MR J & MRS J PARRY

DEVELOPMENT AT TALPONCIAU FARM, ACREFAIR, WREXHAM, LL14 1TU

STAGE 1 - PHASE 2 – GROUND CONTAMINATION INVESTIGATION AND RISK ASSESSMENT

REPORT No. E0761.S1.P2.R1

OCTOBER 2016

Client : **MR J & MRS J PARRY**

Project Title : **DEVELOPMENT AT TALPONCIAU FARM, ACREFAIR, WREXHAM, LL14 1TU**

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Date. **OCTOBER 2015**

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1. INTRODUCTION.

1.1 Background and Terms of Reference

1.1.1 In April 2016 e-geo Solutions Ltd were commissioned by Mr & Mrs J Parry to undertake a Stage 1 - Phase 2 Ground Contamination Investigation and Risk Assessment at a proposed development site at Talponciau Farm in Acrefair, Wrexham in North Wales. The objective of the contamination assessment was to determine the nature of ground materials below the site, the status of the site with respect to potential contamination and to quantify the risks any contamination presents to development of the land for residential use.

1.1.2 This report presents the findings of the ground investigation and the analysis of soil samples, detailing the ground conditions encountered and identifying any contamination issues and associated risks which could impact upon the site, its potential development and the wider environment. The scope of the investigation was based on the findings of a previous study at the site by e-geo Solutions Ltd, titled 'Development at Taponciau Farm, Acrefair, Wrexham, LL14 1TU – Stage 1 – Phase 1 Desk Study and Preliminary Ground Contamination Risk Assessment' Report Ref E0761.S1.P1.R1 dated 2 March 2016.

1.1.3 The report has been prepared for the sole use of the Client, for the purposes described and no extended duty of care applies to other parties. Any other party using this report for any purpose whatsoever do so at their own risk and any duty of care to that party is specifically excluded.

1.1.4 The comments given, and opinions expressed, in this report are based on the information available at the time the report was compiled, however there may be additional information and data which becomes available at a later date which has an impact on the report content. Where data supplied by others has been used it has been assumed that the information is correct. No responsibility can be accepted by e-geo Solutions Ltd for inaccuracies within the data supplied by others.

1.1.5 The copyright of this report and its contents prepared by e-geo Solutions Ltd is solely owned by e-geo Solutions Ltd. Neither this report nor contents prepared by e-geo Solutions Ltd may be reproduced, published or adapted without the express written approval of e-geo Solutions Ltd.

1.2 Report Contents

1.2.1 The study has been undertaken with reference to guidance in the 'Model Procedures for the Management of Land Contamination' (CLR11) and the BSI Publication 'Investigation of Potentially Contaminated Sites' – Code of Practice (BS10175). The report includes sections on:-

- Present site description, profile and setting
- A description of the scope of the investigation, sample analysis and its justification
- The geological and hydro-geological conditions encountered during the investigation
- Chemical analysis results and an assessment of ground contamination
- Risk assessment and recommendations for further quantification or actions

2. SITE LOCATION, DESCRIPTION AND PROFILE.

2.1 Site Location

2.1.1 The proposed development site (the site) is situated within the farmstead of Talponciau Farm which is located 1km northeast of the village of Acrefair, near Wrexham, as shown on Figure 1. The site is centred at Grid Reference 328070, 343911 and covers a small area to the west of the existing farm buildings as shown on Figure 2.

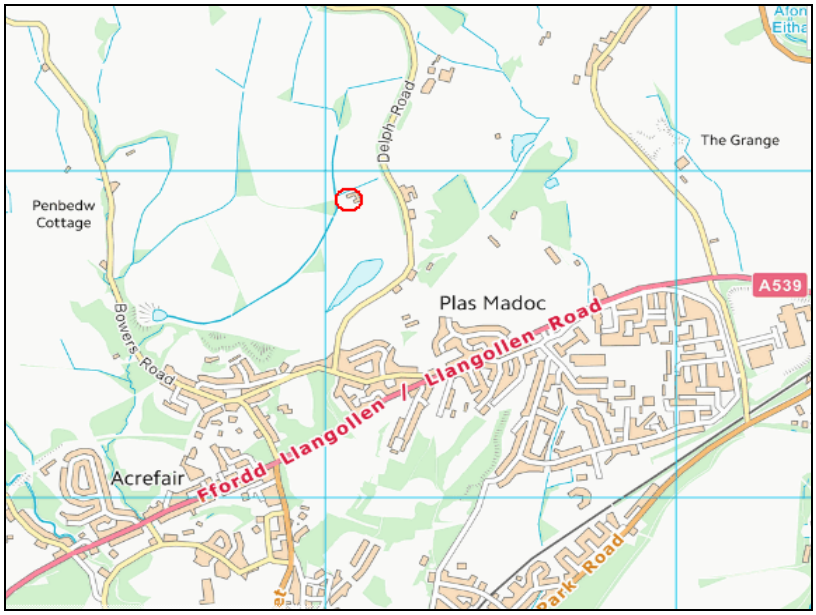

Figure 1 – Site Location

2.2 Site Description and Topography

2.2.1 The single property development site comprises a small area of gravel surfaced hard standing to the west of the existing farm buildings extending southwards over agricultural land used for grazing. The main farm buildings comprising barns are immediately to the east. The whole site is generally flat and level and at an elevation similar to the surrounding land. To the east of the farm buildings and surrounding the site on all other sides is flat and gently sloping agricultural land used for grazing.

