e3p

Amberley Drive, Wythenshawe

Reference:10-914-R4-1
Date: January 2021

VALIDATION COMPLETION REPORT

Land off Amberley Drive
Wythenshawe
M23 2RW

Prepared for:
ENGIE

Report Ref: 10-914-R4-1
Date Issued: January 2021

E3P

Manchester Office
Taylor Road
Urmston
Manchester
M41 7JQ

+ 44 (0) 161 707 9612
https://e3p.co.uk/

Registered in England
CRN: 807255262

QUALITY ASSURANCE

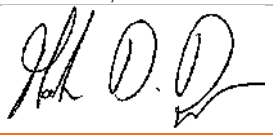
PROJECT NUMBER	10-914		
VERSION	Version 1		
REMARKS	Final		
DATE	January 2021		
PREPARED BY	N. Sellars		
QUALIFICATIONS	MSci (Hons), FGS		
SIGNATURE			
CHECKED BY	N. Sellars		
QUALIFICATIONS	MSci (Hons), FGS		
SIGNATURE			
AUTHORISED BY	M Dyer		
QUALIFICATIONS	BSc, FGS, AIEMA, MIEnvSc, CEnv		
SIGNATURE			

Table of Contents

1. INTRODUCTION 3
1.1. Background 3
1.2. Objectives 3
1.3. Limitations 3
1.4. Confidentiality 3

2. GARDEN VALIDATION 4

3. CHEMICAL VALIDATION 5
3.1. Topsoil and Subsoil 5
3.2. Chemical Validation 5

4. GAS MEMBRANE VALIDATION 6
4.1. Summary Of Ground Gas Risk Assessment 6
4.2. Gas Membrane Validation 6

5. CONCLUSIONS 7

APPENDIX I LIMITATIONS 8

APPENDIX II GLOSSARY 10

APPENDIX III DRAWINGS 13

APPENDIX IV CHEMICAL TESTING RESULTS 14

APPENDIX V GAS MEMBRANE VALIDATION CERTIFICATES 15

1. INTRODUCTION

1.1. BACKGROUND

E3P Ltd has been commissioned by Engie to produce a Completion Report in relation to the validation of the garden plots and gas membrane installations at their newly constructed site off Amberley Drive in Wythenshawe.

Manchester City Council confirmed their general acceptance of the remediation works and subsequent validation works for the proposed residential development, pending the following information:

- Validation of the 600mm cover system; and
- Validation of the ground gas protection measures.

Interim validation letters pertaining to the above have been produced previously, however all outstanding information is included within this report.

All acronyms used within this report are defined in the Glossary presented in Appendix II.

1.2. OBJECTIVES

E3P have been instructed to develop a detailed Validation Completion Report associated with the validation of the residential development that will incorporate the following:

- Overview of the validation works undertaken on the development site within the garden areas;
- Chemical laboratory analysis undertaken of the site won and imported material;
- Overview of the validation works undertaken on the development site pertaining to the installation of gas protection measures to Amber 1 where required.

1.3. LIMITATIONS

The limitations of this report are presented in Appendix I.

1.4. CONFIDENTIALITY

E3P 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 E3P; a charge may be levied against such approval.

2. GARDEN VALIDATION

Independent validation of plots 1–52 was undertaken between 23rd January 2020 and 8th December 2020. In total, nine visits were made during which the depth of the cover system was measured to confirm the installation of 450mm subsoil (site won) and 150mm topsoil (imported) with photographs taken by way of validation.

All material used for the cover system was confirmed chemically suitable for use through chemical analysis, discussed further in Section 3.0. All validation works have been completed in strict accordance with the specification previously agreed with Manchester City Council.

Table 2.1 below shows the Garden Validation reference and date of validation for each garden and landscaped area.

TABLE 2.1 SUMMARY OF GARDEN VALIDATIONS

DATE	REPORT NUMBER	PLOT NUMBER
23rd January 2020	V1	27-30 & 50-52
3rd February 2020	V2	31-34 & 45-49
15th June 2020	V3	41-44
6th July 2020	V4	16-20
20th August 2020	V5	13-14 & 37-39
25th August 2020	V6	15, 35-36, 40
23rd November 2020	V7	1-8 & 21-22
3rd December 2020	V8	9-11 & 23-25
8th December 2020	V9	12 & 26

The full details of the cover system depths of each plot garden area are detailed within the individual letters issued, as per the report reference listed within Table 2.1. All garden validation letter reports are available on request.

3. CHEMICAL VALIDATION

3.1. TOPSOIL AND SUBSOIL

All gardens and landscaped areas required a 600mm chemically suitable cover system comprising at least 450mm subsoil and 150mm topsoil.

Topsoil

No suitable source of topsoil was identified on site; therefore, it was required that topsoil was imported to site for use within the garden areas to complete the cover system and ensure general compliance with Building Control / NHBC warranty requirements for the dwellings.

Subsoil

During the enabling cut-fill works approximately 1,800m3 of subsoil was generated from the underlying naturally occurring drift deposits. The subsoil was stockpiled to be installed during the build phase of the development.

3.2. CHEMICAL VALIDATION

Ten samples of the imported topsoil were analysed in accordance with the E3P Remediation Strategy. Chemical analysis confirmed that these topsoil deposits were chemically suitable for use within the proposed garden areas.

Laboratory certificates 20-83045, 20-94444, 20-32786 and 20-43839 provide analysis of the topsoil imported to site for utilisation within the proposed gardens areas.

The chemical analysis provides a validated volume of 500 m^3, each plot required circa 5 m^3.

Eight samples of the site won subsoil were collected from the stockpile and analysed in accordance with the regulatory approved Remediation Strategy. Laboratory certificate 19-12689 provides analysis of the subsoils that were won from site during the remediation and enabling works.

The chemical analysis provides a validated volume of 2000 m^3.

All samples were analysed in accordance with the regulatory approved Remediation Strategy.

Furthermore, E3P inspected the materials intended for topsoil and subsoil. Chemical analysis identified no contaminant exceedances, therefore it has been determined that the topsoil and subsoil is suitable for utilisation within the proposed gardens.

Sufficient samples have been obtained and analysed to meet the agreed sample frequency of 1 sample per 50m^3 topsoil and 1 sample per 250m^3 subsoil. Laboratory certificates have been attached within the individual garden validation letters and are also included within Appendix IV of this report.

4. GAS MEMBRANE VALIDATION

4.1. SUMMARY OF GROUND GAS RISK ASSESSMENT

E3P completed six ground gas monitoring visits across the site which identified marginally elevated carbon dioxide exceeding the action threshold of 5% within one monitoring well (WS105) and elevated methane exceeding 1% within WS101. The remaining monitoring wells did not display any elevated carbon dioxide or methane readings.

The site was classified as Amber 1 in accordance with BS8485 (2015)+A1(2019) due to construction with a sub-floor void.

In this instance BS8485 requires a minimum of 3.5 points be achieved by installation of a suitable combination of measures as prescribed within the 2015 version of this specification.

4.2. GAS MEMBRANE VALIDATION

The ground gas membranes were validated within plots 1–52 with the full details included within the Gas Membrane Validation Certificates included within Appendix V.

In brief, the works included the validation of the following for each plot:

- General condition of the membrane;
- Verification of the joints;
- Verification of service entries and top hats; and
- Verification of venting systems.

Following the completion of the above, E3P can confirm that Plots 1–52 have been installed with gas protection measures in accordance with Amber 1 to an acceptable level of workmanship.

5. CONCLUSIONS

On completion of the validation works undertaken in relation to the installation of a chemically suitable cover system and gas protection measures, E3P can confirm that all works were undertaken in strict accordance with the agreed Remediation Strategy and therefore would deem the site suitable for use as a residential development.

