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Client Name	Marbank Construction Limited
Contact	Mr C Shepherd

Mowlem Trading Estate

Sample Analysis

Date Printed	09-Mar-2015
Report Number	EFS/151669
Table Number	1

Where individual results are flagged see report notes for status

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Marbank Construction Limited: Mowlem Trading Estate		
Sample Details:	23453352 - Stockpile B	**Job Number:**	S15_1669
LIMS ID Number:	CL1541276	**Date Booked in:**	03-Mar-15
QC Batch Number:	150214	**Date Extracted:**	05-Mar-15
Quantitation File:	Initial Calibration	**Date Analysed:**	05-Mar-15
Directory:	0515PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3	3.26	0.24	97
Acenaphthylene	208-96-8	4.30	0.56	98
Acenaphthene	83-32-9	4.42	0.34	98
Fluorene	86-73-7	4.80	0.34	93
Phenanthrene	85-01-8	5.64	3.61	99
Anthracene	120-12-7	5.69	1.20	99
Fluoranthene	206-44-0	6.98	7.75	93
Pyrene	129-00-0	7.26	6.84	94
Benzo[a]anthracene	56-55-3	8.95	3.68	95
Chrysene	218-01-9	9.00	3.21	98
Benzo[b]fluoranthene	205-99-2	10.48	4.14	93
Benzo[k]fluoranthene	207-08-9	10.51	1.51	93
Benzo[a]pyrene	50-32-8	10.91	3.52	96
Indeno[1,2,3-cd]pyrene	193-39-5	12.29	2.67	88
Dibenzo[a,h]anthracene	53-70-3	12.32	0.48	92
Benzo[g,h,i]perylene	191-24-2	12.58	2.36	92
Coronene	191-07-1 *	14.71	0.77	48
Total (USEPA16) PAHs	-	-	42.45	-

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	83
Acenaphthene-d10	82
Phenanthrene-d10	84
Chrysene-d12	97
Perylene-d12	109

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	105
Terphenyl-d14	98

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polycyclic Aromatic Hydrocarbons
GC/MS (SIM)

Customer and Site Details:	Marbank Construction Limited: Mowlem Trading Estate		
Sample Details:	23453353 - Stockpile C	**Job Number:**	S15_1669
LIMS ID Number:	CL1541277	**Date Booked in:**	03-Mar-15
QC Batch Number:	150214	**Date Extracted:**	05-Mar-15
Quantitation File:	Initial Calibration	**Date Analysed:**	05-Mar-15
Directory:	0515PAH.GC5\	**Matrix:**	Soil
Dilution:	1.0	**Ext Method:**	Ultrasonic

UKAS accredited?: Yes

Target Compounds	CAS #	R.T. (min)	Concentration mg/kg	% Fit
Naphthalene	91-20-3D	3.26	120.00	98
Acenaphthylene	208-96-8	4.30	13.60	99
Acenaphthene	83-32-9	4.42	3.15	98
Fluorene	86-73-7	4.80	11.70	98
Phenanthrene	85-01-8D	5.64	105.00	99
Anthracene	120-12-7	5.69	23.50	98
Fluoranthene	206-44-0D	6.98	76.40	92
Pyrene	129-00-0D	7.26	61.40	92
Benzo[a]anthracene	56-55-3	8.95	20.80	94
Chrysene	218-01-9	9.00	20.90	99
Benzo[b]fluoranthene	205-99-2	10.48	19.80	98
Benzo[k]fluoranthene	207-08-9	10.52	8.12	98
Benzo[a]pyrene	50-32-8	10.91	16.00	95
Indeno[1,2,3-cd]pyrene	193-39-5	12.29	11.70	91
Dibenzo[a,h]anthracene	53-70-3	12.32	2.12	90
Benzo[g,h,i]perylene	191-24-2	12.59	11.30	92
Coronene	191-07-1 *	14.71	3.22	M
Total (USEPA16) PAHs	-	-	528.71	-

* Denotes compound is not UKAS accredited

"M" denotes that % fit has been manually interpreted

Internal Standards	% Area
1,4-Dichlorobenzene-d4	NA
Naphthalene-d8	80
Acenaphthene-d10	87
Phenanthrene-d10	88
Chrysene-d12	96
Perylene-d12	106

Surrogates	% Rec
Nitrobenzene-d5	NA
2-Fluorobiphenyl	101
Terphenyl-d14	94

Concentrations are reported on a wet weight basis.