The site area is bordered to the west and north by a hedge and farm lane. To the east are farm buildings and grazing land and the southern boundary is marked by a fence and then open grazing agricultural land. An aerial photograph of the site is presented as Figure 3

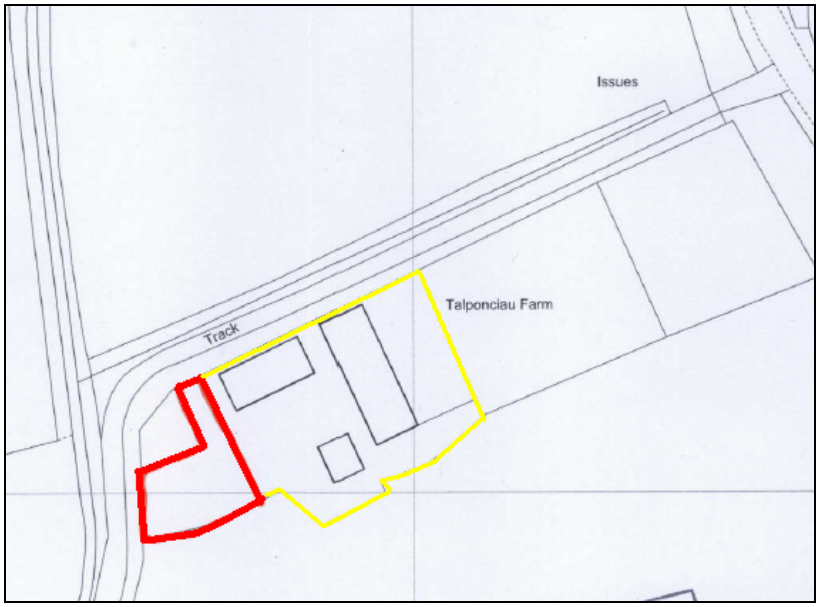

Figure 2 – Development and Planning Application Area

Figure 3 – Aerial Photograph of the Site

2.3 Site Profile

2.3.1 A desk based study has been undertaken and full details of the site characteristics, the site history, environmental profile, geological and hydro-geological setting, and potential contamination sources and risks associated with the contamination are presented in a report titled Development at Taponciau Farm, Acrefair, Wrexham, LL14 1TU – Stage 1 – Phase 1 Desk Study and Preliminary Ground Contamination Risk Assessment' Report Ref E0761.S1.P1.R1 dated 2 March 2016.

2.3.2 The findings of the study indicated that that the site is in an area where extensive coal mining was carried out until the 1970s when the whole area was mined by opencast methods and subsequently restored to agricultural land. Farm buildings (barns) were erected to the east in early 2000s and the northern part of the site area used as a 'farm yard', with the remainder being agricultural land.

5.2.2 From the past and recent use of the site there are very limited potential on-site sources of contamination but there may be:

- Made up ground of predominantly natural ground materials used in the open cast mine site restoration
- Off-site buried chemical wastes but on land 250m to 500m to the northeast and northwest of the site and buried at considerable depth

5.2.3 Although the likelihood of any contamination being present on the site is very low due to the absence of records and information on the land restoration and location of the buried wastes a ground investigation was proposed to establish the actual ground conditions at the site.

3. GROUND INVESTIGATION WORKS.

3.1 Introduction and Investigation Strategy

3.1.1 From the initial site assessment and environmental profile of the site a conceptual model was developed which identified that the likelihood of contaminants being present are negligible due to the absence of any confirmed contamination source.

3.1.2 The site inspection and desk based research identified that open cast coal mining activities had been extensively carried out over the area and the area restored during a land reclamation scheme. These activities will have involved largely natural rock generated during the open cast but may also have included unknown imported materials. Some chemical wastes are known to have been buried in the open cast but indicates are that the location was distant from the site.