E3P do not consider that any further work is necessary.

END OF REPORT

APPENDIX I
LIMITATIONS

1. This report and its findings should be considered in relation to the terms of reference and objectives agreed between E3P and the client as indicated in Section 1.3.

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. During the site walkover, reasonable effort has been made to obtain an overview of the site conditions. However, during the site walkover, no attempt has been made to enter areas of the site that are unsafe or present a risk to health and safety, are locked, barricaded, overgrown, or the location of the area has not been made known or accessible.

5. Access considerations, the presence of services and the activities being carried out on the site limited the locations where sampling locations could be installed and the techniques that could be used.

6. 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.

7. Where mention has been made to the identification of Japanese Knotweed and other invasive plant species and asbestos or asbestos-containing materials, this is for indicative purposes only and do not constitute or replace full and proper surveys.

8. The executive summary, conclusions and recommendations sections of the report provide an overview and guidance only and should not be specifically relied upon without considering the context of the report in full.

9. E3P 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 E3P 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 parties by E3P in this connection without their explicit written agreement there to by E3P.

10. New information, revised practices or changes in legislation may necessitate the re-interpretation of the report, in whole or in part.

APPENDIX II
GLOSSARY

TERMS

ACM	Asbestos-containing material	**MMP**	Materials management plan
ADS	Acoustic design statement	**ND**	Not detected
AST	Above-ground storage tank	**NDP**	Nuclear density probe
BGS	British Geological Survey	**NMP**	Noise management plan
BSI	British Standards Institute	**NPSE**	Noise policy statement for England
BTEX	Benzene, toluene, ethylbenzene, xylenes	**NR**	Not recorded
CA	Coal Authority	**PAH**	Polycyclic aromatic hydrocarbon
CBR	California bearing ratio	**PCB**	Polychlorinated biphenyl
CIEH	Chartered Institute of Environmental Health	**PI**	Plasticity index
CIRIA	Construction Industry Research Association	**PID**	Photo ionisation detector
CLEA	Contaminated land exposure assessment	**POS**	Public open space
CML	Council of Mortgage Lenders	**PPE**	Personnel protective equipment
CoC	Contaminants of concern	**ProPG**	Professional practice guidance
CSM	Conceptual site model	**QA**	Quality assurance
DNAPL	Dense non-aqueous phase liquid (chlorinated solvents, PCB)	**SGV**	Soil guideline value
DWS	Drinking water standard	**SPH**	Separate-phase hydrocarbon
EA	Environment Agency	**SPT**	Standard penetration test
EQS	Environmental quality standard	**SVOC**	Semi-volatile organic compound
FFL	Finished floor level	**TPH**	Total and speciated petroleum hydrocarbon
GAC	General assessment criteria	**TPH CWG**	Total Petroleum Hydrocarbon (Criteria Working Group)
GL	Ground level	**UKWIR**	United Kingdom Water Infrastructure Risk
GSV	Gas screening value	**UST**	Underground storage tank
HCV	Health criteria value	**VCC**	Vibro-concrete column
ICSM	Initial conceptual site model	**VOC**	Volatile organic compound
LEL	Lower explosive limit	**VRSC**	Vibro-replacement stone columns
LMRL	Lower method reporting limit	**VSC**	Vibro-stone columns
LNAPL	Light non-aqueous phase liquid (petrol, diesel, kerosene)	**WHO**	World Health Organisation
MCV	Moisture condition value	**WRAP**	Waste and Resources Action Programme

MIBK	Methyl isobutyl ketone	**WTE**	Water table elevation
m	Metres	**ppm**	Parts per million
km	Kilometres	**mg/m^3**	Milligram per metre cubed
% v/v	Percent volume in air	**m bgl bgl**	Metres below ground level
mb	Millibars (atmospheric pressure)	**m bcl**	Metre below cover level
l/hr	Litres per hour	**mAOD**	Metres above ordnance datum (sea level)
µg/l	Micrograms per litre (parts per billion)	**kN/m^2**	Kilonewtons per metre squared
ppb	Parts per billion	**µm**	Micrometre
mg/kg	Milligrams per kilogram (parts per million)	**SSRT**	Site Specific Remediation Target
PSD	Particle Size Distribution	**DD**	Dry Density
CL:AIRE	Contaminated Land: Applications in Real Environments	**Mc**	Moisture Content
ρ	Bulk Density	**GPR**	Ground Penetrating Radar
NDP	Nuclear Density Probe	**FFL**	Finished Floor Level
LEL	Lower Explosive Limit	**UKWIR**	UK Water Industry Research
CIRIA	Construction Industry Research and Information Association	**LOD**	Limit of Detection

APPENDIX III
DRAWINGS



Key:

Remediation Treatment

Private garden requiring 600mm certified cover comprising 450mm sub-soil and 150mm topsoil. Garden to be individually validated.

Gas Protection Measures (Visqueen U.N.O)

METHANE & CO_2 Resistant Membrane. Required to achieve CS2/Amber one with three points as required by BS8485

Remediation Issues

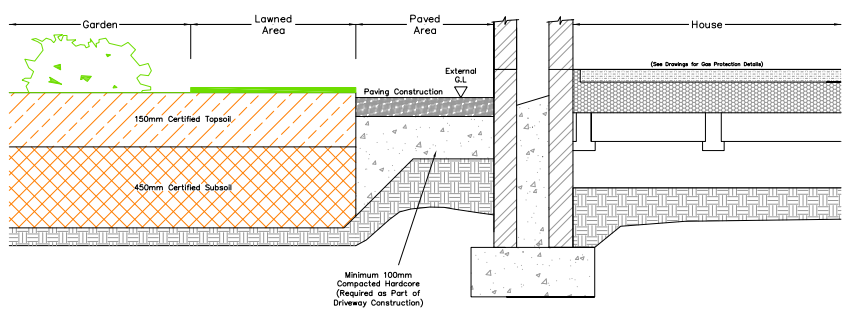
Item	Plot Number	Active
Garden Cover System	-	-
Hotspot Treatment	-	-
CO_2 Membrane	-	-
CH_4 Membrane	-	-
Hydrocarbon Membrane	-	-
Hazardous Material Storage	-	-

Notes:

N.B: *All areas of identified contamination impact to soil and groundwater are estimated using best endeavors from historic and current intrusive investigation. However, the contractor must satisfy themselves of the potential extent of remediation works. The identified impact must be spatially delineated in accordance with the E3P Remediation strategy. The entire development site will require a 600mm chemically suitable cover system comprising of 150mm topsoil & 450mm subsoil with underlying orange 'no dig' geotextile membrane installed in all proposed garden areas to mitigate the elevated contaminant concentrations.*

P1	R1	27-06-2017	REVISION	CB	MD
P1	-	19-06-2017	DRAFT	CB	MD
Phase	Revision	Date	Issue	Drawn	Authorised

Indicative Construction for Garden Cover



Client: Alan Johnston Partnership

Job No: 10-914

Date: 27-06-2017

Drawing No: 009

Scale: NTS @ A3

Job Title: Amberley Drive, Wythenshawe

Drawing Title: Build Phase Mitigation Plan

Environmental Energy Engineering Partnerships Ltd
City Heliport & Business Centre
Eccles, Manchester, M30 7RU
Tel: 0161 707 9612
E-mail: info@e3p.co.uk
Website: www.e3p.co.uk

The client must not amend any drawing, design or other intellectual property produced by E3P Ltd without permission in writing from E3P 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, E3P Ltd shall not be liable for any damage and/or losses occurring as a result of the amended drawing, design or intellectual property.