The Total PAH result is the sum of non-rounded individual PAH results and therefore may differ to the sum of the rounded individual PAH results printed above. By convention, where any one or more result is a "less than", the total is expressed as a "less than" and includes the "less than" concentration within the total.

Polychlorinated Biphenyls (congeners)

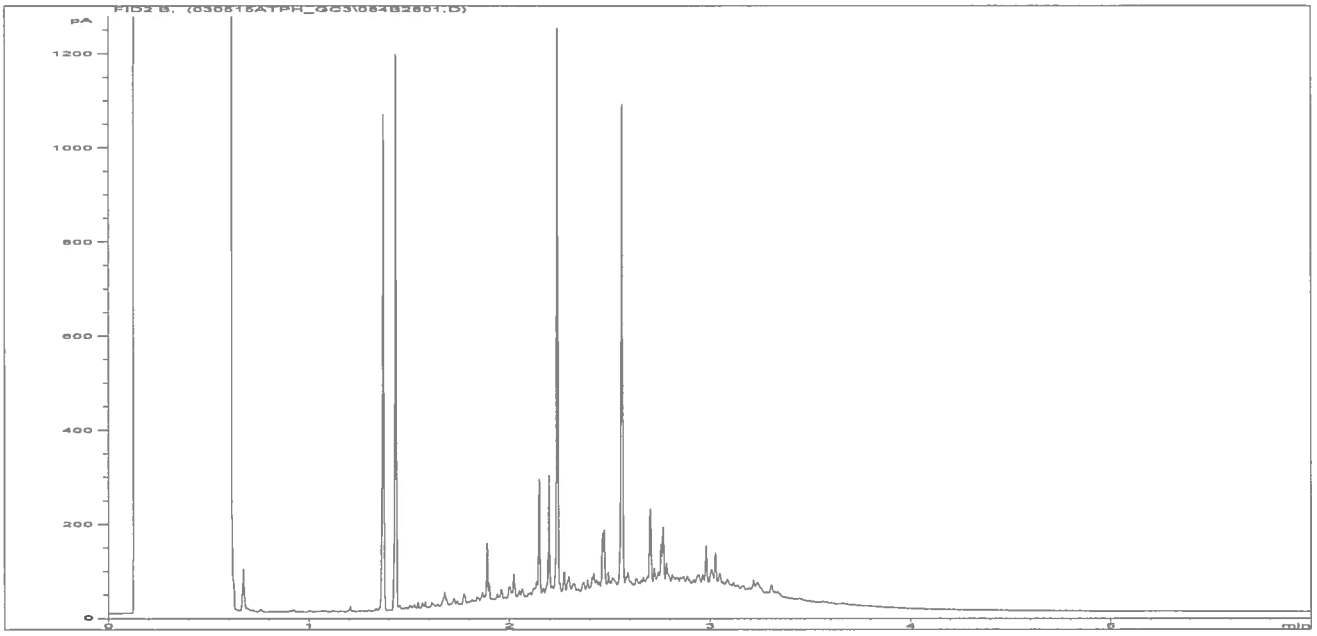
Customer and Site Details:	Marbank Construction Limited: Mowlem Trading Estate	**Matrix:**	SOIL
Job Number:	S15_1669	**Date Booked in:**	03-Mar-15
QC Batch Number:	150214	**Date Extracted:**	05-Mar-15
Directory:	0305PCB.GC8	**Date Analysed:**	06-Mar-15
Method:	Ultrasonic		

*** This sample data is not UKAS accredited.**

			Concentration, (µg/kg)						
	Sample ID	**Customer ID**	**PCB28**	**PCB52**	**PCB101**	**PCB118**	**PCB153**	**PCB138**	**PCB180**
*	CL1541276	23453352 - Stockpile B	<5.25	<5.25	<5.25	<5.25	<5.25	<5.25	<5.25
*	CL1541277	23453353 - Stockpile C	<5.25	<5.25	<5.25	<5.25	<5.25	<5.25	<5.25

Where individual results are flagged see report notes for status.