3.2 Scope of Investigation Works

3.2.1 Based on the sites previous use and uncertainties the flowing intrusive investigation was undertaken:

Item	Method	Purpose and Specification
Trial pits	BS10175 and BS5930	To obtain samples of ground strata and examine ground profile to depths of 2.5m. Construct 4 trial pits across the site
Ground materials and groundwater sampling	BS10175 and CLEA	Recovery of representative ground samples for analysis. Collection of approx 7 ground samples. Storage in appropriate sealable containers (soils)
Chemical analysis	MCETS and UKAS accredited laboratory	Determination of chemical constituents with a focus on metals: Suite 1 - pH, arsenic, cadmium, chromium (hexavalent and total), lead, copper, nickel, zinc, mercury, selenium, cyanide, sulphate, sulphide, sulphur, cyanide, phenol, PAH Suite 3 – TPH (aliphatic/aromatic) SOM

3.2.2 The rationale behind the trial pit locations was as follows:

Trial Pit No.	Depth (m)	Purpose	Rationale
TP1	2.00	To examine ground strata and collect ground samples for analysis	Located outside building footprint immediately north of the proposed development
TP2	2.00	To examine ground strata and collect ground samples for analysis	Located outside building footprint immediately north of the proposed development
TP3	2.00	To examine ground strata and collect ground samples for analysis	Located outside building footprint immediately north of the proposed development
TP4	2.00	To examine ground strata and collect ground samples for analysis	Located outside building footprint immediately north of the proposed development

3.2.3 On 5 August 2016 an intrusive investigation was undertaken at the site and comprised 4 No. trial pits to depths of 2.00m, the visual and olfactory examination of the ground strata and the collection of 7 ground samples. All ground investigation works were undertaken in accordance with the following UK legislation and regulatory guidance for the investigation of contaminated land.

- Investigation of Potentially Contaminated Sites – Code of Practice (British Standard 10175:2015)
- CLR 11, 'Model procedures for the management of contaminated land: risk assessment procedures' DoE 1998
- Environment Agency – UK Approach for Evaluating Human Health Risks from Petroleum Hydrocarbons in Soils.
- Environmental Protection Act 1990, Part IIA, as inserted by section 57 of the Environment Act 1995.

3.2.4 The locations of trial pits are indicated on Figure 4. Trial pit records and ground and soil descriptions are presented in Appendix 1.

3.3 Strategy for Analysis and Testing

3.3.1 The strategy for chemical analysis was designed based upon the preliminary conceptual model for the site and observations made during the intrusive investigation. The results of the chemical analysis are presented in Appendix 2.

3.3.2 A total of 7 Nr soil samples were analysed for selected parameters. The analytical suites included:

Analytical Suite/determinant	Samples
pH, arsenic, boron, cadmium, chromium (hexavalent and total), lead, copper, nickel, zinc, mercury, selenium, cyanide, sulphate, sulphide, sulphur, cyanide, phenol	TP1-0.35, TP2-0.30, TP2-0.55, TP3-0.15, TP4-0.50
SO4 (2:1)	TP1-0.75, TP3-0.80
TPH (aliphatic/aromatic split)	TP2-0.30, TP3-0.15
Asbestos screen	TP1-0.35, TP4-0.50