APPENDIX IV
CHEMICAL TESTING RESULTS

Nicola Sellars
e3p
Office 4
Heliport Business Park
Eccles
Liverpool Road
Manchester
M30 7RU

t: 0161 707 9612

e: nsellars@e3p.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-83045

Project / Site name:	Amberley Drive	**Samples received on:**	24/01/2020
Your job number:	10914	**Samples instructed on:**	24/01/2020
Your order number:		**Analysis completed by:**	31/01/2020
Report Issue Number:	1	**Report issued on:**	31/01/2020
Samples Analysed:	3 soil samples		

Signed:

Rachel Bradley

Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 20-83045

Project / Site name: Amberley Drive

Lab Sample Number				1422098	1422099	1422100		
Sample Reference				TS01	TS02	TS03		
Sample Number				Plot 52	Plot 51	Plot 27		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				23/01/2020	23/01/2020	23/01/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1		
Moisture Content	%	N/A	NONE	13	13	13		
Total mass of sample received	kg	0.001	NONE	0.55	0.56	0.53		
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected		
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	7.2	6.3	7.3		
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1		
Total Sulphate as SO_4	mg/kg	50	MCERTS	610	390	550		
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	230	65	250		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.11	0.032	0.12		
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	115	32.4	124		
Sulphide	mg/kg	1	MCERTS	3.5	1.6	< 1.0		
Total Sulphur	mg/kg	50	MCERTS	270	200	260		
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05		
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80	< 0.80		
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.2	3.7	4.4		
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2	< 0.2		
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	11	12	12		
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	11	15		
Lead (aqua regia extractable)	mg/kg	1	MCERTS	24	29	25		
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3		
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	7.6	8.7	9.8		
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	31	34	35		

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 20-83045

Project / Site name: Amberley Drive

Lab Sample Number				1422098	1422099	1422100		
Sample Reference				TS01	TS02	TS03		
Sample Number				Plot 52	Plot 51	Plot 27		
Depth (m)				None Supplied	None Supplied	None Supplied		
Date Sampled				23/01/2020	23/01/2020	23/01/2020		
Time Taken				None Supplied	None Supplied	None Supplied		
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0		
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1		
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0		
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0		
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0		
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10		
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	< 10	< 10		

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 20-83045

Project / Site name: Amberley Drive

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1422098	TS01	Plot 52	None Supplied	Brown loam and clay with gravel and vegetation.
1422099	TS02	Plot 51	None Supplied	Brown loam and clay with gravel and vegetation.
1422100	TS03	Plot 27	None Supplied	Brown loam and clay with gravel and vegetation.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 20-83045

Project / Site name: Amberley Drive

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Matt Jackson
e3p
Office 4
Heliport Business Park
Eccles
Liverpool Road
Manchester
M30 7RU

t: 0161 707 9612

e: mjackson@e3p.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-94444

Project / Site name:	Amberly Drive	**Samples received on:**	24/03/2020
Your job number:	10-914	**Samples instructed on:**	24/03/2020
Your order number:		**Analysis completed by:**	31/03/2020
Report Issue Number:	1	**Report issued on:**	31/03/2020
Samples Analysed:	2 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska

Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils	- 4 weeks from reporting
leachates	- 2 weeks from reporting
waters	- 2 weeks from reporting
asbestos	- 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement. Application of uncertainty of measurement would provide a range within which the true result lies. An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 20-94444

Project / Site name: Amberly Drive

Lab Sample Number				1482364	1482365			
Sample Reference				TS102	TS101			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				23/03/2020	23/03/2020			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Stone Content	%	0.1	NONE	< 0.1	< 0.1			
Moisture Content	%	N/A	NONE	11	11			
Total mass of sample received	kg	0.001	NONE	0.52	0.52			
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected			
General Inorganics								
pH - Automated	pH Units	N/A	MCERTS	6.6	7.0			
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1			
Total Sulphate as SO_4	mg/kg	50	MCERTS	340	340			
Water Soluble Sulphate as SO_4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	110	42			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.054	0.021			
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	53.9	20.9			
Sulphide	mg/kg	1	MCERTS	< 1.0	< 1.0			
Total Sulphur	mg/kg	50	MCERTS	170	160			
Total Phenols								
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Speciated PAHs								
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(a)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Chrysene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05			
Total PAH								
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	< 0.80	< 0.80			
Heavy Metals / Metalloids								
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	3.6	3.6			
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2			
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0			
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	11	9.9			
Copper (aqua regia extractable)	mg/kg	1	MCERTS	11	9.7			
Lead (aqua regia extractable)	mg/kg	1	MCERTS	27	27			
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3			
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	8.0	7.4			
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0			
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	28	30			

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 20-94444

Project / Site name: Amberly Drive

Lab Sample Number				1482364	1482365			
Sample Reference				TS102	TS101			
Sample Number				None Supplied	None Supplied			
Depth (m)				None Supplied	None Supplied			
Date Sampled				23/03/2020	23/03/2020			
Time Taken				None Supplied	None Supplied			
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**					
Petroleum Hydrocarbons								
TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0			
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1			
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0			
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0			
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	< 1.0			
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10			
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	< 10			

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 20-94444

Project / Site name: Amberly Drive

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1482364	TS102	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1482365	TS101	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 20-94444

Project / Site name: Amberly Drive

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Water (PrW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Nicola Sellars
e3p
Taylor Road
Urmston
Manchester
M41 7JQ

e: nsellars@e3p.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-32786

Project / Site name:	Amberley Drive	**Samples received on:**	29/09/2020
Your job number:	10914	**Samples instructed on/ Analysis started on:**	29/09/2020
Your order number:	10914-NS-D	**Analysis completed by:**	06/10/2020
Report Issue Number:	1	**Report issued on:**	06/10/2020
Samples Analysed:	3 soil samples		

Signed: A. Czerwińska

Agnieszka Czerwińska
Technical Reviewer (Reporting Team)
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 20-32786
Project / Site name: Amberley Drive
Your Order No: 10914-NS-D

Lab Sample Number				1634582	1634583	1634584
Sample Reference				TS101	TS102	TS103
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				29/09/2020	29/09/2020	29/09/2020
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1
Moisture Content	%	N/A	NONE	18	19	17
Total mass of sample received	kg	0.001	NONE	0.5	0.5	0.5
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected	Not-detected
General Inorganics						
pH - Automated	pH Units	N/A	MCERTS	7.3	7.4	7.6
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1	< 1
Total Sulphate as SO4	mg/kg	50	MCERTS	840	660	850
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	95	110	170
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.048	0.056	0.087
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	47.6	55.7	87.1
Sulphide	mg/kg	1	MCERTS	12	30	6.1
Total Sulphur	mg/kg	50	MCERTS	400	410	380
Total Phenols						
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Speciated PAHs						
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.47	0.51	0.5
Pyrene	mg/kg	0.05	MCERTS	0.49	0.49	0.49
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.27	0.33	0.31
Chrysene	mg/kg	0.05	MCERTS	0.25	0.26	0.26
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(a)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05	< 0.05
Total PAH						
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	1.48	1.59	1.56
Heavy Metals / Metalloids						
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	11	9.5
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	0.3	0.3
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	17	18	17
Copper (aqua regia extractable)	mg/kg	1	MCERTS	35	47	40
Lead (aqua regia extractable)	mg/kg	1	MCERTS	70	74	66
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	18	21	17
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	80	150	120

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 20-32786
Project / Site name: Amberley Drive
Your Order No: 10914-NS-D

Lab Sample Number				1634582	1634583	1634584
Sample Reference				TS101	TS102	TS103
Sample Number				None Supplied	None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied	None Supplied
Date Sampled				29/09/2020	29/09/2020	29/09/2020
Time Taken				None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**			
Petroleum Hydrocarbons						
TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	< 4.0	< 4.0	< 4.0
TPH (C16 - C21)	mg/kg	1	MCERTS	< 1.0	2.3	< 1.0
TPH (C21 - C35)	mg/kg	1	MCERTS	< 1.0	35	25
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	< 10	39	27

