Remediation Strategy
Trenchard Drive, Wythenshawe

REC Reference: 103580P2R1

Prepared For: PLP Construction

June 2019



National Consultancy, Locally Delivered

A CONCEPT LIFE SCIENCES COMPANY

QUALITY ASSURANCE

Issue/revision	Issue 1	Revision 1	Revision 2
Remarks	-	Update to wording	
Date	30.04.2019	04.06.19	
Prepared by	L. Moore	C.Lima	
Signature			
Position	Graduate Consultant	Consultant	
Checked by	M.Lucass	M.Lucass	
Signature			
Position	Associate Director	Associate Director	
Authorised by	M.Lucass	M.Lucass	
Signature			
Position	Associate Director	Associate Director	
Project number	1CO103580		

EXECUTIVE SUMMARY

Site Address	Trenchard Drive, Wythenshawe, M22 5LZ
National Grid Reference	383931, 385465
Site Area	Approximately 0.344 hectares

Background

Resource and Environmental Consultants (REC) Ltd. have been commissioned by PLP construction to prepare a Remediation Strategy for the Trenchard Drive site. The site is being developed for low rise residential properties with private gardens and an associated access roadway and infrastructure.

Contaminated Land Risk Assessment

Elevated concentrations of lead were previously identified in near surface materials. Further sampling has shown the Made Ground soils found throughout the site to be chemically unsuitable for re-use due to the high concentrations of lead present.

Site Remediation

On the basis of the human health risk assessment, unacceptable risks have been identified. The remediation strategy therefore covers the following:

- Validation of imported material and additional site won material;
- Re-use of site won material via a Materials Management Plan;
- Previously unidentified contamination; and
- Validation procedures including record keeping.

TABLE OF CONTENTS

1.0 INTRODUCTION 1

1.1 Background 1
1.2 Proposed Development 1
1.3 Previous Reports 1
1.4 Objectives and Scope of Work 1
1.5 Summary of Parties Involved 1
1.6 Limitations and Confidentiality 2

2.0 SITE CHARACTERISTICS 3

2.1 Site Location and Description 3
2.2 Ground Conditions 3
2.3 Hydrogeology and Hydrology 3
2.4 Human Health Risk Assessment - Soils 3
2.5 Supplementary Lead Sampling 4
2.6 Discussion of Results 4
2.7 Revised Conceptual Site Model 4

3.0 REMEDIATION STRATEGY 6

3.1 Remediation Options Appraisal 6
3.2 Validation of Imported Materials and Additional Site Won Material 6
3.3 Materials Management Plan 6
3.4 Previously Unidentified Contamination 6
3.5 Validation and Record Keeping 7

APPENDICES

Appendix I Drawing No 103580-001 – Site Location Plan
Drawing No 103580-002 – Proposed Residential Development Plan
Drawing No 103580-005 – REC Exploratory Hole Location Plan
Appendix II Remediation / Validation Criteria
Appendix III Laboratory Test Certificates

1.0 INTRODUCTION

1.1 Background

Resource and Environmental Consultants (REC) Ltd have been instructed by PLP Construction to prepare a Remediation Strategy for the Trenchard Drive development site. A Site Location Plan is presented as Drawing No. 103580-001, included within Appendix I.

1.2 Proposed Development

REC understands that PLP Construction intend to redevelop the site to include 2 detached, 8 semi-detached, 3 townhouses and 3 mid terrace properties with associated private gardens, associated access roads and infrastructure. The following development plans have been included within Appendix I:

- Trevor Bridge Associates Ltd Drawing No. 5168.02 – Landscape Proposal; and
- MPSL Planning and Design Ltd Drawing No. 01 – Site Layout.

1.3 Previous Reports

REC has previously completed a Phase II Geo-Environmental Site Investigation to assess the potential risk associated with contaminants within soils. The findings of this investigation are summarised within Section 2. The following phases of work have previously been carried out by REC and should be read in conjunction with this report:

- Phase I Geo-Environmental Site Assessment, Trenchard Drive, Wythenshawe, REC, report ref: LA45620p1r1, dated September 2014; and
- Phase II Geo-Environmental Assessment, Trenchard Drive, Wythenshawe, REC, report ref: 103580p1r1, dated March 2019.

1.4 Objectives and Scope of Work

The purpose of the Remediation Strategy is to identify and evaluate feasible remedial techniques and to confirm the process for validation of the implemented scheme. This will ensure a safe, cost effective and regulatory compliant redevelopment of the site. The main objectives of the remediation strategy are as follows:

- To provide a remediated site that is suitable for its proposed redevelopment i.e. residential housing with gardens units with associated parking and localised soft landscaping etc; and
- To satisfy planning condition 17 as part of planning permission 111674/JO/2016/S2.

1.5 Summary of Parties Involved

Table 1.1 overleaf summarises the key companies and agencies involved in the development.