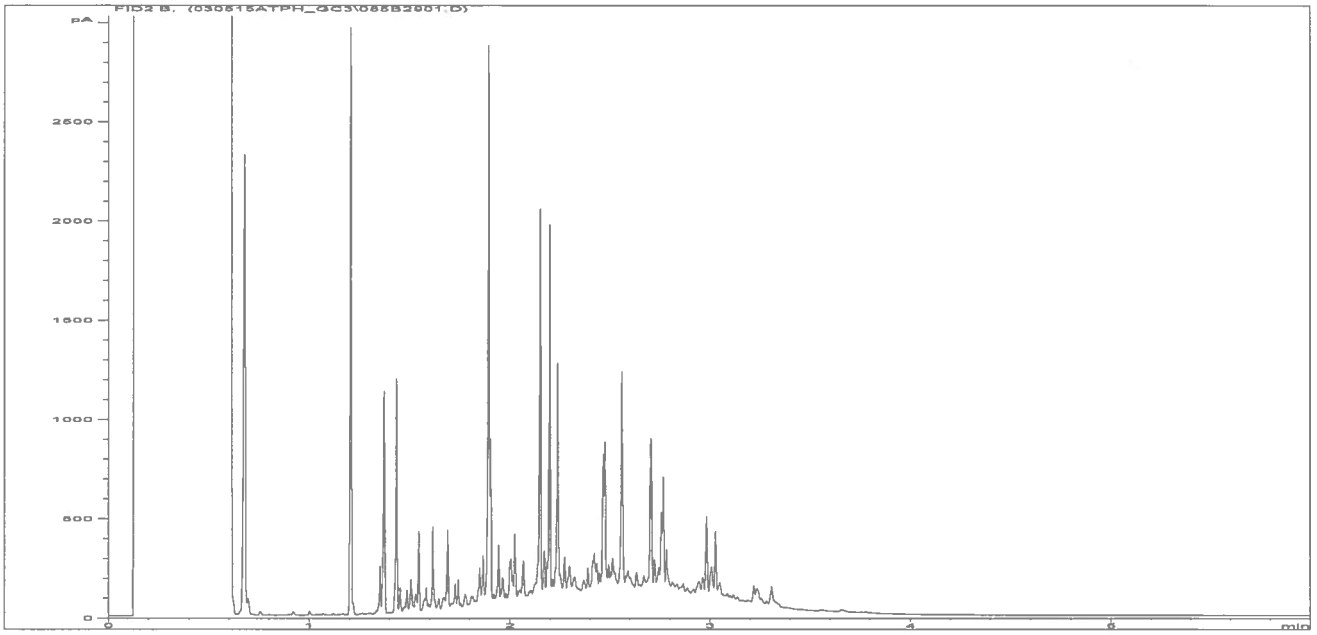
Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1541276	**Job Number:**	S15_1669
Multiplier:	8	**Client:**	Marbank Construction Limited
Dilution:	1	**Site:**	Mowlem Trading Estate
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	23453352 - Stockpile B
Acquisition Date/Time:	05-Mar-15		
Datafile:	D:\TES\DATA\Y2013\02\030515ATPH_GC3\084B2801.D		

Where individual results are flagged see report notes for status.

Petroleum Hydrocarbons (C8 to C40) by GC/FID



Sample ID:	CL1541277	**Job Number:**	S15_1669
Multiplier:	8	**Client:**	Marbank Construction Limited
Dilution:	1	**Site:**	Mowlem Trading Estate
Acquisition Method:	5UL_RUNF.M	**Client Sample Ref:**	23453353 - Stockpile C
Acquisition Date/Time:	05-Mar-15		
Datafile:	D:\TES\DATA\Y2013\02\030515ATPH_GC3\085B2901.D		

Where individual results are flagged see report notes for status.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