U/S = Unsuitable Sample I/S = Insufficient Sample

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 20-32786
Project / Site name: Amberley Drive

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1634582	TS101	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1634583	TS102	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.
1634584	TS103	None Supplied	None Supplied	Brown loam and clay with gravel and vegetation.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 20-32786
Project / Site name: Amberley Drive

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Nicola Sellars
e3p
Taylor Road
Urmston
Manchester
M41 7JQ

e: nsellars@e3p.co.uk

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 20-43839

Project / Site name:	Amberly Drive	**Samples received on:**	26/11/2020
Your job number:	10914	**Samples instructed on/ Analysis started on:**	26/11/2020
Your order number:	10914-NS-F	**Analysis completed by:**	03/12/2020
Report Issue Number:	1	**Report issued on:**	03/12/2020
Samples Analysed:	2 soil samples		

Signed:

Rachel Bradley
Deputy Quality Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41 -711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 20-43839
Project / Site name: Amberly Drive
Your Order No: 10914-NS-F

Lab Sample Number				1698218	1698219
Sample Reference				TS101	TS102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				24/11/2020	24/11/2020
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	25	24
Total mass of sample received	kg	0.001	NONE	0.7	0.7
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	Not-detected
General Inorganics					
pH - Automated	pH Units	N/A	MCERTS	7.3	7.6
Total Cyanide	mg/kg	1	MCERTS	< 1	< 1
Total Sulphate as SO4	mg/kg	50	MCERTS	600	650
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	g/l	0.00125	MCERTS	0.049	0.064
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/kg	2.5	MCERTS	98	130
Water Soluble SO4 (2:1 Leach. Equiv.) 1hr extraction	mg/l	1.25	MCERTS	48.8	64.3
Sulphide	mg/kg	1	MCERTS	5.3	4.4
Total Sulphur	mg/kg	50	MCERTS	500	510
Total Phenols					
Total Phenols (monohydric)	mg/kg	1	MCERTS	< 1.0	< 1.0
Speciated PAHs					
Naphthalene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthylene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluorene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Phenanthrene	mg/kg	0.05	MCERTS	0.51	0.29
Anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Fluoranthene	mg/kg	0.05	MCERTS	0.83	0.65
Pyrene	mg/kg	0.05	MCERTS	0.8	0.58
Benzo(a)anthracene	mg/kg	0.05	MCERTS	0.43	0.32
Chrysene	mg/kg	0.05	MCERTS	0.39	0.24
Benzo(b)fluoranthene	mg/kg	0.05	MCERTS	0.67	0.35
Benzo(k)fluoranthene	mg/kg	0.05	MCERTS	0.24	0.14
Benzo(a)pyrene	mg/kg	0.05	MCERTS	0.47	0.28
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	MCERTS	0.26	< 0.05
Dibenz(a,h)anthracene	mg/kg	0.05	MCERTS	< 0.05	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	MCERTS	0.36	< 0.05
Total PAH					
Speciated Total EPA-16 PAHs	mg/kg	0.8	MCERTS	4.96	2.85

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 20-43839
Project / Site name: Amberly Drive
Your Order No: 10914-NS-F

Lab Sample Number				1698218	1698219
Sample Reference				TS101	TS102
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				24/11/2020	24/11/2020
Time Taken				None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Heavy Metals / Metalloids					
Arsenic (aqua regia extractable)	mg/kg	1	MCERTS	12	13
Cadmium (aqua regia extractable)	mg/kg	0.2	MCERTS	< 0.2	< 0.2
Chromium (hexavalent)	mg/kg	4	MCERTS	< 4.0	< 4.0
Chromium (aqua regia extractable)	mg/kg	1	MCERTS	21	21
Copper (aqua regia extractable)	mg/kg	1	MCERTS	39	42
Lead (aqua regia extractable)	mg/kg	1	MCERTS	76	76
Mercury (aqua regia extractable)	mg/kg	0.3	MCERTS	< 0.3	< 0.3
Nickel (aqua regia extractable)	mg/kg	1	MCERTS	19	19
Selenium (aqua regia extractable)	mg/kg	1	MCERTS	< 1.0	< 1.0
Zinc (aqua regia extractable)	mg/kg	1	MCERTS	100	110
Petroleum Hydrocarbons					
TPH (C5 - C6)	mg/kg	1	NONE	< 1.0	< 1.0
TPH (C6 - C8)	mg/kg	0.1	MCERTS	< 0.1	< 0.1
TPH (C8 - C10)	mg/kg	0.1	MCERTS	< 0.1	< 0.1
TPH (C10 - C12)	mg/kg	2	MCERTS	< 2.0	< 2.0
TPH (C12 - C16)	mg/kg	4	MCERTS	6.7	5.5
TPH (C16 - C21)	mg/kg	1	MCERTS	12	20
TPH (C21 - C35)	mg/kg	1	MCERTS	40	49
TPH (C35 - C40)	mg/kg	10	MCERTS	< 10	< 10
TPH Total C5 - C40	mg/kg	10	MCERTS	61	76

U/S = Unsuitable Sample I/S = Insufficient Sample

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 20-43839
Project / Site name: Amberly Drive

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
1698218	TS101	None Supplied	None Supplied	Brown clay and loam with gravel and vegetation.
1698219	TS102	None Supplied	None Supplied	Brown clay and loam with gravel and vegetation.

Analytical Report Number : 20-43839
Project / Site name: Amberly Drive

Water matrix abbreviations: Surface Water (SW) Potable Water (PW) Ground Water (GW)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Metals in soil by ICP-OES	Determination of metals in soil by aqua-regia digestion followed by ICP-OES.	In-house method based on MEWAM 2006 Methods for the Determination of Metals in Soil.	L038-PL	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with disperion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Hexavalent chromium in soil	Determination of hexavalent chromium in soil by extraction in water then by acidification, addition of 1,5 diphenylcarbazide followed by colorimetry.	In-house method	L080-PL	W	MCERTS
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Monohydric phenols in soil	Determination of phenols in soil by extraction with sodium hydroxide followed by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (skalar)	L080-PL	W	MCERTS
Speciated EPA-16 PAHs in soil	Determination of PAH compounds in soil by extraction in dichloromethane and hexane followed by GC-MS with the use of surrogate and internal standards.	In-house method based on USEPA 8270	L064-PL	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Sulphide in soil	Determination of sulphide in soil by acidification and heating to liberate hydrogen sulphide, trapped in an alkaline solution then assayed by ion selective electrode.	In-house method	L010-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight.	In-house method based on British Standard Methods and MCERTS requirements.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total cyanide in soil	Determination of total cyanide by distillation followed by colorimetry.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton (Skalar)	L080-PL	W	MCERTS
TPH in (Soil)	Determination of TPH bands by HS-GC-MS/GC-FID	In-house method, TPH with carbon banding and silica gel split/cleanup.	L076-PL	D	MCERTS
Sulphate, water soluble, in soil (1hr extraction)	Sulphate, water soluble, in soil (1hr extraction)	In-house method	L038-PL	D	MCERTS

For method numbers ending in 'UK' analysis have been carried out in our laboratory in the United Kingdom.
For method numbers ending in 'PL' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30oC.

Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

Final Report

Report No.:	19-11558-1		
Initial Date of Issue:	12-Apr-2019		
Client	Redstart Northwest Limited		
Client Address:	Unit 7 Oak Green Business Park Earl Road Cheadle Hulme Cheshire SK8 6QL		
Contact(s):	Phil Sales		
Project	871 Amberley Drive		
Quotation No.:	Q18-12443	**Date Received:**	03-Apr-2019
Order No.:		**Date Instructed:**	03-Apr-2019
No. of Samples:	3		
Turnaround (Wkdays):	7	**Results Due:**	11-Apr-2019
Date Approved:	12-Apr-2019		
Approved By:			
Details:	Martin Dyer, Laboratory Manager		

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 871 Amberley Drive

Client: Redstart Northwest Limited		**Chemtest Job No.:**			19-11558	19-11558	19-11558
Quotation No.: Q18-12443		**Chemtest Sample ID.:**			804413	804414	804415
				Client Sample ID.:	SS01	SS02	SS03
				Sample Type:	SOIL	SOIL	SOIL
				Date Sampled:	02-Apr-2019	02-Apr-2019	02-Apr-2019
				Asbestos Lab:	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-
Asbestos by Gravimetry	U	2192	%	0.001	-	-	-
Total Asbestos	N	2192	%	0.001	-	-	-
Moisture	N	2030	%	0.020	15	15	14
pH	U	2010		N/A	8.5	8.5	9.4
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.45	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.016	< 0.010	0.059
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.073	0.036	0.085
Arsenic	U	2450	mg/kg	1.0	12	9.5	13
Barium	U	2450	mg/kg	10	190	170	200
Beryllium	U	2450	mg/kg	1.0	1.0	< 1.0	< 1.0
Cadmium	U	2450	mg/kg	0.10	0.13	< 0.10	0.21
Molybdenum	U	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	2.5	2.3	3.0
Copper	U	2450	mg/kg	0.50	28	23	38
Mercury	U	2450	mg/kg	0.10	0.12	< 0.10	0.16
Nickel	U	2450	mg/kg	0.50	32	33	26
Lead	U	2450	mg/kg	0.50	53	39	62
Selenium	U	2450	mg/kg	0.20	0.21	< 0.20	< 0.20
Vanadium	U	2450	mg/kg	5.0	32	31	27
Zinc	U	2450	mg/kg	0.50	99	80	120
Chromium (Trivalent)	N	2490	mg/kg	1.0	31	29	25
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	1.6	1.7	4.0
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	60	18	38
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	60	18	38
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 871 Amberley Drive

Client: Redstart Northwest Limited				**Chemtest Job No.:**	19-11558	19-11558	19-11558
Quotation No.: Q18-12443				**Chemtest Sample ID.:**	804413	804414	804415
				Client Sample ID.:	SS01	SS02	SS03
				Sample Type:	SOIL	SOIL	SOIL
				Date Sampled:	02-Apr-2019	02-Apr-2019	02-Apr-2019
				Asbestos Lab:	DURHAM	DURHAM	DURHAM
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	1.8	1.1	3.9
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	130	51	180
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	130	52	180
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	190	70	220
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	1.3
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.42
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.52
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.76
Phenanthrene	U	2700	mg/kg	0.10	1.0	0.67	5.0
Anthracene	U	2700	mg/kg	0.10	0.28	0.19	1.4
Fluoranthene	U	2700	mg/kg	0.10	2.3	1.4	6.2
Pyrene	U	2700	mg/kg	0.10	1.9	1.4	6.3
Benzo[a]anthracene	U	2700	mg/kg	0.10	0.85	0.57	2.7
Chrysene	U	2700	mg/kg	0.10	0.91	0.59	2.8
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	1.8	< 0.10	4.2
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	0.50	< 0.10	1.4
Benzo[a]pyrene	U	2700	mg/kg	0.10	1.3	< 0.10	2.8
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	0.85	< 0.10	1.7
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	0.36
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	0.82	< 0.10	1.6
Total Of 16 PAH's	U	2700	mg/kg	2.0	13	4.8	40
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

Chemtest
The right chemistry to deliver results
Chemtest Ltd.
Depot Road
Newmarket
CB8 0AL
Tel: 01638 606070
Email: info@chemtest.com

UKAS TESTING
2183

Final Report

Report No.:	19-12689-1
Initial Date of Issue:	23-Apr-2019
Client	Redstart Northwest Limited
Client Address:	Unit 7 Oak Green Business Park Earl Road Cheadle Hulme Cheshire SK8 6QL
Contact(s):	Phil Sales
Project	871 Amberley Drive

Quotation No.:	Q18-12443	**Date Received:**	12-Apr-2019
Order No.:		**Date Instructed:**	12-Apr-2019
No. of Samples:	8		
Turnaround (Wkdays):	5	**Results Due:**	18-Apr-2019
Date Approved:	23-Apr-2019		

Approved By:



Details: Robert Monk, Technical Manager

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 871 Amberley Drive

Client: Redstart Northwest Limited				**Chemtest Job No.:**	19-12689	19-12689	19-12689	19-12689	19-12689	19-12689	19-12689	19-12689
Quotation No.: Q18-12443				**Chemtest Sample ID.:**	810108	810109	810110	810111	810112	810113	810114	810115
				Client Sample ID.:	SS04	SS05	SS06	SS07	SS08	SS09	SS10	SS11
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Date Sampled:	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
ACM Type	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos Identification	U	2192	%	0.001	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected	No Asbestos Detected
ACM Detection Stage	U	2192		N/A	-	-	-	-	-	-	-	-
Asbestos by Gravimetry	U	2192	%	0.001	-	-	-	-	-	-	-	-
Total Asbestos	N	2192	%	0.001	-	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	11	11	12	12	13	10	12	11
pH	U	2010		N/A	8.7	8.8	8.7	8.7	8.6	8.7	8.6	8.7
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	0.41	0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	0.089	0.017	< 0.010	< 0.010	0.014	< 0.010	< 0.010	< 0.010
Total Sulphur	U	2175	%	0.010	0.011	< 0.010	0.010	< 0.010	< 0.010	0.011	0.013	0.014
Cyanide (Free)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Cyanide (Total)	U	2300	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Total)	U	2430	%	0.010	0.042	0.026	0.028	0.028	0.031	0.025	0.027	0.037
Arsenic	U	2450	mg/kg	1.0	9.9	8.6	8.8	9.5	12	10	10	7.7
Barium	U	2450	mg/kg	10	130	100	80	110	96	100	140	330
Beryllium	U	2450	mg/kg	1.0	1.1	< 1.0	< 1.0	< 1.0	1.0	< 1.0	< 1.0	< 1.0
Cadmium	U	2450	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Molybdenum	U	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Antimony	N	2450	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Copper	U	2450	mg/kg	0.50	15	12	9.2	13	14	14	21	13
Mercury	U	2450	mg/kg	0.10	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	0.18	< 0.10
Nickel	U	2450	mg/kg	0.50	46	42	47	50	49	47	45	42
Lead	U	2450	mg/kg	0.50	7.4	5.0	5.2	5.3	6.6	5.2	10	5.7
Selenium	U	2450	mg/kg	0.20	< 0.20	0.24	< 0.20	< 0.20	< 0.20	< 0.20	< 0.20	0.39
Vanadium	U	2450	mg/kg	5.0	40	40	41	44	45	43	40	38
Zinc	U	2450	mg/kg	0.50	71	66	72	74	75	73	73	65
Chromium (Trivalent)	N	2490	mg/kg	1.0	42	39	43	44	44	42	41	39
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Organic Matter	U	2625	%	0.40	1.9	1.7	1.5	0.60	0.41	0.90	1.2	0.90
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0

