terra firma
Geotechnical & Geoenvironmental Specialists
www.terrafirmawales.co.uk

Our Ref: 14242/Geoenvironmental

Your Ref:

Contact: Alan Beattie

12th December 2020

Mr Jim Slater
By email (jcsecurities@hotmail.co.uk)

For the attn. of Mr Jim Slater

Dear Sir,

ADDITIONAL GEOENVIRONMENTAL INVESTIGATION: FORMER CLYNE PRIMARY SCHOOL, CLYNE, NEATH

1.0 Introduction

Terra Firma Wales Ltd were retained by Mr Jim Slater (the Client) to undertake a supplementary geoenvironmental investigation at the former Clyne Primary School, Clyne. The site location can be found in **Drawing 01**.

The original site investigation was undertaken while the school buildings were present on site. They have now been demolished and supplementary testing has therefore been undertaken to determine if contamination is present in these areas.

The main objectives of the supplementary geoenvironmental investigation are:

- Investigate the areas under the former buildings for contamination

In order to achieve the above objectives, Terra Firma (Wales) Limited carried out an assessment programme including a review of existing data, followed by a field investigation to collect geoenvironmental data from selected locations.

1.1 Limitations and Exceptions of Investigation

The Client has requested that a supplementary geoenvironmental investigation be performed to enable the outlined main objectives.

The ground investigation works were conducted, and this report has been prepared for the sole internal reliance of the Client and their design and construction team. This report shall not be relied upon or transferred to any other parties without the express written authorisation of Terra Firma (Wales) Limited. If an unauthorised third party comes into possession of this report, they rely on it at their peril and the authors owe them no duty of care and skill. The report represents the findings and opinions of experienced geoenvironmental and geotechnical consultants. Terra Firma (Wales) Limited does not provide legal advice and the advice of lawyers may be required.

The subsurface geological profiles, any contamination and other plots are generalised by necessity and have been based on the information found at the locations of the exploratory holes and depths sampled and tested.

1.2 Limitations and Exceptions of Investigation

The quality and environmental aspects of the assessment and investigation comply with UKAS Accredited ISO 9001:2015 and ISO 14001:2015 standards.

2.0 Field Investigation

2.1 Site Works

A geoenvironmental site investigation comprising seven trial pits was undertaken on the 16th December 2021.

The fieldwork was supervised by Terra Firma (Wales) Limited, who logged the exploratory holes to the requirements of BS 5930:2015+A1:2020. The proposed locations of the exploratory holes were determined by Terra Firma (Wales) Ltd in general accordance with BS 10175:2011+A2:2017.

Trial pits referenced TP-A to TP-G, were formed using a 13tonne tracked excavator with a 0.60m wide bucket.

Representative disturbed samples were taken and retained in airtight containers for environmental testing. The level of the site under the former school is to be reduced by between approximately 1.50m and 2.00m. Samples have therefore been targeted at depths that will be the new final level of the site and in use by the site end users.

On completion all trial pits were backfilled with materials arisings compacted in layers using the excavator bucket.

The trial pit logs are presented in **Annex A** and their locations can be found on **Drawing 02**.

2.2 Laboratory Chemical Testing

2.2.1 Sampling Strategy

Sample locations, depths and suspected/known contamination source targets are summarised in **Table 2.1**:

Table 2.1 Sample Locations, Depths and Targets

Location	Depth (m)	Contamination Targets
TP-A	1.50	Soils at final ground level
TP-B	1.70	Soils at final ground level
TP-C	2.00	Soils at final ground level
TP-D	2.40	Soils at final ground level
TP-E	0.60	Soils at final ground level (former basement area)
TP-F	0.80	Soils at final ground level
TP-G	0.50	Soils at final ground level

2.2.2 Soil Laboratory Analysis

During the site investigation works soil samples were taken and despatched to the accredited laboratories of Eurofins Chemtest for laboratory chemical testing. Soil samples were tested for the determinands listed in **Table 2.2**.