					Leaching Data	
Client	Marbank Construction Limited				Weight of sample (kg)	0.253
Contact	Mr C Shepherd				Moisture content @ 105℃ (% of Wet Weight)	11.06
					Equivalent Weight based on drying at 105℃ (kg)	0.225
Site	Mowlem Trading Estate				Volume of water required to carry out 2:1 stage (litres)	0.422
					Fraction of sample above 4 mm %	70.600
Sample Description		**Report No**	**Sample No**	**Issue Date**	Fraction of non-crushable material %	0.000
23453352 - Stockpile B		s15_1669	CL/1541276	11-Mar-15	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	3.87	3	5	6
	LOI450	Loss on Ignition (%)	4.3			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.0357	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	600	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	48.59	100		
U	PHSOIL	pH (pH units)	10.5		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	2.33		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except [oo]		mg/kg (dry weight)				
U	WSLM3	pH (pH units) [oo]	9.6	8.9	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) [oo]	2240	593					
U	ICPMSW	Arsenic	0.013	0.008	0.026	0.09	0.5	2	25
U	ICPWATVAR	Barium	0.14	0.1	0.28	1.1	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.02	0.008	0.04	0.1	0.5	10	70
U	ICPMSW	Copper	0.043	0.013	0.086	0.17	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.074	0.009	0.148	0.18	0.5	10	30
U	ICPMSW	Nickel	0.008	0.001	0.016	0.02	0.4	10	40
U	ICPMSW	Lead	0.002	<0.001	0.004	<0.01	0.5	10	50
U	ICPMSW	Antimony	0.005	0.01	0.01	0.09	0.06	0.7	5
U	ICPMSW	Selenium	0.004	0.002	0.008	0.02	0.1	0.5	7
U	ICPMSW	Zinc	0.009	0.003	0.018	0.04	4	50	200
U	KONENS	Chloride	39	6	78	104	800	15000	25000
U	ISEF	Fluoride	0.3	0.7	0.6	6	10	150	500
U	ICPWATVAR	Sulphate as SO4	1480	217	2960	3854	1000	20000	50000
N	WSLM27	Total Dissolved Solids	1750	462	3500	6337	4000	60000	100000
U	SFAPI	Phenol Index	<0.05	<0.05	<0.1	<0.5	1		
N	WSLM13	Dissolved Organic Carbon	18	5.2	36	69	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.

WASTE ACCEPTANCE CRITERIA TESTING
BSEN 12457/3

					Leaching Data	
Client	Marbank Construction Limited				Weight of sample (kg)	0.242
Contact	Mr C Shepherd				Moisture content @ 105℃ (% of Wet Weight)	7.36
					Equivalent Weight based on drying at 105℃ (kg)	0.225
Site	Mowlem Trading Estate				Volume of water required to carry out 2:1 stage (litres)	0.433
					Fraction of sample above 4 mm %	90.600
Sample Description		Report No	Sample No	Issue Date	Fraction of non-crushable material %	0.000
23453353 - Stockpile C		s15_1669	CL/1541277	11-Mar-15	Volume to undertake analysis (2:1 Stage) (litres)	0.300
					Weight of Deionised water to carry out 8:1 stage (kg)	1.650

Note: The >4mm fraction is crushed using a disc mill

Accreditation	Method Code	Solid Waste Analysis (Dry Basis)	Concentration in Solid (Dry Weight Basis)	Landfill Waste Acceptance Criteria Limit Values		
				Inert Waste Landfill	Stable Non-reactive Hazardous Waste in Non-Hazardous Landfill	Hazardous Waste Landfill
N	WSLM59	Total Organic Carbon (% M/M)	5.46	3	5	6
	LOI450	Loss on Ignition (%)	5.4			10
U	BTEXHSA	Sum of BTEX (mg/kg)	<0.06	6		
N	PCBUSECD	Sum of 7 Congener PCB's (mg/kg)	<0.03689	1		
U	TPHFIDUS	Mineral Oil (mg/kg)	2040	500		
N	PAHMSUS	PAH Sum of 17 (mg/kg)	574.19	100		
U	PHSOIL	pH (pH units)	11.6		>6	
N	ANC	Acid Neutralisation Capacity (mol/kg) @pH 7	2.41		To be evaluated	To be evaluated

Accreditation	Method Code	Leachate Analysis	2:1 Leachate	8:1 Leachate	Calculated amount leached @ 2:1	Calculated cumulative amount leached @ 10:1	Landfill Waste Acceptance Criteria Limit Values for BSEN 12457/3 @ L/S 10 litre kg-1 mg/kg (dry weight)		
			mg/l except ºº		mg/kg (dry weight)				
U	WSLM3	pH (pH units) ºº	12.1	11.9	Calculated data not UKAS Accredited				
U	WSLM2	Conductivity (µs/cm) ºº	5630	3330					
U	ICPMSW	Arsenic	0.002	<0.001	0.004	<0.01	0.5	2	25
U	ICPWATVAR	Barium	1.16	0.51	2.32	6	20	100	300
U	ICPMSW	Cadmium	<0.0001	<0.0001	<0.0002	<0.001	0.04	1	5
U	ICPMSW	Chromium	0.014	0.018	0.028	0.17	0.5	10	70
U	ICPMSW	Copper	0.023	0.008	0.046	0.1	2	50	100
U	ICPMSW	Mercury	<0.0001	<0.0001	<0.0002	<0.001	0.01	0.2	2
U	ICPMSW	Molybdenum	0.005	0.004	0.01	0.04	0.5	10	30
U	ICPMSW	Nickel	0.01	0.004	0.02	0.05	0.4	10	40
U	ICPMSW	Lead	0.009	0.002	0.018	0.03	0.5	10	50
U	ICPMSW	Antimony	<0.001	<0.001	<0.002	<0.01	0.06	0.7	5
U	ICPMSW	Selenium	0.002	0.001	0.004	0.01	0.1	0.5	7
U	ICPMSW	Zinc	0.062	0.022	0.124	0.27	4	50	200
U	KONENS	Chloride	61	15	122	211	800	15000	25000
U	ISEF	Fluoride	<0.1	0.6	<0.2	<5	10	150	500
U	ICPWATVAR	Sulphate as SO4	5	<3	10	<33	1000	20000	50000
N	WSLM27	Total Dissolved Solids	4390	2600	8780	28387	4000	60000	100000
U	SFAPI	Phenol Index	0.16	<0.05	0.32	<0.6	1		
N	WSLM13	Dissolved Organic Carbon	20	5	40	70	500	800	1000