Table 1.1 Involved Parties

Function / Interest	Name of Party
Land Owner / Developer	PLP Construction
Geo-Environmental Consultant	REC Ltd
Principal Contractor	PLP Construction
Local Planning Authority	Manchester City Council

1.6 Limitations and Confidentiality

The limitations of the work are provided at the end of this report. REC has prepared this report solely for the use of the Client and those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed. Should any third party wish to use or rely upon the contents of the report, written approval must be sought from REC.

2.0 SITE CHARACTERISTICS

2.1 Site Location and Description

The site is roughly L-shaped and accessed from Trenchard Drive. Historical mapping suggests that the site used to contain two buildings from 1872 to 1960. After 1960 there were a number of buildings developed in the northern part of the site including greenhouses and numerous outbuildings. Around 1993 the majority of these buildings to the north had been demolished.

Table 2.1 Site Location Details

Site Address	Trenchard Drive, Wythenshawe, M22 5LZ
National Grid Reference	383931, 385465
Site Area	Approximately 0.344 hectares

The site is an irregular shaped, flat and undeveloped parcel of land located off Trenchard Drive in Wythenshawe. It is bordered by residential properties in all directions.

2.2 Ground Conditions

Localised Made Ground deposits were encountered at the site and consisted of dark brown very sandy gravelly clay with a low cobble content with fine to coarse gravel consisting of angular brick, concrete, slate, glass, quartzite and limestone. There was also dark brown gravelly fine to medium sand in which the gravel was fine to medium consisting of sub-angular concrete, slate, ash and brick. The depth of the Made Ground was between up to 1.35m.

2.3 Hydrogeology and Hydrology

The site is underlain by unproductive superficial deposits and the Bollin Mudstone Member, a secondary B aquifer. The nearest water course is a tertiary river located 311m north of the site.

2.4 Human Health Risk Assessment - Soils

Within the REC Phase II Geo-Environmental Assessment (Report No 103580p1r1) long term (chronic) toxicity risk to human health was assessed by utilising appropriate and conservative generic assessment criteria (GAC) to determine whether potentially unacceptable risks were present.

All soil chemical data from previous investigations is presented within the REC report 103580p1r1. Relevant findings are summarised below. A site plan of exploratory hole locations is presented as Drawing No. 103580-002 within this report.

Chemical analysis recorded exceedances of the screening value (200mg/kg) for lead with a concentration of 2,500mg/kg recorded in WS104 at a depth of 0.3m bgl; 540mg/kg recorded in WS105 at a depth of 0.5m bgl; and 320mg/kg recorded in WS109 at a depth of 0.4m bgl within the Made Ground.

It is likely that the very high level of lead recorded in WS104 relates to material with lead used in its construction, that has subsequently been crushed and tested in the lab along with the soil and is not representative of the concentration of lead in the actual soil itself.

In the case of lead, the main exposure pathway is soil ingestion and therefore the contamination found can be remediated through the removal of the viable exposure pathway in the proposed development or removal of the source.

Further testing was recommended to evaluate lead concentrations prior to near surface material being reused and/or removed from site.

2.5 Supplementary Lead Sampling

In order to further assess the concentrations and spatial distribution of lead in the made ground, REC attended site on 18th April 2019 to complete supplementary trial pitting and sampling. A total of 18no. trial pits were excavated in close proximity to WS104, WS105 and WS109 (where previous exceedances of lead were found) and samples taken from a range of depths and materials.

A total of 18no. samples were taken, and 9no. of these samples exceeded the GAC (generic assessment criteria) concentration of 200mg/kg, with concentrations ranging from 220mg/kg to 590mg/kg. There were also 4no. samples that were close to the GAC concentration, with concentrations of 170mg/kg, 150mg/kg, 150mg/kg and 200mg/kg.

Sampling locations are shown on drawing 103580-004 and Laboratory test certificates are included within Appendix III.

2.6 Discussion of Results

The majority of the highest lead concentrated samples are located at shallower depths ranging between 0.2 – 0.5m. In locations around WS104 this corresponds to areas of Made Ground that contains dark brown gravelly fine to medium sand in which the gravel is fine to medium sub-angular ash and brick. As noted previously it is likely that the lead result in WS104 relates to material with lead used in its construction, that has subsequently been crushed and tested in the lab along with the soil and is not representative of the concentration of lead in the actual soil itself.

In locations around WS105 the Made Ground at these depths comprise of dark brown very sandy gravelly clay with occasional cobbles; the sand here is fine to medium and the gravel is fine to coarse, angular to rounded brick, with quartzite, sandstone and limestone. In locations around WS109 the Made Ground at these depths typically contain dark brown slightly gravelly clayley fine to medium sand. The sand is fine to medium, sub-angular to sub-rounded brick, glass and concrete.

Average lead concentrations across the site including the 18 samples taking during this phase of works and the 6 No. samples collected previously is 336mg/kg.

13 samples exceed the 200mg/kg limit for residential with plant uptake. A further 6 samples are between 150mg/kg and 200mg/kg, i.e. close to the limit. Statistical assessment has therefore not been undertaken as it is considered that concentrations within the Made Ground material are above the threshold.

2.7 Revised Conceptual Site Model

Following completion of the additional testing detailed above, unacceptable risks have been defined regarding lead concentrations for the proposed end use as shown in Table 2.2 overleaf.