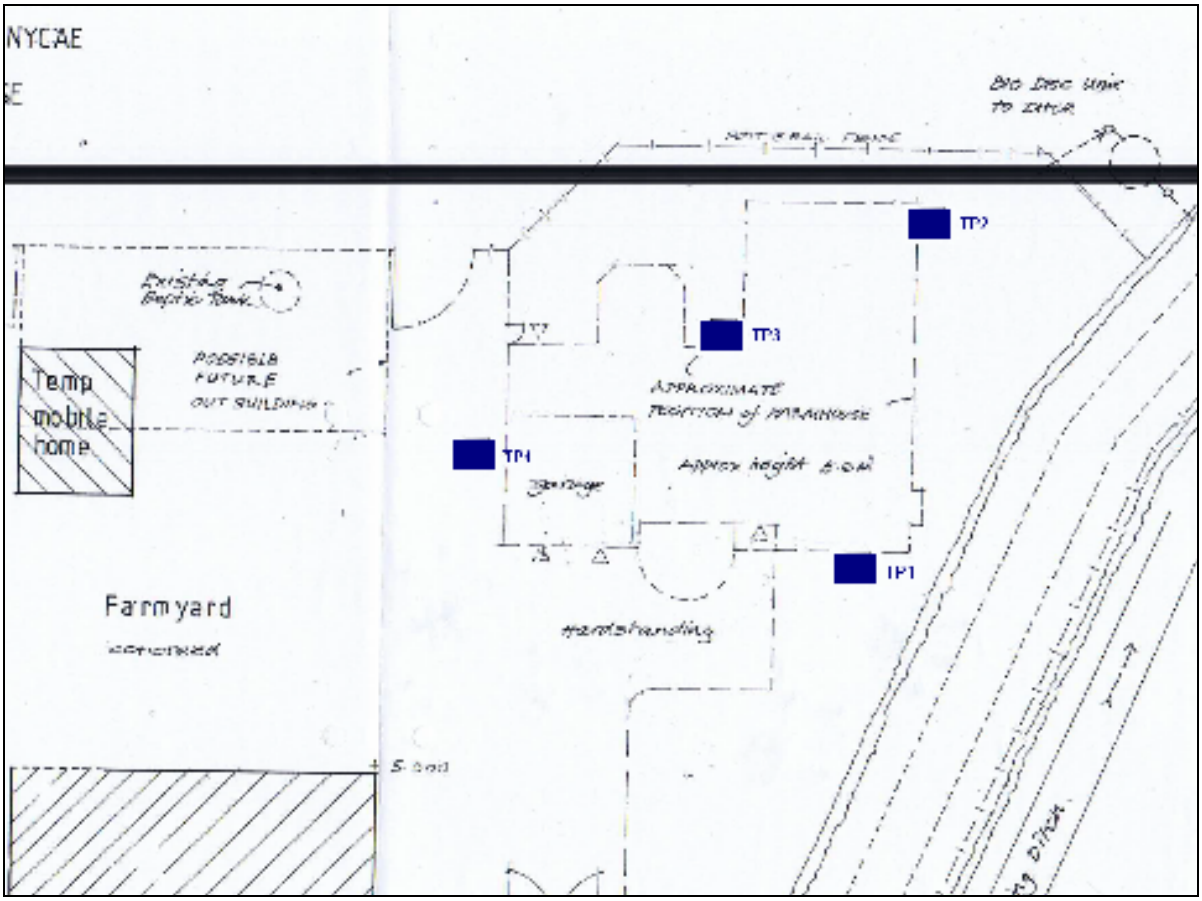

Figure 4 – Trial Pit Location Plan

4. GROUND CONDITIONS AND GEOLOGY.

4.1 Surface Layers and Made Ground

4.1.1 The majority of the site has a surface of grass with topsoil.

4.1.2 Below the topsoil made ground of natural soils and rock origin was encountered in all trial pits. The ground strata comprised:

0.10-0.25 medium brown silty topsoil
0.25-2.00 Stiff medium grey gravely silty CLAY with high cobble content and occasional boulder

4.2 Geology – Soils

4.2.1 The natural ground was not encountered but the made ground comprised reworked natural ground.

4.3 Geology - Bedrock

4.3.1 Bedrock was not encountered.

4.4 Groundwater

4.4.1 No groundwater was encountered in any of the trial pits. All ground strata was very dry.

4.5 Contamination Observations

4.5.1 During the excavation of trial pits observations were made for both visual and olfactory evidence of contamination. No unusual materials, odours or visual evidence of contamination was noted and there was no evidence of coal or mining wastes in any of the trial pits.

4.5.2 The ground strata comprised recompacted rock, weathered rock and soil materials of natural origin with no wastes of any description. No wood or other putresible material which could generate hazardous gasses was found. The findings confirmed that ground materials art the site comprised rock and soil materials which had been generated and replaced and recompacted during the opencast operations.

5. CONTAMINATION ASSESSMENT

5.1 General

5.1.1 The results of the chemical analysis of soils samples are presented in Appendix 2. An assessment of the results of the analysis on samples has been undertaken to determine the presence and extent of any ground contamination. The assessment of contamination undertaken is a 'Tier 1 Generic Risk Assessment' which requires the comparison of contaminant concentrations to a set of generic Tier 1 Screening Values (TSV) risk based screening concentrations.

5.1.2 Contaminant concentrations below the TSVs are considered not to warrant further risk assessment. Concentrations of potential contaminants above the TSVs are considered further in relation to distribution and potential pollution linkages. It should be noted that exceeding the TSVs does not necessarily mean there is a risk and the site requires remediation.

5.2 Soils Reference Values

5.2.1 TSVs for soil derived to be protective of human health are defined for standard end use situations in accordance with UK CLR framework. The values chosen are dependant on the site use or proposed development. The proposed use of the site is 'residential'. The TSVs selected to assess soils in relation to human health over the whole site are therefore 'residential land use'.

5.2.2 Total Petroleum Hydrocarbons (TPH) describes a broad range of organic compounds derived from crude oil. The SGV for TPH has yet to be set and due to the huge number of individual hydrocarbon compounds, and fact that they are present as highly complex mixes makes substance specific risk assessment unfeasible. Therefore to assess the results other screening and guideline values have been used to determine the presence and magnitude of contamination and risk.

5.2.3 The applicable TSVs for assessment of the analytical results are based on the following guideline criteria:

Ref	Guideline Criteria
1	(CLEA 2009) Soil Guideline Values (SGVs) for 'residential' end-use.
2	Tier 1 screening criteria for general soil contaminants not addressed by CLEA such as: 2.1 – LQM CIEH Generic Assessment Criteria – 2nd Edition 2009 2.2 - Welsh Assembly Government C4SL

5.3 Soils Analysis Assessment

5.3.1 The results of the screening against guideline criteria values are presented in the tables below. Where values exceed the relevant TSVs they are highlighted in the tables.