Table 2.2 Soil Laboratory Analysis

Metals & Metalloids	In-Organics	Organics	Others
Arsenic	Cyanide	Phenols	pH (acidity)
Cadmium	Sulphate	PAH	Asbestos
Chromium III		Petroleum Hydrocarbons	
Chromium VI			
Copper			
Lead			
Mercury			
Nickel			
Selenium			
Zinc			
Boron			

The results are discussed in detail in section **3.0** and the laboratory test results certificates may be found in **Annex C**.

3.0 Evaluation of Geoenvironmental Analytical Results

3.1 Assessment Methodology

Comparison of the analytical results has been made with the 2015 Suitable 4 Use Levels (S4UL) provided by Land Quality Management (LQM) Limited and the Chartered Institute of Environmental Health (CIEH) or provisional Category 4 Screening Levels (pC4SL).

Sulphate results have been compared to guidelines presented in British Research Establishment (BRE SD1:2015). Sulphate levels need only be considered for buried concrete risk assessment and are not human health related.

3.2 Soil Test Results

A summary of the chemical test results which include the regulatory soil guideline values used in a residential setting with plant uptake are given in the following tables. The complete results can be found in **Annex C**.

Table 3.1 Summary of Soil Chemical Test Results – Inorganics & Miscellaneous

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Arsenic	37	LQM/CIEH	9.3	16	0
Cadmium	11	LQM/CIEH	<0.10	0.23	0
Chromium III	910	LQM/CIEH	17	26	0
Chromium VI	6	LQM/CIEH	<0.50	<0.50	0

Copper	2400	LQM/CIEH	16	38	0
Lead	200	pC4SL	15	31	0
Mercury (inorganic)	40	LQM/CIEH	<0.05	0.08	0
Nickel	180	LQM/CIEH	17	48	0
Selenium	250	LQM/CIEH	0.33	0.88	0
Zinc	3700	LQM/CIEH	34	110	0
Cyanide	-	-	<0.50	0.60	-
Boron	290	LQM/CIEH	<0.40	<0.40	0
Sulphate (%)	0.24	BRE	<0.010	0.10	0
Organic Matter (%)	-	-	0.6	1.9	-
pH	-	-	6.7	8.0	-

Notes:
- No available guideline

Table 3.2 Summary of Soil Chemical Test Results – Speciated Polycyclic Aromatic Hydrocarbons & Phenols

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Naphthalene	2.3	LQM/CIEH	<0.10	3.10	1
Acenaphthylene	170	LQM/CIEH	<0.10	1.50	0
Acenaphthene	210	LQM/CIEH	<0.10	0.74	0
Fluorene	170	LQM/CIEH	<0.10	1.50	0
Phenanthrene	95	LQM/CIEH	<0.10	3.1	0
Anthracene	2400	LQM/CIEH	<0.10	0.80	0
Fluoranthene	280	LQM/CIEH	<0.10	1.4	0
Pyrene	620	LQM/CIEH	<0.10	1.5	0
Benzo(a)anthracene	7.2	LQM/CIEH	<0.10	0.55	0
Chrysene	15	LQM/CIEH	<0.10	0.57	0
Benzo(b)fluoranthene	2.6	LQM/CIEH	<0.10	0.47	0
Benzo(k)fluoranthene	77	LQM/CIEH	<0.10	0.33	0
Benzo(a)pyrene	2.2	LQM/CIEH	<0.10	0.48	0
Indeno(123cd)pyrene	27	LQM/CIEH	<0.10	0.35	0
Dibenzo(ah)anthracene	0.24	LQM/CIEH	<0.10	0.12	0
Benzo(ghi)perylene	320	LQM/CIEH	<0.10	0.41	0
Total PAH	-	-	<2.0	17	-
Phenols	120	LQM/CIEH	<0.30	<0.30	0