Table 2.2 Outstanding risks to Human Health

Source	Contaminant	Potential migration pathway	Potential Receptors	Likelihood of Occurrence	Severity	Overall Risk Rating	Potential Mitigation / Further Assessment
On-Site							
Made Ground	Lead	Ingestion of contaminated soils, dermal contact with contaminated soils	Future Site Users	Likely	Medium	Moderate	A minimum provision of 600mm clean cover in all garden areas will break pathway.

3.0 REMEDIATION STRATEGY

On the basis of the human health and controlled water risk assessments, an unacceptable risk has been identified to human health.

3.1 Remediation Options Appraisal

To address the outstanding risks to human health the following options or combination of options would adequately reduce the risk to acceptable levels:

- Removal of Made Ground deposits from site;
- Placement of a clean cover system and no dig membrane; and
- Breaking of the exposure pathway through use of hardstanding in areas of Made Ground.

The remediation strategy therefore covers the following:

- Validation of imported material and additional site won material;
- Re-use of site won material via a Materials Management Plan;
- Previously unidentified contamination; and
- Validation procedures including record keeping.

3.2 Validation of Imported Materials and Additional Site Won Material

Validation samples are required from all materials that are to be re-used or imported and used within any soft standing where there is the potential for any contaminants present to pose a risk to future site users. The sampling frequency for testing of materials is presented within Table 3.1 below.

Table 3.1 Specification of Materials Validation Laboratory Analysis

Material Type	Testing Frequency	Suite of Analysis
Imported Topsoil	1 Sample per 50m^3	Speciated PAHs, banded hydrocarbons, asbestos identification, CLEA metals
Site Generated Sub-Soil	1 Sample Per 250m^3	
Imported or Site Generated Fill Material	1 Sample Per 1,000m^3	

Test results should be compared against screening criteria provided in Appendix II. Where materials are found to contain concentrations of contaminants in excess of the screening criteria further assessment will be required to ensure their suitability for use.

3.3 Materials Management Plan

Re-use of materials on site should be undertaken via development of a 'Materials Management Plan' (MMP) to be created in accordance with Version 2 of the CL:AIRE Definition of Waste - Industry Code of Practice. The MMP should be declared by a Qualified Person and a signed declaration submitted to the EA prior to reuse of materials on the site.

3.4 Previously Unidentified Contamination

Should any significantly impacted material be encountered during the development, then the following procedure should be followed:

- The contractor shall contact a suitably qualified Environmental Consultant and describe the findings;
- The area will be made inaccessible and signed as containing potentially contaminated materials

or alternatively stockpiled on an impermeable surface to allow development on site to continue;
- A suitably qualified Environmental Consultant will attend site to assess and characterise the contamination, including obtaining samples where required;
- Results will be compared with relevant screening criteria depending on the proposed use; and
- The local planning authority (LPA) / environmental health officer (EHO)shall be made aware of the findings.

Recommendations for any further action if required shall be agreed with the LPA/EHO which may include revision of this remediation strategy.

3.5 Validation and Record Keeping

Any works undertaken in-line with this remediation strategy require verification and submission of a verification report to confirm the findings and to the satisfaction of the Local Planning Authority (LPA).

REC recommends that a suitably qualified and experienced engineer visit areas of soft standing and undertake hand dug inspection pits to confirm that a suitable depth of topsoil material has been placed and no injurious/harmful artefacts are present within the upper 600mm of placed material.

The engineer will record the thickness, depth and composition of any topsoil and sub soil and take validation photographs. In addition, samples of topsoil will be obtained for validation testing, as per the frequency outlined in Table 4.1., above.

REC will ensure that the requirements of this strategy are complied with. On satisfactory completion of all of the remediation works REC will provide a validation report. This report will comprise relevant site records and act as a certification that the remedial preparation works have been carried out in accordance with the strategy.

The verification report shall include as a minimum:

- Summary of pre-development conditions;
- Summary of land regrading / raising and details of any unexpected contamination;
- Description of any remedial measures including excavation volumes, obstructions, soils placement and laboratory analysis;
- Information on waste disposal including waste carriers, receiving sites and volumes of materials moved;
- Details of the source and volumes of imported materials clearly referencing the origin of the materials used and testing carried out to confirm its suitability for use via comparison to the criteria in Appendix II, where required.