Chemtest
The right chemistry to deliver results

Results - Soil

Project: 871 Amberley Drive

Client: Redstart Northwest Limited				**Chemtest Job No.:**	19-12689	19-12689	19-12689	19-12689	19-12689	19-12689	19-12689	19-12689
Quotation No.: Q18-12443				**Chemtest Sample ID.:**	810108	810109	810110	810111	810112	810113	810114	810115
				Client Sample ID.:	SS04	SS05	SS06	SS07	SS08	SS09	SS10	SS11
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Date Sampled:	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019	11-Apr-2019
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**								
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0	< 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	< 10	< 10	< 10	< 10	< 10	< 10	< 10	< 10
Naphthalene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	2700	mg/kg	0.10	0.12	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	2700	mg/kg	0.10	0.15	0.19	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	2700	mg/kg	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	U	2700	mg/kg	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Benzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Toluene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
m & p-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
o-Xylene	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Total Phenols	U	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30

Test Methods

SOP	Title	Parameters included	Method summary
2010	pH Value of Soils	pH	pH Meter
2030	Moisture and Stone Content of Soils(Requirement of MCERTS)	Moisture content	Determination of moisture content of soil as a percentage of its as received mass obtained at <37°C.
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2300	Cyanides & Thiocyanate in Soils	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Allkaline extraction followed by colorimetric determination using Automated Flow Injection Analyser.
2430	Total Sulphate in soils	Total Sulphate	Acid digestion followed by determination of sulphate in extract by ICP-OES.
2450	Acid Soluble Metals in Soils	Metals, including: Arsenic; Barium; Beryllium; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Vanadium; Zinc	Acid digestion followed by determination of metals in extract by ICP-MS.
2490	Hexavalent Chromium in Soils	Chromium [VI]	Soil extracts are prepared by extracting dried and ground soil samples into boiling water. Chromium [VI] is determined by 'Aquakem 600' Discrete Analyser using 1,5-diphenylcarbazide.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2680	TPH A/A Split	Aliphatics: >C5–C6, >C6–C8,>C8–C10, >C10–C12, >C12–C16, >C16–C21, >C21–C35, >C35– C44Aromatics: >C5–C7, >C7–C8, >C8– C10, >C10–C12, >C12–C16, >C16– C21, >C21– C35, >C35– C44	Dichloromethane extraction / GCxGC FID detection
2700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-FID	Acenaphthene; Acenaphthylene; Anthracene; Benzo[a]Anthracene; Benzo[a]Pyrene; Benzo[b]Fluoranthene; Benzo[ghi]Perylene; Benzo[k]Fluoranthene; Chrysene; Dibenz[ah]Anthracene; Fluoranthene; Fluorene; Indeno[123cd]Pyrene; Naphthalene; Phenanthrene; Pyrene	Dichloromethane extraction / GC-FID (GC-FID detection is non-selective and can be subject to interference from co-eluting compounds)
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2920	Phenols in Soils by HPLC	Phenolic compounds including Resorcinol, Phenol, Methylphenols, Dimethylphenols, 1-Naphthol and TrimethylphenolsNote: chlorophenols are excluded.	60:40 methanol/water mixture extraction, followed by HPLC determination using electrochemical detection.

Report Information

Key

U	UKAS accredited
M	MCERTS and UKAS accredited
N	Unaccredited
S	This analysis has been subcontracted to a UKAS accredited laboratory that is accredited for this analysis
SN	This analysis has been subcontracted to a UKAS accredited laboratory that is not accredited for this analysis
T	This analysis has been subcontracted to an unaccredited laboratory
I/S	Insufficient Sample
U/S	Unsuitable Sample
N/E	not evaluated
<	"less than"
>	"greater than"

Comments or interpretations are beyond the scope of UKAS accreditation
The results relate only to the items tested
Uncertainty of measurement for the determinands tested are available upon request
None of the results in this report have been recovery corrected
All results are expressed on a dry weight basis
The following tests were analysed on samples as received and the results subsequently corrected to a dry weight basis TPH, BTEX, VOCs, SVOCs, PCBs, Phenols
For all other tests the samples were dried at < 37°C prior to analysis
All Asbestos testing is performed at the indicated laboratory
Issue numbers are sequential starting with 1 all subsequent reports are incremented by 1

Sample Deviation Codes

A - Date of sampling not supplied
B - Sample age exceeds stability time (sampling to extraction)
C - Sample not received in appropriate containers
D - Broken Container
E - Insufficient Sample (Applies to LOI in Trommel Fines Only)

Sample Retention and Disposal

All soil samples will be retained for a period of 45 days from the date of receipt
All water samples will be retained for 14 days from the date of receipt
Charges may apply to extended sample storage

If you require extended retention of samples, please email your requirements to:
customerservices@chemtest.com

APPENDIX V
GAS MEMBRANE VALIDATION CERTIFICATES

E3P
Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

Manchester | London | Edinburgh

info@E3P.co.uk
www.E3P.co.uk

GAS MEMBRANE VALIDATION

Site: Amberley Drive	
Date: 20-02-2020	Project Number: 10-914
Project Manager: N. Sellars	E3P Engineer: J. Newall
Ground Gas Risk Assessment: **Amber 1**	
Membrane Specification: Monarflex Low Permeability Gas Membrane	
Plot Number: 1-7	

Overview:

The membrane comprised a Monarflex low permeability gas membrane resistant to radon, carbon dioxide and low levels of methane. E3P can confirm there were no holes or rips at the time of inspection. Upon being laid the membrane is to be covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection.

All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant DPM. The membrane was taped to the gas resistant DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape.

Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top-hats have been adequately sealed against the membrane.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that **Plots 1-7** have been installed with gas protection measures in accordance with Amber 1 to an acceptable level of workmanship.

Plot - 1

General Condition of Membrane-Good Condition




Verification of Joints and Seals-Good Condition




Verification of Service Penetrations-Good Condition



Verification of Ventilation-Good Condition




Plot - 2

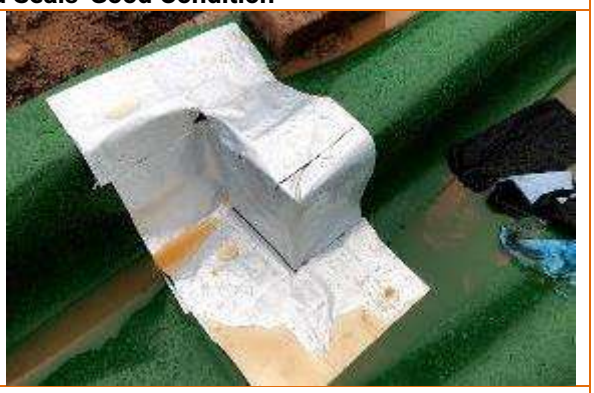
General Condition of Membrane-Good Condition