Notes:
Thresholds based on 1.0% soil organic matter
- No available guidelines

Table 3.3 Summary of Soil Chemical Test Results – Petroleum Hydrocarbons

Substance	Threshold Value (mg/kg)	Source	Measured Concentrations (mg/kg)		Number of Exceedances
			Minimum	Maximum	
Aliphatic					
PH C5 – C6 Ali	42	LQM/CIEH	<1.0	<1.0	0
PH C6 – C8 Ali	100	LQM/CIEH	<1.0	<1.0	0
PH C8 – C10 Ali	27	LQM/CIEH	<1.0	<1.0	0
PH C10 – C12 Ali	130	LQM/CIEH	<1.0	<1.0	0
PH C12 – C16 Ali	1100	LQM/CIEH	<1.0	<1.0	0
PH C16 – C21 Ali	65000*	LQM/CIEH	<1.0	<1.0	0
PH C21 – C35 Ali	65000*	LQM/CIEH	<1.0	<1.0	0
PH C35 – C44 Ali	65000	LQM/CIEH	<1.0	<1.0	0
Aromatic					
PH C5 – C7 Arom	70	LQM/CIEH	<1.0	<1.0	0
PH C7 – C8 Arom	130	LQM/CIEH	<1.0	<1.0	0
PH C8 – C10 Arom	34	LQM/CIEH	<1.0	<1.0	0
PH C10 – C12 Arom	74	LQM/CIEH	<1.0	<1.0	0
PH C12 – C16 Arom	140	LQM/CIEH	<1.0	<1.0	0
PH C16 – C21 Arom	260	LQM/CIEH	<1.0	<1.0	0
PH C21 – C35 Arom	1100	LQM/CIEH	<1.0	<1.0	0
PH C35 – C44 Arom	1100	LQM/CIEH	<1.0	<1.0	0

Notes:
PH – Petroleum Hydrocarbon
Ali – Aliphatic
Arom – Aromatic
Thresholds based on 1.0% soil organic matter
* – Ali C16-21 and C21-C35 based on criteria for Ali EC >16-35

Asbestos

All soil samples were scheduled for asbestos screening. Asbestos was not detected.

4.0 Quantitative Risk Assessment

4.1 Contaminants of Concern

Contaminants identified as part of the investigation are summarised in **Table 4.4**. Where applicable, the contaminant, source relationship is based on the inferences made in the preliminary conceptual site model, prepared by others.

Table 4.4 Contaminants of Concern

Location	Depth	Contaminant
TP-A	1.50	Naphthalene

4.2 Pollutant Linkages

Based on the findings of the supplementary investigation and identified contaminants, the preliminary conceptual site model has been revised. Significant pollutant linkages are tabulated in the refined conceptual site model **Table 4.5**. Identified pollutant linkages will require detailed risk assessment and appropriate mitigation or remedial measures.

Table 4.5 Refined Conceptual Site Model

Source	Pathway	Receptor
Contaminated Soil	Dermal contact with made ground/dust	Human Health: Construction Workers Neighbouring Site Users Site End Users (Residents and Visitors)
	Ingestion of soil and/or soil attached to home-grown produce	
	Ingestion of home grown produce	
	Inhalation of dust	
Contaminated Soils	Inhalation of Volatiles (Naphthalene)	Site End Users (Residents and Visitors)

4.3 Mitigation and Remedial Measures

The following sections summarise the likely mitigation and remedial measures suitable for the identified contamination and proposed development. The detailed methodology to achieve the measures have been prescribed in a Remediation Strategy Report (reference 14242-2 dated September 2020) and the results presented in a Validation Report upon completion of the development.

4.3.1 Human Health

4.3.1.1 Contaminated Soils

To protect site end users from the previously identified contamination the site will need to be capped. The capping system should comprise of the proposed buildings and roads. Under hard standings such as driveways, paths and patios 600mm of inert suitable granular material should be used. In garden and soft landscaped areas 600mm of suitable inert topsoil/subsoil material should be used. The capping layer under hard standings and in garden and landscaped area should be placed over a geotextile no dig barrier to prevent the mixing of soils.

In addition to the capping as outlined in the Remediation Strategy and to protect future site users from volatile contamination, the impacted soils encountered in TP-A at 1.50m should be excavated and removed for off-site disposal. Additional soils samples should then be taken and tested to confirm the contamination has been suitably removed. Once removed there is negligible risk to site end users from volatile contamination.

As good practice, construction workers should adhere to good site management, COSHH, good standards of hygiene and appropriate health & safety on site, with personal protection equipment (PPE) and dust suppression where appropriate.