TERMS

MMP	Material Management Plan
MM	Material Movement
FFL	Finished Floor Level
COP	Code of Practice
AST	Above ground Storage Tank
UST	Underground Storage Tank
EA	Environment Agency
CSM	Conceptual Site Model
GL	Ground Level
D	Not Detected
NR	Not Recorded
BSI	British Standards Institute
BGS	British Geological Survey
CLEA	Contaminated Land Exposure Assessment
SGV	Soil Guideline Value
GAC	General Assessment Criteria
CIEH	Chartered Institute of Environmental Health
PID	Photo Ionisation Detector
CIRIA	Construction Industry Research Association
GSV	Gas Screening Value
EQS	Environmental Quality Standard
DWS	Drinking Water Standard
PAH	Poly Aromatic Hydrocarbon
TPH (CWG)	Total Petroleum Hydrocarbon (Criteria Working Group)
VOC	Volatile Organic Compound
SVOC	Semi Volatile Organic Compound
SPT	Standard Penetration Test
VCCs	Vibro Concrete Columns
QA	Quality Assurance

UNITS

m	Metres
km	Kilometres
%	Percent
%v/v	Percent volume in air
mb	Milli Bars (atmospheric pressure)
1/hr	Litres per hour
µg/l	Micrograms per Litre (parts per billion)
ppb	Parts Per Billion
mg/kg	Milligrams per kilogram (parts per million)
ppm	Parts Per Million
mg/m^3	Milligram per metre cubed
m bgl	Metres Below Ground Level
m bcl	Metre Below Cover Level
mAOD	Metres Above Ordnance Datum (sea level)
kN/m^2	Kilo Newtons per metre squared
µm	Micro meter

LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between REC Ltd and the Client.

2. For the work, reliance has been placed on publicly available data obtained from the sources identified. The information is not necessarily exhaustive and further information relevant to the site may be available from other sources. When using the information it has been assumed it is correct. No attempt has been made to verify the information.

3. This report has been produced in accordance with current UK policy and legislative requirements for land and groundwater contamination which are enforced by the local authority and the Environment Agency. Liabilities associated with land contamination are complex and requires advice from legal professionals.

4. In addition to the above REC Ltd note that when investigating, or developing, potentially contaminated land it is important to recognise that sub-surface conditions may vary spatially and also with time. The absence of certain ground, ground gas, and contamination or groundwater conditions at the positions tested is not a guarantee that such conditions do not exist anywhere across the site. Due to the presence of existing buildings and structures access could not be obtained to all areas. Additional contamination may be identified following the removal of the buildings or hard standing.

5. Site sensitivity assessments have been made based on available information at the time of writing and are ultimately for the decision of the regulatory authorities.

6. REC cannot be held responsible for any use of the report or its contents for any purpose other than that for which it was prepared. The copyright in this report and other plans and documents prepared by REC is owned by them and no such plans or documents may be reproduced, published or adapted without written consent. Complete copies of this may, however, be made and distributed by the client as is expected in dealing with matters related to its commission. Should the client pass copies of the report to other parties for information, the whole report should be copied, but no professional liability or warranties shall be extended to other

APPENDIX I

DRAWINGS

KEY:

N

Site Boundary





The client must not amend any drawing, design or other intellectual property produced by REC Ltd, without permission in writing from REC Ltd in advance of any amendments being made.
In the event that such written permission is not obtained in advance of the amendments being made, REC Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or other intellectual property.

REC Ltd
Osprey House,
Pacific Quay, Broadway,
Manchester, M50 2UE

T: +44 161 868 1300
recltd.co.uk

Job Title:	Land off Trenchard Drive
Client:	PLP Construction Ltd
Drawing No:	001
Drawn By:	AR
Approved by:	PH
Notes:	N.T.S
Drawing Title:	Site Location Plan

KEY:

N



The client must not amend any drawing, design or other intellectual property produced by REC Ltd, without permission in writing from REC Ltd in advance of any amendments being made.
In the event that such written permission is not obtained in advance of the amendments being made, REC Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or other intellectual property.

REC

REC Ltd
Osprey House,
Pacific Quay, Broadway,
Manchester, M50 2UE

T: +44 161 868 1300
recltd.co.uk

Job Title:	Land off Trenchard Drive
Client:	PLP Construction Ltd
Drawing No:	002
Drawn By:	AR
Approved by:	PH
Notes:	N.T.S
Drawing Title:	Proposed Development Plan