Verification of Joints and Seals-Good Condition





Verification of Service Penetrations-Good Condition



Verification of Ventilation-Good Condition



Plot - 3

General Condition of Membrane-Good Condition




Verification of Joints and Seals-Good Condition




Verification of Service Penetrations-Good Condition



Verification of Ventilation-Good Condition

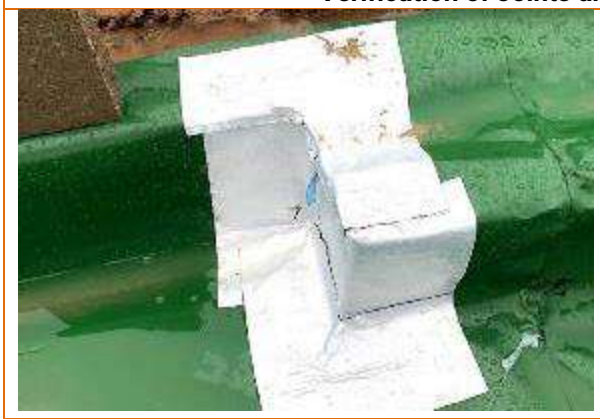



Plot - 4

General Condition of Membrane-Good Condition




Verification of Joints and Seals-Good Condition




Verification of Service Penetrations-Good Condition




Verification of Ventilation-Good Condition



Plot - 5

General Condition of Membrane-Good Condition

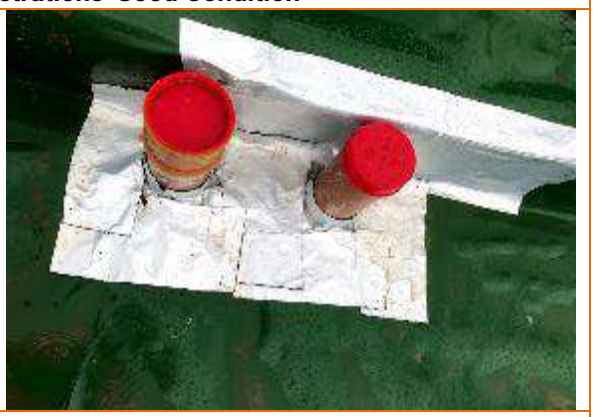


Verification of Joints and Seals-Good Condition



Verification of Service Penetrations-Good Condition





Verification of Ventilation-Good Condition





Plot – 6

General Condition of Membrane-Good Condition




Verification of Joints and Seals-Good Condition




Verification of Service Penetrations-Good Condition




Verification of Ventilation-Good Condition



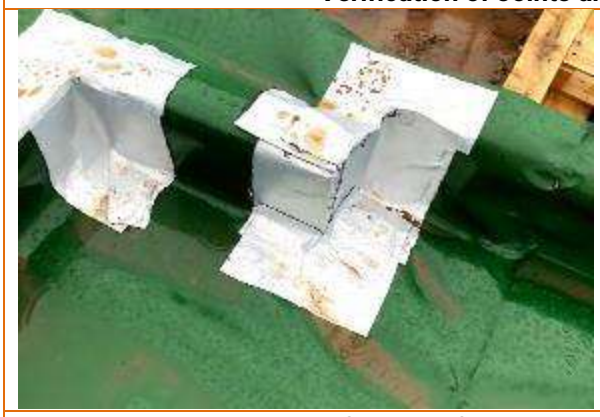
Plot - 7

General Condition of Membrane-Good Condition





Verification of Joints and Seals-Good Condition





Verification of Service Penetrations-Good Condition





Verification of Ventilation-Good Condition



e3p

GAS PROTECTION VALIDATION

Amberley Drive.

Plot No: 1

Inspection date/time:	20/02/20	Inspected by:	J Newall	Photographed:	✓/×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has (PASSED)/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/(IS NOT)* required for this Plot.

Inspection by: J Newall ..... Signed: J Newall .....

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

e3p

GAS PROTECTION VALIDATION

Plot No: 2

Inspection date/time:	20/02/20	Inspected by:	J Newall	Photographed:	✓/×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has (PASSED)/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/(IS NOT)* required for this Plot.

Inspection by: J Newall ..... Signed: .....

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

e3p

GAS PROTECTION VALIDATION

Plot No: 3

Inspection date/time:	20/02/20	Inspected by:	J Newall	Photographed:	✓/x

	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has (PASSED)/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/(IS NOT)* required for this Plot.

Inspection by: J Newall ..... Signed: J Newall .....

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

e3p

GAS PROTECTION VALIDATION

Plot No: 4

Inspection date/time:	20/02/20	Inspected by:	J Nevill	Photographed:	0×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: J Nevill Signed: .....

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

Gas Protection Validation Site Record

Plot No: 5

Inspection date/time:	20/02/20	Inspected by:	J Newall	Photographed:	9×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: J Newall Signed: J Newall

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

Gas Protection Validation Site Record

Plot No: 6

Inspection date/time:	20/02/20	Inspected by:	J Newall	Photographed:	9×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: J Newall Signed: J Newall

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

Gas Protection Validation Site Record

Plot No: 7

Inspection date/time:	20/02/20	Inspected by:	JNewall	Photographed:	9×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: JNewall Signed: JNewall

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

E3P
Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

Manchester | London | Edinburgh

info@E3P.co.uk
www.E3P.co.uk

GAS MEMBRANE VALIDATION

Site: Amberley Drive	
Date: 24-06-2020	Project Number: 10-914
Project Manager: N. Sellars	E3P Engineer: J. James
Ground Gas Risk Assessment: **Amber 1**	
Membrane Specification: Monarflex Low Permeability Gas Membrane	
Plot Number: 8	

Overview:

The membrane comprised a Monarflex low permeability gas membrane resistant to radon, carbon dioxide and low levels of methane. E3P can confirm there were no holes or rips at the time of inspection. Upon being laid the membrane is to be covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection.

All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant DPM. The membrane was taped to the gas resistant DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape.

Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top-hats have been adequately sealed against the membrane.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that **Plot 8** has been installed with gas protection measures in accordance with Amber 1 to an acceptable level of workmanship.

Plot – 8

General Condition of Membrane-Good Condition




Verification of Joints and Seals-Good Condition




Verification of Service Penetrations-Good Condition




Verification of Ventilation-Good Condition




e3p

Plot No: 8

Gas Protection Validation Site Record

Inspection date/time:	24/6/20	Inspected by:	J JAMES	Photographed:	✓/x ✓

	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & Inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: Jordan James Signed: .....

E3P
Heliport Business Park
Liverpool Road
Eccles
Manchester
M30 7RU

Manchester | London | Edinburgh

info@E3P.co.uk
www.E3P.co.uk

GAS MEMBRANE VALIDATION

Site: Amberley Drive	
Date: 20-01-2020	Project Number: 10-914
Project Manager: N. Sellars	E3P Engineer: J. Newall
Ground Gas Risk Assessment: **Amber 1**	
Membrane Specification: Monarflex Low Permeability Gas Membrane	
Plot Number: 9-12	

Overview:

The membrane comprised a Monarflex low permeability gas membrane resistant to radon, carbon dioxide and low levels of methane. E3P can confirm there were no holes or rips at the time of inspection. Upon being laid the membrane is to be covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection.

All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant DPM. The membrane was taped to the gas resistant DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape.

Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top-hats have been adequately sealed against the membrane.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that **Plots 9-12** have been installed with gas protection measures in accordance with Amber 1 to an acceptable level of workmanship.