All imported soils should be validated as clean and suitable for use in accordance with 'Requirements for the Chemical Testing of Imported Soils for Various End Uses and Validation Cover Systems'.

For proposed new supply water pipes, the UK Water Industry Research publication 'Guidance for the Selection of Water Supply Pipes to be used in Brownfield Sites (Report 10/WM/03/21)' should be consulted.

In accordance with EC Regulation 1272/2008 and Environment Agency Guidance WM3 soils destined for off-site disposal should be classified on the basis of their hazard phrases prior to disposal. Soils are classified as a mirror entry waste and should be classified on the basis of their specific chemical properties.

4.3.2 Aquatic Environment

Site specific mitigation and remedial measures are not required with respect to the aquatic environment. However, removal of the naphthalene contaminated soils will aid in the protection of the aquatic environment.

During the construction period, there is a risk to the environment/adjacent sites from de-watering, digging foundations, moving contaminated soil, drainage misconnections, discharges to local surface waters or the ground, runoff from construction materials and/or exposed ground, wheel washings and oil or chemical spills.

The risk is considered to be negligible as any adverse effects will be easily preventable by due diligence to good construction practise and housekeeping in preventing surface runoff and the spillage of materials.

The basic measures that should be taken are as follows:

- Prepare a drainage plan and mark the manholes to prevent pollutants accidently reaching the surface water sewers;
- Carry out any activities that could cause pollution in a designated, bunded area, away from rivers or boreholes. Where possible it should drain to the foul sewer;
- Use settlement ponds to remove silty water;
- Store all oils and chemicals in a fully bunded area to prevent leaks or spills;
- Get advice on whether you need an environmental permit and apply in good time

We trust that the above is to your satisfaction, however, if you have any queries or require any further information please do not hesitate to contact us. In the meantime, we await your further instructions.

Yours sincerely

for: Terra Firma (Wales) Ltd

Alan Beattie
M.Sci (Hons), FGS

Enc.
Annex A - Trial Pit Logs
Annex B - Soil Laboratory Test Results
Drawing 01 - Site Location
Drawing 02 - Site Layout

ANNEX A
Trial Pit Logs

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5 Deryn Court, Wharfedale Road
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Trial Pit No: TP-A

Sheet 1 of 1

Project Name: Clyne Primary School	Project No: 14242 - Clyne	Co-ords: - Level:	Date: 16/12/2020
Location: Clyne		Dimensions: Depth 2.20	Scale: 1:25
Client: Mr Jim Slater			Logged: ADB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.60			PROBABLE MADE GROUND: Firm, orange brown, slightly gravelly sandy CLAY. Gravel is fine to coarse, subangular to rounded sandstone.
	1.50	ES		2.20			(Medium dense to dense), brown, slightly clayey sandy GRAVEL with common cobbles and boulders. Gravel is fine to coarse, subangular to rounded sandstone.
							End of Pit at 2.200m

1 2 3 4 5

Stability: Trial pit walls stable for duration of excavation.

Remarks: 1. No groundwater encountered. 2. Density indicator in brackets is based on field judgment and is not in accordance with BS5930:2015 but for guidance only. 3. Trial pit terminated below proposed final ground level. 4. Trial pit backfilled with arisings.

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Trial Pit No: TP-B

Sheet 1 of 1

Project Name: Clyne Primary School	Project No: 14242 - Clyne	Co-ords: - Level:	Date: 16/12/2020
Location: Clyne		Dimensions: Depth 2.20	Scale: 1:25
Client: Mr Jim Slater			Logged: ADB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.40			MADE GROUND: Firm, brown, grey gravelly CLAY. Gravel is fine to coarse, subangular to rounded sandstone. Contains clay pipe fragments.
	1.70	ES		2.20			(Medium dense to dense), grey and brown, slightly clayey sandy GRAVEL with common cobbles and boulders. Gravel is fine to coarse, subangular to rounded.
							End of Pit at 2.200m

1 2 3 4 5

Stability: Trial pit walls are stable for duration of excavation.