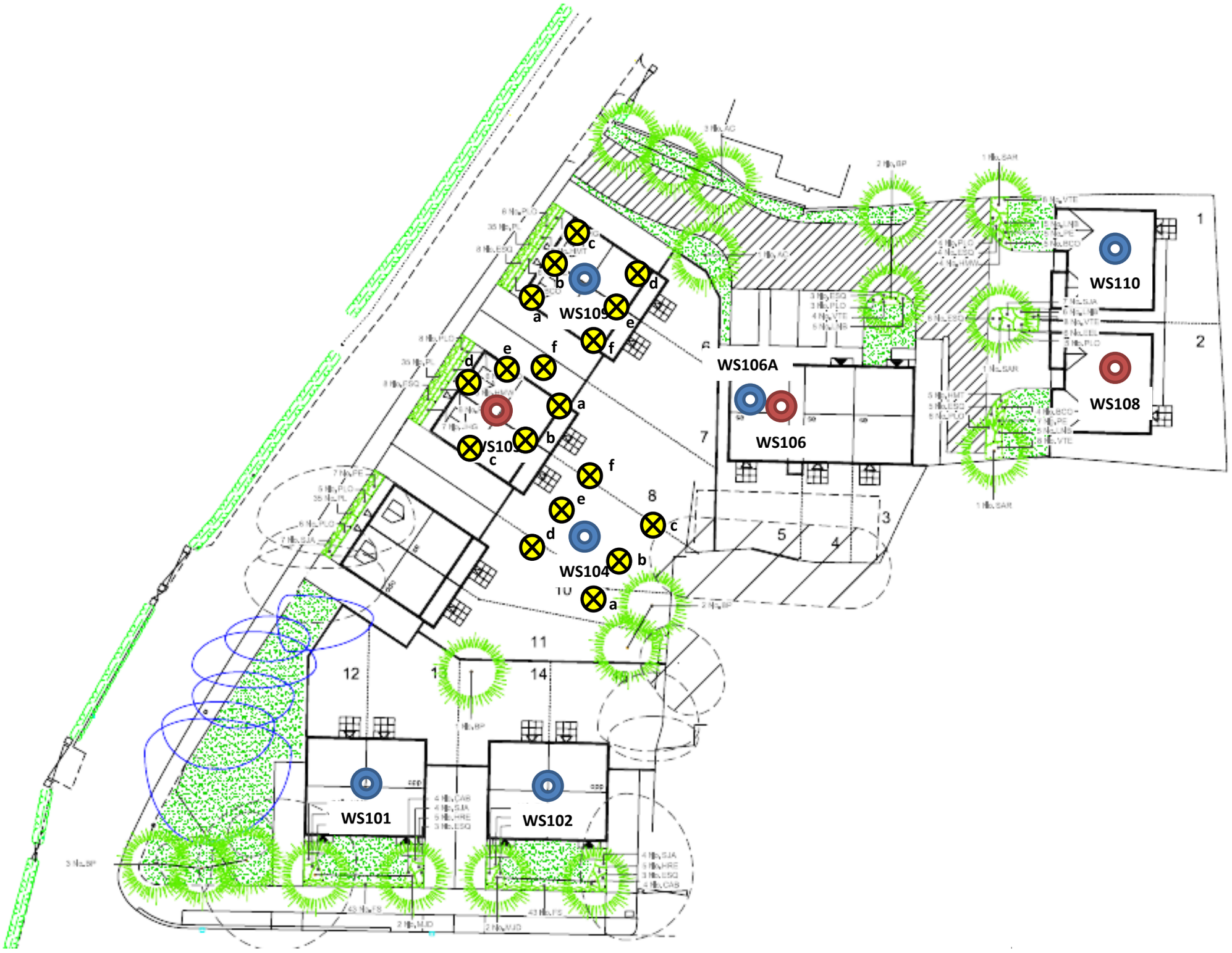
KEY:

N

WS101 Approximate Location of Window Sample with Installation

WS101 Approximate Location of Window Sample without Installation

Approximate Location of Trial Pits



The client must not amend any drawing, design or other intellectual property produced by REC Ltd, without permission in writing from REC Ltd in advance of any amendments being made.
In the event that such written permission is not obtained in advance of the amendments being made, REC Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or other intellectual property.

REC Ltd
Osprey House,
Pacific Quay, Broadway,
Manchester, M50 2UE

T: +44 161 868 1300
recltd.co.uk

Job Title:	Land off Trenchard Drive
Client:	PLP Construction Ltd
Drawing No:	005
Drawn By:	LM
Approved by:	
Notes:	N.T.S
Drawing Title:	Trial Pit Location Plan

APPENDIX II

REMEDIATION / VALIDATION CRITERIA

Suitability Targets For Use Targets For Materials Within Soft Landscaping Areas

Determinand	Units	Screening Value for Use Within Cover System		Screening Value Source
		Private Gardens	Public Open Space	
Inorganics				
Arsenic	mg/kg	37	79	(i)
Cadmium	mg/kg	11	120	(i)
Chromium (VI)	mg/kg	6	7.7	(i)
Lead	mg/kg	200	630	(iv)
Inorganic Mercury	mg/kg	40	120	(i)
Nickel	mg/kg	130	230	(i)
Selenium	mg/kg	250	1,100	(i)
Copper	mg/kg	2,400	12,000	(i)
Zinc	mg/kg	3,700	81,000	(i)
Cyanide	mg/kg	791	800	(v)
Asbestos [1]	%	None Detected	None Detected	N/A
Organics – PAHs and Phenol				
Phenol	mg/kg	280	760	(ii)
Naphthalene	mg/kg	2.3	4,900	(ii)
Acenaphthylene	mg/kg	170	15,000	(ii)
Acenaphthene	mg/kg	210	15,000	(ii)
Fluorene	mg/kg	170	9,900	(ii)
Phenanthrene	mg/kg	95	3,100	(ii)
Anthracene	mg/kg	2,400	74,000	(ii)
Fluoranthene	mg/kg	280	3,100	(ii)
Pyrene	mg/kg	620	7,400	(ii)
Benzo(a)Anthracene	mg/kg	7.2	29	(ii)
Chrysene	mg/kg	15	57	(ii)
Benzo(b)Fluoranthene	mg/kg	2.6	7.1	(ii)
Benzo(k)Fluoranthene	mg/kg	7.7	190	(ii)
Benzo(a)Pyrene	mg/kg	2.2	5.7	(ii)
Indeno(123-cd)Pyrene	mg/kg	27	82	(ii)
Dibenzo(a,h)Anthracene	mg/kg	0.24	0.57	(ii)
Benzo(ghi)Perylene	mg/kg	320	640	(ii)
Organics – TPHs				
TPH C_5-C_6	mg/kg	42	56,000	(iii)
TPH C_6-C_8	mg/kg	100	56,000	(iii)
TPH C_8-C_{10}	mg/kg	27	5,000	(iii)
TPH C_{10}-C_{12}	mg/kg	74	5,000	(iii)
TPH C_{12}-C_{16}	mg/kg	140	5,100	(iii)
TPH C_{16}-C_{21}	mg/kg	260	3,800	(iii)
TPH C_{21}-C_{35}	mg/kg	1,100	3,800	(iii)
TPH C_{35}-C_{40}	mg/kg	1,100	3,800	(iii)