PROJECT				Talponciau Farm, Acrefair						
BH/TP				TP1	TP1	TP2	TP2	TP3	TP3	TP4
SAMPLE DEPTH				0.35	0.75	0.3	0.55	0.15	0.8	0.5
SAMPLE TYPE				MG	MG	MG	MG	MG	MG	MG
DATE SAMPLED				05/08/16	05/08/16	05/08/16	05/08/16	05/08/16	05/08/16	05/08/16
		Ref: 1 - SGV	Ref: 2.1/2.2							
Arsenic	mg/kg	32		8.4		9.0	2.9	11		9.7
Cadmium	mg/kg	10		0.3		0.3	0.2	0.4		0.2
Chromium (total)	mg/kg	130		15		15	6.6	17		22
Lead	mg/kg		210 (2.2)	44		31	9.7	58		23
Mercury	mg/kg	1		< 0.05		< 0.05	< 0.05	< 0.05		< 0.05
Copper	mg/kg		2330	25		26	16	23		23
Nickel	mg/kg	130		24		29	14	22		29
Zinc	mg/kg		3750	59		76	41	85		56
Selenium	mg/kg			< 0.5		< 0.5	0.8	< 0.5		< 0.5
Sulphur	%			0.09		0.04	0.10	0.05		0.05
Sulphate (2:1)	mg/l				520				60	
Sulphide	mg/kg			12		56	1300	28		52
Phenol	mg/kg			< 0.3		< 0.3	< 0.3	< 0.3		< 0.3
Total cyanide	mg/kg			< 0.1		< 0.1	< 0.1	0.2		< 0.1
TPH	mg/kg					< 10		< 10		
PAH	mg/kg			< 0.10		< 0.10	< 0.10	< 0.10		< 0.10
pH	NA			8.2		8.4	8.9	7.7		8.5
Asbestos				NAD						NAD

Exceeds Guideline Criteria Ref 1 SGV
Exceeds Guideline Criteria Ref 2.1/2.2 TSV

5.3.2 Comparison of all analytical results for metals and non-metals using maximum concentrations as a means of assessment with the Tier 1 TSVs for 'residential' use, indicates that the near surface ground materials do not any elevated concentrations of chemical parameters.

5.3.3 The concentrations of all toxic metal, phytotoxic metal and metalloid parameters are below the guideline concentrations.

5.3.4 Phenol and cyanide concentrations are very low or below detection limits.

5.3.5 The pH of 7.7 to 8.9 is neutral to slightly alkaline.

5.3.6 No elevated concentrations of sulphate or soluble sulphate were found.

5.3.7 No elevated hydrocarbon (TPH) or polyaromatic hydrocarbons were detected in the samples tested with concentrations below the detection limits.

5.3.8 No asbestos fibres were detected.

5.3.9 Based on the available analysis the results indicate that the ground materials do not contain any parameters which would be classed as contaminated.

6 RISK ASSESSMENT, DISCUSSION AND REMEDIATION REQUIREMENTS.

6.1 Introduction

6.1.1 The assessment of risk undertaken follows a 'Tier 1 Generic Risk Assessment' approach which follows a source-pathway-target model prior to considering the need for a 'Tier 2 Pathway Specific Risk Assessment'. The process of risk assessment is an evaluation of the probability of harm, and comprises the identification of sources of contamination (toxic substances), receptors that may be affected by the contamination and pathways for contamination to come into contact with receptors.

6.1.2 For a risk to exist there must be a contamination source at concentrations which potentially could present a risk to human health or controlled waters, a realistic exposure pathway and identified receptors.

6.2 Contamination Source

6.2.1 The main data source for the hazard identification is the site development history and use or the site together with observations made during the ground investigation. From the assessment of this data, information on the potential source, type and location of contamination hazard has been identified. However the results of the site investigation and analysis of ground samples has not identified any contamination within the ground materials at the site.

6.2.2 No wastes or putresible or coal materials were found and there is nothing in the ground strata which could generate hazardous gasses.

6.3 Potential Receptors and Sensitivity

6.3.1 The principal receptors during and following site redevelopment for residential use are:

- Humans – Future residents – site to be developed for residential purposes
- Humans – Site construction personnel – personnel involved in site construction activities
- Buildings and Construction materials - site to be developed with a residential propety with associated buried services and infrastructure

6.4 Potential Pathways and Exposure Scenarios

6.4.1 The following potential pathways may exist at the site during and following development.

- Human health exposure via Ingestion, inhalation and dermal contact with identified solid contaminants in near surface ground strata
- Direct contact with buried services and construction materials

6.5 Preliminary Risk Assessment

6.5.1 In order for any risk to exist, a "Source - Pathway - Receptor" linkage must be established. This linkage requires:

- A source of contamination in the ground which has the potential to cause harm or to cause pollution of controlled waters.
- A pathway by or through which a receptor is being exposed to or affected by a contaminant or, could be so exposed or affected by a contaminant.
- A receptor that could be harmed by exposure to a contaminant.