Template Ver. 1

Landfill Waste Acceptance Criteria limit values correct as of 11th March 2009.

Tests where the accreditation is set to U are UKAS accredited, those where the accreditation is set to N are not UKAS accredited

Where individual results are flagged see report notes for status.

Sample Analysis

ESG Environmental Chemistry
Analytical and Deviating Sample Overview

S151669

Customer Marbank Construction Limited
Site Mowlem Trading Estate
Report No S151669

Consignment No S46789
Date Logged 03-Mar-2015

Report Due 09-Mar-2015

ID Number	Description	Sampled	MethodID	ANC	BTEXHSA				CustServ	ICPMSS								LOIPM09		PAHMSUI		PHSOIL	TPHFIDUI		WSLM69
				Acid Neut. Capacity	BTEX-HSA + MTBE analysis	MTBE (µg/kg)	CEN Leac(P)1	CEN Leac(P)2	REPORT A	Arsenic (MS)	Cadmium (MS)	Chromium (MS)	Copper (MS)	Lead (MS)	Mercury (MS)	Nickel (MS)	Selenium (MS)	Zinc (MS)	L.O.I. % @ 450C	Tot.Moisture @ 105C	PAH (17) by GCMS	PCB-7 Congeners Analysis	pH units (AR)	TPH Band (>C10-C40)	TPH by GCFID (AR)	Total Organic Carbon
					✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓	
CL/1541276	23453352 - Stockpile B	26/02/15																							
CL/1541277	23453353 - Stockpile C	26/02/15																							

Note: For analysis where the scheduled turnaround is greater than the holding time we will do our utmost to prioritise these samples. However, it is possible that samples could become deviant whilst being processed in the laboratory.

In this instance please contact the laboratory immediately should you wish to discuss how you would like us to proceed. If you do not respond within 24 hours, we will proceed as originally requested.

Where individual results are flagged for deviating samples.

Deviating Sample Key

A	The sample was received in an inappropriate container for this analysis
B	The sample was received without the correct preservation for this analysis
C	Headspace present in the sample container
D	The sampling date was not supplied so holding time may be compromised - applicable to all analysis
E	Sample processing did not commence within the appropriate holding time
F	Sample processing did not commence within the appropriate handling time

Requested Analysis Key

	Analysis Required
	Analysis dependant upon trigger result - **Note: due date may be affected if triggered**
	No analysis scheduled
1	Analysis Subcontracted - **Note: due date may vary**