Screening Value Source

(i) LQM/CIEH Suitable For Use Level (S4UL) (2015);
(ii) S4UL – Conservative Assessment Approach of 1% SOM;
(iii) S4UL –1% SOM and assumed worst case aliphatic / aromatic compound;
(iv) Defra Category 4 Screening Level (2014);
(v) CLEA v1.06 Derived Value.

APPENDIX III LABORATORY TEST CERTIFICATES

APPENDIX III

LABORATORY TEST CERTIFICATES

CONCEPT LIFE SCIENCES
DELIVERING SCIENCE

Concept Life Sciences is a trading name of Concept Life Sciences Analytical & Development Services Limited registered in England and Wales (No 2514788)

Concept Life Sciences

Certificate of Analysis

Hadfield House
Hadfield Street
Cornbrook
Manchester
M16 9FE
Tel : 0161 874 2400
Fax : 0161 874 2468

Report Number: 817065-2

Date of Report: 26-Apr-2019

Customer: Resource Environmental Consultants Ltd
Osprey House
Pacific Quay
Broadway
Salford
M50 2UE

Customer Contact: Ms Catarina Lina

Customer Job Reference: 103580
Customer Site Reference: Trenchard Drive
Date Job Received at Concept: 18-Apr-2019
Date Analysis Started: 23-Apr-2019
Date Analysis Completed: 26-Apr-2019

The results reported relate to samples received in the laboratory and may not be representative of a whole batch.

Customers are responsible for information provided where, if incorrect, it could affect the validity of the results.

Opinions and interpretations expressed herein are outside the scope of UKAS accreditation

This report should not be reproduced except in full without the written approval of the laboratory

Tests covered by this certificate were conducted in accordance with Concept Life Sciences SOPs

All results have been reviewed in accordance with QMSection 15 of the Concept Life Sciences, Analytical Services Quality Manual

UKAS TESTING
1549

mCERTS
THE ENVIRONMENT AGENCY'S MONITORING CERTIFICATION SCHEME

Report checked and authorised by :
Jack Nagy
Customer Service Advisor

Issued by :
Jack Nagy
Customer Service Advisor

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Misc

				Concept Reference	**817065 001**	**817065 002**	**817065 003**	**817065 004**	**817065 005**
				Customer Sample Reference	**WS104**	**WS104**	**WS104**	**WS104**	**WS104**
				Top Depth	**0.20**	**0.40**	**0.50**	**0.60**	**0.80**
				Bottom Depth	**0.40**	**0.50**	**0.60**	**0.80**	**0.90**
				Depth	**0.20**	**0.40**	**0.50**	**0.60**	**0.80**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Cyanide(Total)	T546	AR	1	mg/kg	<1	**1**	<1	<1	<1
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Misc

				Concept Reference	**817065 006**	**817065 007**	**817065 008**	**817065 009**	**817065 010**
				Customer Sample Reference	**WS104**	**WS105**	**WS105**	**WS105**	**WS105**
				Top Depth	**0.90**	**0.20**	**0.40**	**0.50**	**0.60**
				Bottom Depth	**1.00**	**0.40**	**0.50**	**0.60**	**0.80**
				Depth	**0.90**	**0.20**	**0.40**	**0.50**	**0.60**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Misc

				Concept Reference	**817065 011**	**817065 012**	**817065 013**	**817065 014**	**817065 015**
				Customer Sample Reference	**WS105**	**WS105**	**WS109**	**WS109**	**WS109**
				Top Depth	**0.80**	**0.90**	**0.20**	**0.40**	**0.50**
				Bottom Depth	**0.90**	**1.00**	**0.40**	**0.50**	**0.60**
				Depth	**0.80**	**0.90**	**0.20**	**0.40**	**0.50**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1	<1	<1

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Misc

				Concept Reference	**817065 016**	**817065 017**	**817065 018**
				Customer Sample Reference	**WS109**	**WS109**	**WS109**
				Top Depth	**0.60**	**0.80**	**0.90**
				Bottom Depth	**0.80**	**0.90**	**1.00**
				Depth	**0.60**	**0.80**	**0.90**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Cyanide(Total)	T546	AR	1	mg/kg	<1	<1	<1
Phenols(Mono)	T546	AR	1	mg/kg	<1	<1	<1