6.5.2 The identification of each of these three elements is linked to the identification of the others. A pathway can only be present if it is capable of exposing an identified receptor to an identified contaminant. That particular contaminant should likewise be capable of harming or, in the case of

controlled waters, be capable of polluting that particular receptor. If a pollutant source, pathway and receptor are found to be present then there could be a risk to the identified receptor. If there is an absence of any part of the source, pathway or receptor process, there is no risk.

6.5.3 The results of sampling and analysis have not indicated the presence of any elevated concentrations of chemical parameters. In the absence of any contamination there can be no risk to the identified receptors.

6.5.4 No materials capable of generating hazardous gasses were found in the ground strata.

6.6 Risk Control and Mitigation

6.6.1 With no contamination or hazardous gasses present in the ground strata there is no requirement for remediation or control measures to be implemented.

Appendix 1 - Trial Pit Records

TRIAL PIT RECORD

Trial Pit No:	**TP 1**
Date : 05/08/2016	Site: Talponciau Farm, Acrefair
Excavator : JCB excavator	e07961
Pit size : 1.40x 0.70m Depth : 2.00m	Elev (m aOD):

STRATA DESCRIPTION						SAMPLE RECORD		
Pit No	Depth From (m)	Depth To (m)	Interval (m)	Description	Depth	Type B U D W	Depth (m)	Number
TP1	0.00	0.25	0.25	Stiff medium brown silty Topsoil				
	0.25	2.00+	1.75+	Made Ground - Stiff medium grey gravely silty CLAY with high cobble content and occasional boulder. Gravel is fine to coarse angular siltstone and mudstone	0.5	D	0.35	
						D	0.75	
					1.0			
				many cobbles and boulders from 1.20m	1.5			
					2.0			
		2.00		Base of pit at 2.00m				

Remarks

Sidewalls :	Pit sides stable and vertical
Groundwater :	None
In-situ testing :	None
Contaminants :	None
Services :	None

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TRIAL PIT RECORD

Trial Pit No:	**TP 2**
Date : 05/08/2016	Site: Talponciau Farm, Acrefair
Excavator : JCB excavator	e07961
Pit size : 1.40x 0.70m Depth : 2.00m	Elev (m aOD):

STRATA DESCRIPTION						SAMPLE RECORD		
Pit No	Depth From (m)	Depth To (m)	Interval (m)	Description	Depth	Type B U D W	Depth (m)	Number
TP2	0.00	0.25	0.25	Stiff medium brown silty Topsoil				
	0.25	0.75	0.50	Made Ground - Stiff medium grey gravely silty CLAY with high cobble content and occasional boulder. Gravel is fine to coarse angular siltstone and mudstone	0.5	D D	0.30 0.55	
	0.75	2.00+	1.25+	Made Ground - Boulders and cobbles of siltstone and mudstone in light grey silty clay matrix	1.0 1.5 2.0			
		2.00		Base of pit at 2.00m				

Remarks

Sidewalls :	Pit sides stable and vertical
Groundwater :	None
In-situ testing :	None
Contaminants :	None
Services :	None

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TRIAL PIT RECORD

Trial Pit No:	**TP 3**
Date : 05/08/2016	Site: Talponciau Farm, Acrefair
Excavator : JCB excavator	e07961
Pit size : 1.40x 0.70m Depth : 2.00m	Elev (m aOD):

STRATA DESCRIPTION						SAMPLE RECORD		
Pit No	Depth From (m)	Depth To (m)	Interval (m)	Description	Depth	Type B U D W	Depth (m)	Number
TP3	0.00	0.25	0.25	Stiff medium brown silty Topsoil		D	0.15	
	0.25	2.00+	1.75+	Made Ground - Stiff medium to dark grey gravely silty CLAY with high cobble content and occasional boulder. Gravel is fine to coarse angular siltstone and mudstone	0.5			
					1.0	D	0.80	
					1.5			
					2.0			
		2.00		Base of pit at 2.00m				

Remarks

Sidewalls :	Pit sides stable and vertical
Groundwater :	None
In-situ testing :	None
Contaminants :	None
Services :	None

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TRIAL PIT RECORD

Trial Pit No:	**TP 4**
Date : 05/08/2016	Site: Talponciau Farm, Acrefair
Excavator : JCB excavator	e07961
Pit size : 1.40x 0.70m Depth : 2.00m	Elev (m aOD):

STRATA DESCRIPTION						SAMPLE RECORD		
Pit No	Depth From (m)	Depth To (m)	Interval (m)	Description	Depth	Type B U D W	Depth (m)	Number
TP4	0.00	0.25	0.25	Stiff medium brown silty Topsoil				
	0.25	2.00+	1.75+	Made Ground - Stiff medium to dark grey gravely silty CLAY with high cobble content and occasional boulder. Gravel is fine to coarse angular siltstone and mudstone	0.5	D	0.50	
					1.0			
					1.5			
					2.0			
		2.00		Base of pit at 2.00m				