Remarks: 1. No groundwater encountered. 2. Density indicator in brackets is based on field judgment and is not in accordance with BS5930:2015 but for guidance only. 3. Trial pit terminated below proposed final ground level. 4. Trial pit backfilled with arisings.

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Trial Pit No: TP-C

Sheet 1 of 1

Project Name: Clyne Primary School	Project No: 14242 - Clyne	Co-ords: - Level:	Date: 16/12/2020
Location: Clyne		Dimensions: Depth 2.20	Scale: 1:25
Client: Mr Jim Slater			Logged: ADB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20			MADE GROUND: (Loose), grey brown, clayey GRAVEL. Gravel is fine to coarse, angular limestone. Contains concrete, brick and polystyrene.
	2.00	ES					(Medium dense to dense), grey brown, slightly clayey sandy GRAVEL with common cobbles and boulders. Gravel is fine to coarse, subangular to rounded sandstone.
				2.20			End of Pit at 2.200m

1 2 3 4 5

Stability: Trial pit walls are stable for duration of excavation.

Remarks: 1. No groundwater encountered. 2. Density indicator in brackets is based on field judgment and is not in accordance with BS5930:2015 but for guidance only. 3. Trial pit terminated below proposed final ground level. 4. Trial pit backfilled with arisings.

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Trial Pit No: TP-D

Sheet 1 of 1

Project Name: Clyne Primary School	Project No: 14242 - Clyne	Co-ords: - Level:	Date: 16/12/2020
Location: Clyne		Dimensions: Depth 2.50	Scale: 1:25
Client: Mr Jim Slater			Logged: ADB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20			MADE GROUND: (Loose), grey, gravelly CLAY. Gravel is fine to coarse, angular to subrounded sandstone. Contains brick, slate and concrete.
							(Medium dense to dense), grey brown, very clayey sandy GRAVEL. Gravel is fine to coarse, subangular to rounded sandstone.
	2.40	ES					
				2.50			End of Pit at 2.500m

1
2
3
4
5

Stability: Large collapse of trial pit wall observed.

Remarks: 1. No groundwater encountered. 2. Density indicator in brackets is based on field judgment and is not in accordance with BS5930:2015 but for guidance only. 3. Trial pit terminated below proposed final ground level. 4. Trial pit backfilled with arisings.

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Trial Pit No: TP-E

Sheet 1 of 1

Project Name: Clyne Primary School	Project No: 14242 - Clyne	Co-ords: - Level:	Date: 16/12/2020
Location: Clyne		Dimensions: Depth 1.50	Scale: 1:25
Client: Mr Jim Slater			Logged: ADB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
	0.60	ES					(Medium dense to dense), grey brown, slightly clayey sandy GRAVEL with common cobbles. Gravel is fine to coarse, subangular to rounded sandstone.
				1.50			End of Pit at 1.500m

1 2 3 4 5

Stability: Trial pit walls are stable for duration of excavation.

Remarks: 1. No groundwater encountered. 2. Density indicator in brackets is based on field judgment and is not in accordance with BS5930:2015 but for guidance only. 3. Trial pit terminated below proposed final ground level. 4. Trial pit backfilled with arisings.

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Trial Pit No: TP-F

Sheet 1 of 1

Project Name: Clyne Primary School	Project No: 14242 - Clyne	Co-ords: - Level:	Date: 16/02/2020
Location: Clyne		Dimensions: Depth 1.20	Scale: 1:25
Client: Mr Jim Slater			Logged: ADB

Water Strike	Samples & In Situ Testing			Depth (m)	Level (m)	Legend	Stratum Description
	Depth	Type	Results				
				0.20			MADE GROUND (Recent demolition rubble): (Loose), grey, sandy GRAVEL. Gravel is fine to coarse, angular brick, concrete and building stone.
	0.80	ES					Firm to stiff, orange brown, slightly gravelly CLAY. Gravel is fine to coarse, subangular to rounded sandstone.
				1.20			End of Pit at 1.200m

1 2 3 4 5

Stability: Trial pit walls are stable.

Remarks: 1. No groundwater encountered. 2. Density indicator in brackets is based on field judgment and is not in accordance with BS5930:2015 but for guidance only. 3. Trial pit terminated below proposed final ground level. 4. Trial pit backfilled with arisings.