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
BTEX (MCERTS)

				Concept Reference	**817065 001**	**817065 002**	**817065 003**	**817065 004**	**817065 005**
				Customer Sample Reference	**WS104**	**WS104**	**WS104**	**WS104**	**WS104**
				Top Depth	**0.20**	**0.40**	**0.50**	**0.60**	**0.80**
				Bottom Depth	**0.40**	**0.50**	**0.60**	**0.80**	**0.90**
				Depth	**0.20**	**0.40**	**0.50**	**0.60**	**0.80**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Benzene	T209	M105	10	µg/kg	<10[13]	<10[13]	<10[13]	<10[13]	<10[13]
Toluene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10
EthylBenzene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10
M/P Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10
O Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
BTEX (MCERTS)

				Concept Reference	**817065 006**	**817065 007**	**817065 008**	**817065 009**	**817065 010**
				Customer Sample Reference	**WS104**	**WS105**	**WS105**	**WS105**	**WS105**
				Top Depth	**0.90**	**0.20**	**0.40**	**0.50**	**0.60**
				Bottom Depth	**1.00**	**0.40**	**0.50**	**0.60**	**0.80**
				Depth	**0.90**	**0.20**	**0.40**	**0.50**	**0.60**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Benzene	T209	M105	10	µg/kg	<10[13]	<10[13]	<10[13]	<10[13]	<10[13]
Toluene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10
EthylBenzene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10
M/P Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10
O Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
BTEX (MCERTS)

				Concept Reference	**817065 011**	**817065 012**	**817065 013**	**817065 014**	**817065 015**
				Customer Sample Reference	**WS105**	**WS105**	**WS109**	**WS109**	**WS109**
				Top Depth	**0.80**	**0.90**	**0.20**	**0.40**	**0.50**
				Bottom Depth	**0.90**	**1.00**	**0.40**	**0.50**	**0.60**
				Depth	**0.80**	**0.90**	**0.20**	**0.40**	**0.50**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Benzene	T209	M105	10	µg/kg	<10[13]	<10[13]	<10[13]	<10[13]	<10[13]
Toluene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10
EthylBenzene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10
M/P Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10
O Xylene	T209	M105	10	µg/kg	<10	<10	<10	<10	<10

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
BTEX (MCERTS)

				Concept Reference	**817065 016**	**817065 017**	**817065 018**
				Customer Sample Reference	**WS109**	**WS109**	**WS109**
				Top Depth	**0.60**	**0.80**	**0.90**
				Bottom Depth	**0.80**	**0.90**	**1.00**
				Depth	**0.60**	**0.80**	**0.90**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Benzene	T209	M105	10	µg/kg	<10(13)	<10(13)	<10(13)
Toluene	T209	M105	10	µg/kg	<10	<10	<10
EthylBenzene	T209	M105	10	µg/kg	<10	<10	<10
M/P Xylene	T209	M105	10	µg/kg	<10	<10	<10
O Xylene	T209	M105	10	µg/kg	<10	<10	<10

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
MCERTS Preparation

Concept Reference	**817065 001**	**817065 002**	**817065 003**	**817065 004**	**817065 005**
Customer Sample Reference	**WS104**	**WS104**	**WS104**	**WS104**	**WS104**
Top Depth	**0.20**	**0.40**	**0.50**	**0.60**	**0.80**
Bottom Depth	**0.40**	**0.50**	**0.60**	**0.80**	**0.90**
Depth	**0.20**	**0.40**	**0.50**	**0.60**	**0.80**
Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**

Determinand	Method	Test Sample	LOD	Units					
MCERTS Classification	T143	AR							
Moisture @105C	T162	AR	0.1	%	**16**	**21**	**13**	**14**	**18**
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
MCERTS Preparation

Concept Reference	**817065 006**	**817065 007**	**817065 008**	**817065 009**	**817065 010**
Customer Sample Reference	**WS104**	**WS105**	**WS105**	**WS105**	**WS105**
Top Depth	**0.90**	**0.20**	**0.40**	**0.50**	**0.60**
Bottom Depth	**1.00**	**0.40**	**0.50**	**0.60**	**0.80**
Depth	**0.90**	**0.20**	**0.40**	**0.50**	**0.60**
Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**

Determinand	Method	Test Sample	LOD	Units					
MCERTS Classification	T143	AR							
Moisture @105C	T162	AR	0.1	%	**15**	**12**	**4.3**	**22**	**14**
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
MCERTS Preparation

Concept Reference	**817065 011**	**817065 012**	**817065 013**	**817065 014**	**817065 015**
Customer Sample Reference	**WS105**	**WS105**	**WS109**	**WS109**	**WS109**
Top Depth	**0.80**	**0.90**	**0.20**	**0.40**	**0.50**
Bottom Depth	**0.90**	**1.00**	**0.40**	**0.50**	**0.60**
Depth	**0.80**	**0.90**	**0.20**	**0.40**	**0.50**
Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**