Remarks

Sidewalls :	Pit sides stable and vertical
Groundwater :	None
In-situ testing :	None
Contaminants :	None
Services :	None

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Appendix 2 - Chemical Analysis Results

Certificate of Analysis

Certificate Number 16-75390

15-Aug-16

Client EGEO Solutions Ltd
Oak House
Groes Lwyd
Abergele
LL22 7SU

Our Reference	16-75390
Client Reference	TALPONCIAU
Order No	PO761P1
Contract Title	Talponciau Farm
Description	7 Soil samples.
Date Received	09-Aug-16
Date Started	09-Aug-16
Date Completed	15-Aug-16
Test Procedures	Identified by prefix DETSn (details on request).

Notes Opinions and interpretations are outside the scope of UKAS accreditation. This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. Observations and interpretations are outside the scope of ISO 17025. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved By

Rob Brown
Business Manager

UKAS TESTING
2139

Summary of Chemical Analysis
Soil Samples

Our Ref 16-75390
Client Ref TALPONCIAU
Contract Title Talponciau Farm

			Lab No	1035626	1035627	1035628	1035629	1035630	1035631	1035632
			Sample ID	TP1	TP1	TP2	TP2	TP3	TP3	TP4
			Depth	0.35	0.75	0.30	0.55	0.15	0.80	0.50
			Other ID							
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	05/08/16	05/08/16	05/08/16	05/08/16	05/08/16	05/08/16	05/08/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
Metals										
Arsenic	DETSC 2301#	0.2	mg/kg	8.4		9.0	2.9	11		9.7
Cadmium	DETSC 2301#	0.1	mg/kg	0.3		0.3	0.2	0.4		0.2
Chromium	DETSC 2301#	0.15	mg/kg	15		15	6.6	17		22
Copper	DETSC 2301#	0.2	mg/kg	25		26	16	23		23
Lead	DETSC 2301#	0.3	mg/kg	44		31	9.7	58		23
Mercury	DETSC 2325#	0.05	mg/kg	< 0.05		< 0.05	< 0.05	< 0.05		< 0.05
Nickel	DETSC 2301#	1	mg/kg	24		29	14	22		29
Selenium	DETSC 2301#	0.5	mg/kg	< 0.5		< 0.5	0.8	< 0.5		< 0.5
Zinc	DETSC 2301#	1	mg/kg	59		76	41	85		56
Inorganics										
pH	DETSC 2008#			8.2		8.4	8.9	7.7		8.5
Cyanide, Total	DETSC 2130#	0.1	mg/kg	< 0.1		< 0.1	< 0.1	0.2		< 0.1
Organic matter	DETSC 2002#	0.1	%			1.7		3.7		
Sulphate Aqueous Extract as SO4	DETSC 2076#	10	mg/l		520				60	
Sulphide	DETSC 2024#	10	mg/kg	12		56	1300	28		52
Sulphur as S, Total	DETSC 2320	0.01	%	0.09		0.04	0.10	0.05		0.05
Petroleum Hydrocarbons										
Aliphatic C5-C6	DETSC 3321*	0.01	mg/kg			< 0.01		< 0.01		
Aliphatic C6-C8	DETSC 3321*	0.01	mg/kg			< 0.01		< 0.01		
Aliphatic C8-C10	DETSC 3321*	0.01	mg/kg			< 0.01		< 0.01		
Aliphatic C10-C12	DETSC 3072#	1.5	mg/kg			< 1.5		< 1.5		
Aliphatic C12-C16	DETSC 3072#	1.2	mg/kg			< 1.2		< 1.2		
Aliphatic C16-C21	DETSC 3072#	1.5	mg/kg			< 1.5		< 1.5		
Aliphatic C21-C35	DETSC 3072#	3.4	mg/kg			< 3.4		< 3.4		
Aliphatic C5-C35	DETSC 3072*	10	mg/kg			< 10		< 10		
Aromatic C5-C7	DETSC 3321*	0.01	mg/kg			< 0.01		< 0.01		
Aromatic C7-C8	DETSC 3321*	0.01	mg/kg			< 0.01		< 0.01		
Aromatic C8-C10	DETSC 3321*	0.01	mg/kg			< 0.01		< 0.01		
Aromatic C10-C12	DETSC 3072#	0.9	mg/kg			< 0.9		< 0.9		
Aromatic C12-C16	DETSC 3072#	0.5	mg/kg			< 0.5		< 0.5		
Aromatic C16-C21	DETSC 3072#	0.6	mg/kg			< 0.6		< 0.6		
Aromatic C21-C35	DETSC 3072#	1.4	mg/kg			< 1.4		< 1.4		
Aromatic C5-C35	DETSC 3072*	10	mg/kg			< 10		< 10		
TPH Ali/Aro Total	DETSC 3072*	10	mg/kg			< 10		< 10		

Key: * -not accredited. # -MCERTS (accreditation only applies if report carries the MCERTS logo). n/s -not supplied.