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Trial Pit No: TP-G

Project Name: Clyne Primary School	Project No: 14242 - Clyne	Co-ords: - Level:	Date: 16/12/2020
Location: Clyne		Dimensions: Depth 1.60	Scale: 1:25
Client: Mr Jim Slater			Logged: ADB

Water Strike	Samples & In Situ Testing: Depth	Type	Results	Depth (m)	Level (m)	Legend	Stratum Description
							MADE GROUND (Recent demolition rubble): (Loose), grey, sandy GRAVEL. Gravel is fine to coarse, angular brick, concrete and stone. Contains occasional timber and plastic.
				0.30			REWORKED NATURAL: Firm, tan brown, slightly gravelly CLAY. Gravel is fine to coarse, subangular to rounded sandstone.
	0.50	ES					
				0.70			MADE GROUND: (Loose), dark grey, gravelly SAND. Gravel is fine to coarse, subangular to angular mudstone.
				0.80			Firm, tan brown, slightly sandy gravelly CLAY. Gravel is fine to coarse, subangular to rounded sandstone.
				1.60			End of Pit at 1.600m

1
2
3
4
5

Stability: Trial pit walls are stable.

Remarks: 1. No groundwater encountered. 2. Density indicator in brackets is based on field judgment and is not in accordance with BS5930:2015 but for guidance only. 3. Trial pit terminated below proposed final ground level. 4. Trial pit backfilled with arisings.

ANNEX B
Soil Laboratory Test Results

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

Final Report

Report No.:	20-34918-1		
Initial Date of Issue:	04-Jan-2021		
Client	Terra Firma (Wales) Ltd		
Client Address:	5 Deryn Court Wharfedale Road Pentwyn Cardiff CF23 7HA		
Contact(s):	Alan Beattie		
Project	14242 - Clyne		
Quotation No.:	Q20-21666	**Date Received:**	18-Dec-2020
Order No.:	14242AB	**Date Instructed:**	18-Dec-2020
No. of Samples:	7		
Turnaround (Wkdays):	9	**Results Due:**	04-Jan-2021
Date Approved:	04-Jan-2021		

Approved By:

Details: Glynn Harvey, Technical Manager

Results - Soil

Project: 14242 - Clyne

Client: Terra Firma (Wales) Ltd				**Chemtest Job No.:**	20-34918	20-34918	20-34918	20-34918	20-34918	20-34918	20-34918
Quotation No.: Q20-21666				**Chemtest Sample ID.:**	1116343	1116344	1116345	1116346	1116347	1116348	1116349
				Client Sample ID.:	TP-A	TP-B	TP-C	TP-D	TP-E	TP-F	TP-G
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.50	1.70	2.00	2.40	0.60	0.80	0.50
				Date Sampled:	16-Dec-2020	16-Dec-2020	16-Dec-2020	16-Dec-2020	16-Dec-2020	16-Dec-2020	16-Dec-2020
				Time Sampled:	0:00	0:00	0:00	0:00	0:00	0:00	0:00
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
ACM Type	U	2192		N/A	-	-	-	-	-	-	-
Asbestos Identification	U	2192		N/A	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	-	-	-	-	-	-	-
Moisture	N	2030	%	0.020	12	8.7	5.5	7.8	6.0	13	16
Soil Colour	N	2040		N/A	Brown	Brown	Brown	Brown	Brown	Brown	Brown
Other Material	N	2040		N/A	Stones	Stones	Stones	Stones	Stones	Stones	Stones
Soil Texture	N	2040		N/A	Sand	Sand	Sand	Sand	Sand	Sand	Clay
pH	M	2010		4.0	7.2	7.6	8.0	7.0	7.6	6.7	7.6
Boron (Hot Water Soluble)	M	2120	mg/kg	0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40	< 0.40
Cyanide (Total)	M	2300	mg/kg	0.50	0.60	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Sulphate (Acid Soluble)	M	2430	%	0.010	0.10	0.032	< 0.010	0.016	0.017	0.041	< 0.010
Arsenic	M	2450	mg/kg	1.0	15	11	12	16	14	9.3	12
Cadmium	M	2450	mg/kg	0.10	0.22	0.15	0.15	0.23	0.17	< 0.10	< 0.10
Chromium	M	2450	mg/kg	1.0	26	17	20	21	24	19	19
Mercury Low Level	M	2450	mg/kg	0.05	0.06	0.05	< 0.05	0.05	0.08	0.07	< 0.05
Copper	M	2450	mg/kg	0.50	31	28	29	30	38	19	16
Nickel	M	2450	mg/kg	0.50	48	31	34	35	43	20	17
Lead	M	2450	mg/kg	0.50	29	22	22	26	31	15	18
Selenium	M	2450	mg/kg	0.20	0.88	0.33	0.43	0.60	0.40	0.59	0.60
Zinc	M	2450	mg/kg	0.50	98	70	86	82	110	45	34
Chromium (Trivalent)	N	2490	mg/kg	1.0	26	17	20	21	24	19	19
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Aliphatic TPH >C5-C6	N	2680	mg/kg	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
Aliphatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C12-C16	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C16-C21	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aliphatic TPH >C21-C35	M	2680	mg/kg	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
Total Aliphatic Hydrocarbons	N	2680	mg/kg	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
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C8-C10	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C10-C12	M	2680	mg/kg	1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0
Aromatic TPH >C12-C16	M	2680	mg/kg	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