Determinand	Method	Test Sample	LOD	Units					
MCERTS Classification	T143	AR							
Moisture @105C	T162	AR	0.1	%	**16**	**19**	**14**	**11**	**15**
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1	<0.1	<0.1

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
MCERTS Preparation

				Concept Reference	**817065 016**	**817065 017**	**817065 018**
				Customer Sample Reference	**WS109**	**WS109**	**WS109**
				Top Depth	**0.60**	**0.80**	**0.90**
				Bottom Depth	**0.80**	**0.90**	**1.00**
				Depth	**0.60**	**0.80**	**0.90**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
MCERTS Classification	T143	AR					
Moisture @105C	T162	AR	0.1	%	**6.6**	**14**	**14**
Retained on 10mm sieve	T2	M40	0.1	%	<0.1	<0.1	<0.1

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Lead Stand Alone Analysis

				Concept Reference	**817065 001**	**817065 002**	**817065 003**	**817065 004**	**817065 005**
				Customer Sample Reference	**WS104**	**WS104**	**WS104**	**WS104**	**WS104**
				Top Depth	**0.20**	**0.40**	**0.50**	**0.60**	**0.80**
				Bottom Depth	**0.40**	**0.50**	**0.60**	**0.80**	**0.90**
				Depth	**0.20**	**0.40**	**0.50**	**0.60**	**0.80**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Lead	T6	M40	1	mg/kg	**440**	**590**	**170**	**270**	**370**

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Lead Stand Alone Analysis

				Concept Reference	**817065 006**	**817065 007**	**817065 008**	**817065 009**	**817065 010**
				Customer Sample Reference	**WS104**	**WS105**	**WS105**	**WS105**	**WS105**
				Top Depth	**0.90**	**0.20**	**0.40**	**0.50**	**0.60**
				Bottom Depth	**1.00**	**0.40**	**0.50**	**0.60**	**0.80**
				Depth	**0.90**	**0.20**	**0.40**	**0.50**	**0.60**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Lead	T6	M40	1	mg/kg	**14**	**300**	**150**	**220**	**280**

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Lead Stand Alone Analysis

				Concept Reference	**817065 011**	**817065 012**	**817065 013**	**817065 014**	**817065 015**
				Customer Sample Reference	**WS105**	**WS105**	**WS109**	**WS109**	**WS109**
				Top Depth	**0.80**	**0.90**	**0.20**	**0.40**	**0.50**
				Bottom Depth	**0.90**	**1.00**	**0.40**	**0.50**	**0.60**
				Depth	**0.80**	**0.90**	**0.20**	**0.40**	**0.50**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**					
Lead	T6	M40	1	mg/kg	**69**	**43**	**520**	**370**	**150**

Concept Reference: 817065
Project Site: Trenchard Drive
Customer Reference: 103580

Soil Analysed as Soil
Lead Stand Alone Analysis

				Concept Reference	**817065 016**	**817065 017**	**817065 018**
				Customer Sample Reference	**WS109**	**WS109**	**WS109**
				Top Depth	**0.60**	**0.80**	**0.90**
				Bottom Depth	**0.80**	**0.90**	**1.00**
				Depth	**0.60**	**0.80**	**0.90**
				Date Sampled	**18-APR-2019**	**18-APR-2019**	**18-APR-2019**
				Matrix Class	**Topsoil**	**Topsoil**	**Topsoil**
Determinand	**Method**	**Test Sample**	**LOD**	**Units**			
Lead	T6	M40	1	mg/kg	**46**	**200**	**11**

Index to symbols used in 817065-2

Value	Description
AR	As Received
M105	Analysis conducted on an "as received" aliquot. Results are reported on a dry weight basis where moisture content was determined by assisted drying of sample at 105C
M40	Analysis conducted on sample assisted dried at no more than 40C. Results are reported on a dry weight basis.
13	Results have been blank corrected.
M	Analysis is MCERTS accredited
N	Analysis is not UKAS accredited

Method Index

Value	Description
T546	Colorimetry (CF)
T6	ICP/OES
T2	Grav
T143	Process
T209	GC/MS (Head Space)(MCERTS)
T162	Grav (1 Dec) (105 C)

Accreditation Summary

Determinand	Method	Test Sample	LOD	Units	Symbol	Concept References
Cyanide(Total)	T546	AR	1	mg/kg	M	001-018
Phenols(Mono)	T546	AR	1	mg/kg	M	001-018
Benzene	T209	M105	10	µg/kg	M	001-018
Toluene	T209	M105	10	µg/kg	M	001-018
EthylBenzene	T209	M105	10	µg/kg	M	001-018
M/P Xylene	T209	M105	10	µg/kg	M	001-018
O Xylene	T209	M105	10	µg/kg	M	001-018
MCERTS Classification	T143	AR			M	001-018
Moisture @105C	T162	AR	0.1	%	N	001-018
Retained on 10mm sieve	T2	M40	0.1	%	N	001-018
Lead	T6	M40	1	mg/kg	M	001-018