Summary of Chemical Analysis
Soil Samples

Our Ref 16-75390
Client Ref TALPONCIAU
Contract Title Talponciau Farm

			Lab No	1035626	1035627	1035628	1035629	1035630	1035631	1035632
			Sample ID	TP1	TP1	TP2	TP2	TP3	TP3	TP4
			Depth	0.35	0.75	0.30	0.55	0.15	0.80	0.50
			Other ID							
			Sample Type	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Sampling Date	05/08/16	05/08/16	05/08/16	05/08/16	05/08/16	05/08/16	05/08/16
			Sampling Time	n/s	n/s	n/s	n/s	n/s	n/s	n/s
Test	**Method**	**LOD**	**Units**							
PAHs										
Naphthalene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	0.09	< 0.03		< 0.03
Acenaphthylene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Acenaphthene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Fluorene	DETSC 3303	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Phenanthrene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Anthracene	DETSC 3303	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Pyrene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Benzo(a)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Chrysene	DETSC 3303	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Benzo(b)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Benzo(k)fluoranthene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Benzo(a)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Indeno(1,2,3-c,d)pyrene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Dibenzo(a,h)anthracene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
Benzo(g,h,i)perylene	DETSC 3303#	0.03	mg/kg	< 0.03		< 0.03	< 0.03	< 0.03		< 0.03
PAH - USEPA 16, Total	DETSC 3303	0.1	mg/kg	< 0.10		< 0.10	< 0.10	< 0.10		< 0.10
Phenols										
Phenol - Monohydric	DETSC 2130#	0.3	mg/kg	< 0.3		< 0.3	< 0.3	< 0.3		< 0.3

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Summary of Asbestos Analysis
Soil Samples

Our Ref 16-75390
Client Ref TALPONCIAU
Contract Title Talponciau Farm

Lab No	Sample ID	Material Type	Result	Comment*	Analyst
1035626	TP1 0.35	SOIL	NAD	none	Colin Patrick
1035632	TP4 0.50	SOIL	NAD	none	Colin Patrick

Crocidolite = Blue Asbestos, Amosite = Brown Asbestos, Chrysotile = White Asbestos. Anthophyllite, Actinolite and Tremolite are other forms of Asbestos. Samples are analysed by DETSC 1101 using polarised light microscopy in accordance with HSG248 and documented in-house methods. NAD = No Asbestos Detected. Where a sample is NAD, the result is based on analysis of at least 2 sub-samples and should be taken to mean 'no asbestos detected in sample'. Key: * - not included in laboratory scope of accreditation.

Information in Support of the Analytical Results

Our Ref 16-75390
Client Ref TALPONCIAU
Contract Talponciau Farm

Containers Received & Deviating Samples

Lab No	Sample ID	Date Sampled	Containers Received	Holding time exceeded for tests	Inappropriate container for tests
1035626	TP1 0.35 SOIL	05/08/16	GJ 250ml		
1035627	TP1 0.75 SOIL	05/08/16	GJ 250ml		
1035628	TP2 0.30 SOIL	05/08/16	GJ 250ml		
1035629	TP2 0.55 SOIL	05/08/16	GJ 250ml		
1035630	TP3 0.15 SOIL	05/08/16	GJ 250ml		
1035631	TP3 0.80 SOIL	05/08/16	GJ 250ml		
1035632	TP4 0.50 SOIL	05/08/16	GJ 250ml		

Key: G-Glass J-Jar

DETS cannot be held responsible for the integrity of samples received whereby the laboratory did not undertake the sampling. In this instance samples received may be deviating. Deviating Sample criteria are based on British and International standards and laboratory trials in conjunction with the UKAS note 'Guidance on Deviating Samples'. All samples received are listed above. However, those samples that have additional comments in relation to hold time, inappropriate containers etc are deviating due to the reasons stated. This means that the analysis is accredited where applicable, but results may be compromised due to sample deviations. If no sampled date (soils) or date+time (waters) has been supplied then samples are deviating. However, if you are able to supply a sampled date (and time for waters) this will prevent samples being reported as deviating where specific hold times are not exceeded and where the container supplied is suitable.

Soil Analysis Notes

Inorganic soil analysis was carried out on a dried sample, crushed to pass a 425µm sieve, in accordance with BS1377.

Organic soil analysis was carried out on an 'as received' sample. Organics results are corrected for moisture and expressed on a dry weight basis.

The Loss on Drying, used to express organics analysis on an air dried basis, is carried out at a temperature of 28°C +/-2°C.

Disposal

From the issue date of this test certificate, samples will be held for the following times prior to disposal :-

Soils - 1 month, Liquids - 2 weeks, Asbestos (test portion) - 6 months