Plot - 9

General Condition of Membrane-Good Condition




Verification of Joints and Seals-Good Condition




Verification of Service Penetrations-Good Condition




Verification of Ventilation-Good Condition

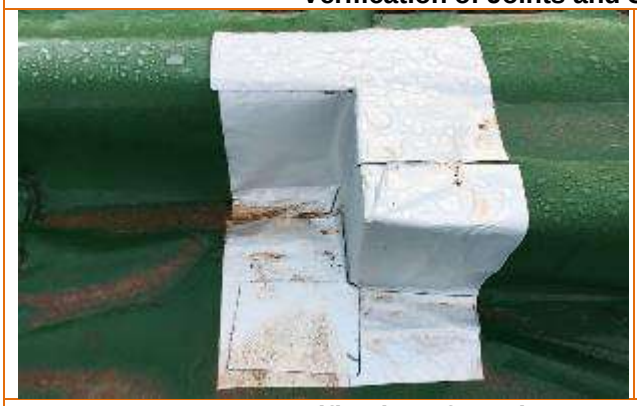



Plot - 10

General Condition of Membrane-Good Condition




Verification of Joints and Seals-Good Condition




Verification of Service Penetrations-Good Condition

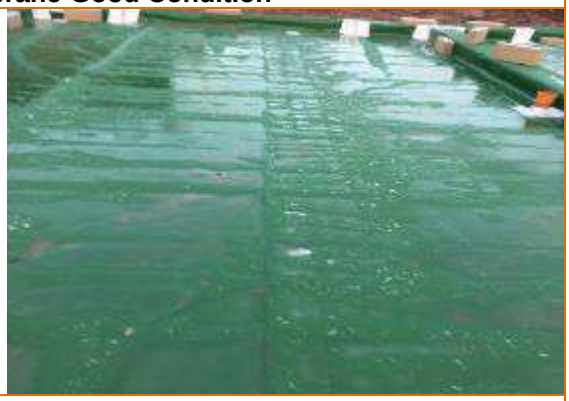



Verification of Ventilation-Good Condition




Plot - 11

General Condition of Membrane-Good Condition

Verification of Joints and Seals-Good Condition

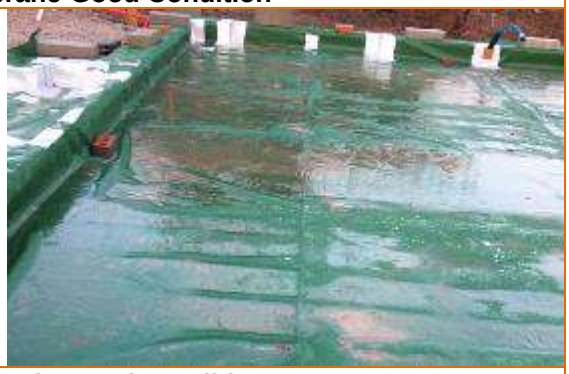



Verification of Service Penetrations-Good Condition




Plot - 12

General Condition of Membrane-Good Condition

Verification of Joints and Seals-Good Condition




Verification of Service Penetrations-Good Condition




Verification of Ventilation-Good Condition




Gas Protection Validation Site Record Amberley Drive

Plot No: 9

Inspection date/time:	16/01/20	Inspected by:	J Newall	Photographed:	✓/×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has (PASSED)/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS (NOT)* required for this Plot.

Inspection by: J Newall Signed: [signature]

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

Gas Protection Validation Site Record

Plot No: 10

Inspection date/time: 16/01/20	**Inspected by:** J Newall	**Photographed:** ✓/×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: J Newall Signed: .....

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

Gas Protection Validation Site Record

Plot No: 11

Inspection date/time: 26/01/22	Inspected by: J Newall	Photographed: ✓/×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: J Newall Signed: .....

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

Gas Protection Validation Site Record

Plot No: 12

Inspection date/time: 20/01/20	**Inspected by:** J Newall	**Photographed:** ✓/×

	✓/×	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has PASSED/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: J Newall Signed: .....

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

GAS MEMBRANE VALIDATION

Site: Amberley Drive	
Date: 14-08-2019	Project Number: 10-914
Project Manager: N. Sellars	E3P Engineer: J. Newall
Ground Gas Risk Assessment: **Amber 1**	
Membrane Specification: Monarflex Low Permeability Gas Membrane	
Plot Number: 13-14 & 37-38	

Overview:

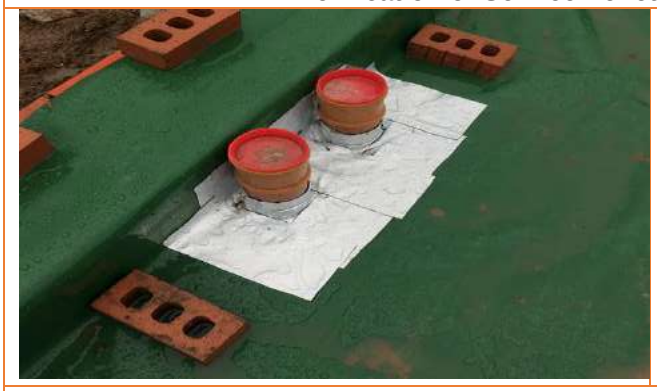
The membrane comprised a Monarflex low permeability gas membrane resistant to radon, carbon dioxide and low levels of methane. E3P can confirm there were no holes or rips at the time of inspection. Upon being laid the membrane is to be covered with a Celotex (closed Cell) floor insulation material which is considered to provide a high degree of protection.

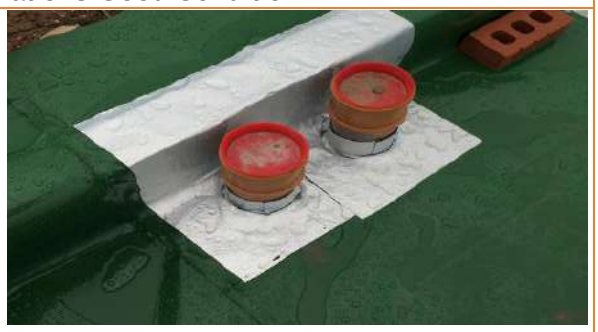
All external joints were inspected and E3P can confirm that the membrane was overlapped and double taped to external and internal gas resistant DPM. The membrane was taped to the gas resistant DPM using a double-sided jointing tape. All the overlaps were then additionally taped using foil backed girth tape.

Each unit has a service duct located to the front and outer edge of the property. E3P inspected each one and can confirm that the top hats have been adequately sealed against the membrane.

Based on the information provided within this report, the site inspections and validation checklists, E3P can confirm that **Plots 13-14 and 37-38** have been installed with gas protection measures in accordance with Amber 1 to an acceptable level of workmanship.

Plot - 13
General Condition of Membrane-Good Condition

Verification of Joints and Seals-Good Condition
 
Verification of Service Penetrations-Good Condition
 
Verification of Ventilation-Good Condition
 

Plot - 14	
General Condition of Membrane-Good Condition	
	
Verification of Joints and Seals-Good Condition	
	
Verification of Service Penetrations-Good Condition	
	
Verification of Ventilation-Good Condition	
	

Plot - 37
General Condition of Membrane-Good Condition

Verification of Joints and Seals-Good Condition
 
Verification of Service Penetrations-Good Condition
 
Verification of Ventilation-Good Condition
 

Plot - 38	
General Condition of Membrane-Good Condition	
	
Verification of Joints and Seals-Good Condition	
	
Verification of Service Penetrations-Good Condition	
	
Verification of Ventilation-Good Condition	
	

Gas Protection Validation Site Record

Plot No: 13 Amberley drive

Inspection date/time:	14/08/19	Inspected by:	J Newall	Photographed:	Y/x

	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has ~~PASSED~~/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by:.....Signed: J Newall

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

Gas Protection Validation Site Record

Plot No: 14

Inspection date/time:	14/08/19	Inspected by:	J Newall	Photographed:	0/x

	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has ~~PASSED~~/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by:.....Signed: J Newall

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

Gas Protection Validation Site Record

Plot No: 38

Inspection date/time:	14/08/19	Inspected by:	J Newall	Photographed:	0/x

	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has ~~PASSED~~/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by: ..... Signed: J Newall

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.

Gas Protection Validation Site Record

Plot No: 37

Inspection date/time:	14/08/19	Inspected by:	J Newall	Photographed:	0/x

	✓/x	Notes/recommendations
Membrane Type Correct	✓	
Extent of Coverage Correct	✓	
Underside of Membrane	✓	
Slab / membrane condition	✓	
Laps and joints	✓	
Damp-proof course	✓	
Service entries	✓	
Folded Membrane Joint Taped & inspected	✓	

This Plot has ~~PASSED~~/FAILED* inspection. (Any proposed remedial works will be noted in the "Remarks" column on this form).

An additional inspection visit IS/IS NOT* required for this Plot.

Inspection by:.....Signed: J Newall

One record sheet to be completed for each plot – To be completed by E3P Professional Inspecting.