Method Descriptions

Matrix	MethodID	Analysis Basis	Method Description
Soil	ANC	Oven Dried @ < 35℃	Quantitative digestion with Hydrochloric Acid back titration with 1M Sodium Hydroxide to pH 7
Soil	BTEXHSA	As Received	Determination of Benzene, Toluene, Ethyl benzene and Xylenes (BTEX) by Headspace GCFID
Soil	ICPMSS	Oven Dried @ < 35℃	Determination of Metals in soil samples by aqua regia digestion followed by ICPMS
Soil	LOI(%MM)	Oven Dried @ < 35℃	Determination of loss on ignition for soil samples at specified temperature by gravimetry
Soil	MICROTMSS	As Received	Determination of the Total Moisture content at 105°C by loss on oven drying gravimetric analysis utilising a microwave moisture meter
Soil	PAHMSUS	As Received	Determination of Polycyclic Aromatic Hydrocarbons (PAH) by hexane/acetone extraction followed by GCMS detection
Soil	PCBUSECDAR	As Received	Determination of Polychlorinated Biphenyl (PCB) congeners/aroclors by hexane/acetone extraction followed by GCECD detection
Soil	PHSOIL	As Received	Determination of pH of 2.5:1 deionised water to soil extracts using pH probe.
Soil	TPHFIDUS	As Received	Determination of hexane/acetone extractable Hydrocarbons in soil with GCFID detection.
Soil	WSLM59	Oven Dried @ < 35℃	Determination of Organic Carbon in soil using sulphurous Acid digestion followed by high temperature combustion and IR detection
Water	ICPMSW	As Received	Direct quantitative determination of Metals in water samples using ICPMS
Water	ICPWATVAR	As Received	Direct determination of Metals and Sulphate in water samples using ICPOES
Water	ISEF	As Received	Determination of Fluoride in water samples by Ion Selective Electrode (ISE)
Water	KONENS	As Received	Direct analysis using discrete colorimetric analysis
Water	SFAPI	As Received	Segmented flow analysis with colorimetric detection
Water	WSLM13	As Received	Instrumental analysis using acid/persulphate digestion and non-dispersive IR detection
Water	WSLM2	As Received	Determination of the Electrical Conductivity (µS/cm) by electrical conductivity probe.
Water	WSLM27	As Received	Gravimetric Determination
Water	WSLM3	As Received	Determination of the pH of water samples by pH probe

Where individual results are flagged see report notes for status.

Report Notes

Generic Notes

Soil/Solid Analysis

Unless stated otherwise,
- Results expressed as mg/kg have been calculated on the basis indicated in the Method Description table.
  All results on MCERTS reports are reported on a 105°C dry weight basis with the exception of pH and conductivity.
- Sulphate analysis not conducted in accordance with BS1377
- Water Soluble Sulphate is on a 2:1 water:soil extract

Waters Analysis

Unless stated otherwise results are expressed as mg/l

Nil: Where "Nil" has been entered against Total Alkalinity or Total Acidity this indicates that a measurement was not required due to the inherent pH of the sample.

Oil analysis specific

Unless stated otherwise,
- Results are expressed as mg/kg
- SG is expressed as g/cm^3@ 15°C

Gas (Tedlar bag) Analysis

Unless stated otherwise, results are expressed as ug/l

Asbestos Analysis

CH Denotes Chrysotile **TR** Denotes Tremolite
CR Denotes Crocidolite **AC** Denotes Actinolite
AM Denotes Amosite **AN** Denotes Anthophylite
NAIIS No Asbestos Identified in Sample
NADIS No Asbestos Detected In Sample

Symbol Reference

^ Sub-contracted analysis.
$$ Unable to analyse due to the nature of the sample
¶ Samples submitted for this analyte were not preserved on site in accordance with laboratory protocols. This may have resulted in deterioration of the sample(s) during transit to the laboratory. Consequently the reported data may not represent the concentration of the target analyte present in the sample at the time of sampling
¥ Results for guidance only due to possible interference
& Blank corrected result
I.S Insufficient sample to complete requested analysis
I.S(g) Insufficient sample to re-analyse, results for guidance only
Intf Unable to analyse due to interferences
N.D Not determined **N.Det** Not detected
N.F No Flow
NS Information Not Supplied
Req Analysis requested, see attached sheets for results
Þ Raised detection limit due to nature of the sample
* All accreditation has been removed by the laboratory for this result
‡ MCERTS accreditation has been removed for this result
§ accreditation has been removed for this result as it is a non-accredited matrix

Note: The Laboratory may only claim that data is accredited when all of the requirements of our Quality System have been met. Where these requirements have not been met the laboratory may elect to include the data in its final report and remove the accreditation from individual data items if it believes that the validity of the data has not been affected. If further details are required of the circumstances which have led to the removal of accreditation then please do not hesitate to contact the laboratory.

Sample Descriptions

Client : Marbank Construction Limited

Site : Mowlem Trading Estate

Report Number : S15_1669

Note: major constituent in upper case

Lab ID Number	Client ID	Description
CL/1541276	23453352 - Stockpile B	Brown MADE GROUND
CL/1541277	23453353 - Stockpile C	Grey MADE GROUND

AVIRON ASSOCIATES LIMITED

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