Results - Soil

Project: 14242 - Clyne

Client: Terra Firma (Wales) Ltd				**Chemtest Job No.:**	20-34918	20-34918	20-34918	20-34918	20-34918	20-34918	20-34918
Quotation No.: Q20-21666				**Chemtest Sample ID.:**	1116343	1116344	1116345	1116346	1116347	1116348	1116349
				Client Sample ID.:	TP-A	TP-B	TP-C	TP-D	TP-E	TP-F	TP-G
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	1.50	1.70	2.00	2.40	0.60	0.80	0.50
				Date Sampled:	16-Dec-2020	16-Dec-2020	16-Dec-2020	16-Dec-2020	16-Dec-2020	16-Dec-2020	16-Dec-2020
				Time Sampled:	0:00	0:00	0:00	0:00	0:00	0:00	0:00
				Asbestos Lab:	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**							
Aromatic TPH >C21-C35	M	2680	mg/kg	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
Total Aromatic Hydrocarbons	N	2680	mg/kg	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
Naphthalene	M	2700	mg/kg	0.10	3.1	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	M	2700	mg/kg	0.10	1.5	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	M	2700	mg/kg	0.10	0.74	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	M	2700	mg/kg	0.10	1.5	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	M	2700	mg/kg	0.10	3.1	0.92	0.46	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	M	2700	mg/kg	0.10	0.80	0.36	0.15	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	M	2700	mg/kg	0.10	1.4	0.83	0.21	0.29	< 0.10	< 0.10	< 0.10
Pyrene	M	2700	mg/kg	0.10	1.5	0.66	0.50	0.37	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	M	2700	mg/kg	0.10	0.55	0.35	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	M	2700	mg/kg	0.10	0.57	0.56	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	M	2700	mg/kg	0.10	0.47	0.36	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	M	2700	mg/kg	0.10	0.33	0.33	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	M	2700	mg/kg	0.10	0.48	0.25	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	M	2700	mg/kg	0.10	0.35	0.30	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	M	2700	mg/kg	0.10	< 0.10	0.12	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	M	2700	mg/kg	0.10	0.26	0.41	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	M	2700	mg/kg	2.0	17	5.5	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	M	2920	mg/kg	0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30
Organic Matter BS1377	N	2930	%	0.10	0.80	0.80	0.80	1.9	0.60	1.1	0.90

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.
2040	Soil Description(Requirement of MCERTS)	Soil description	As received soil is described based upon BS5930
2120	Water Soluble Boron, Sulphate, Magnesium & Chromium	Boron; Sulphate; Magnesium; Chromium	Aqueous extraction / ICP-OES
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.
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)
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.
2930	Organic Matter	Organic Matter	Acid Dichromate digestion/Titration

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)

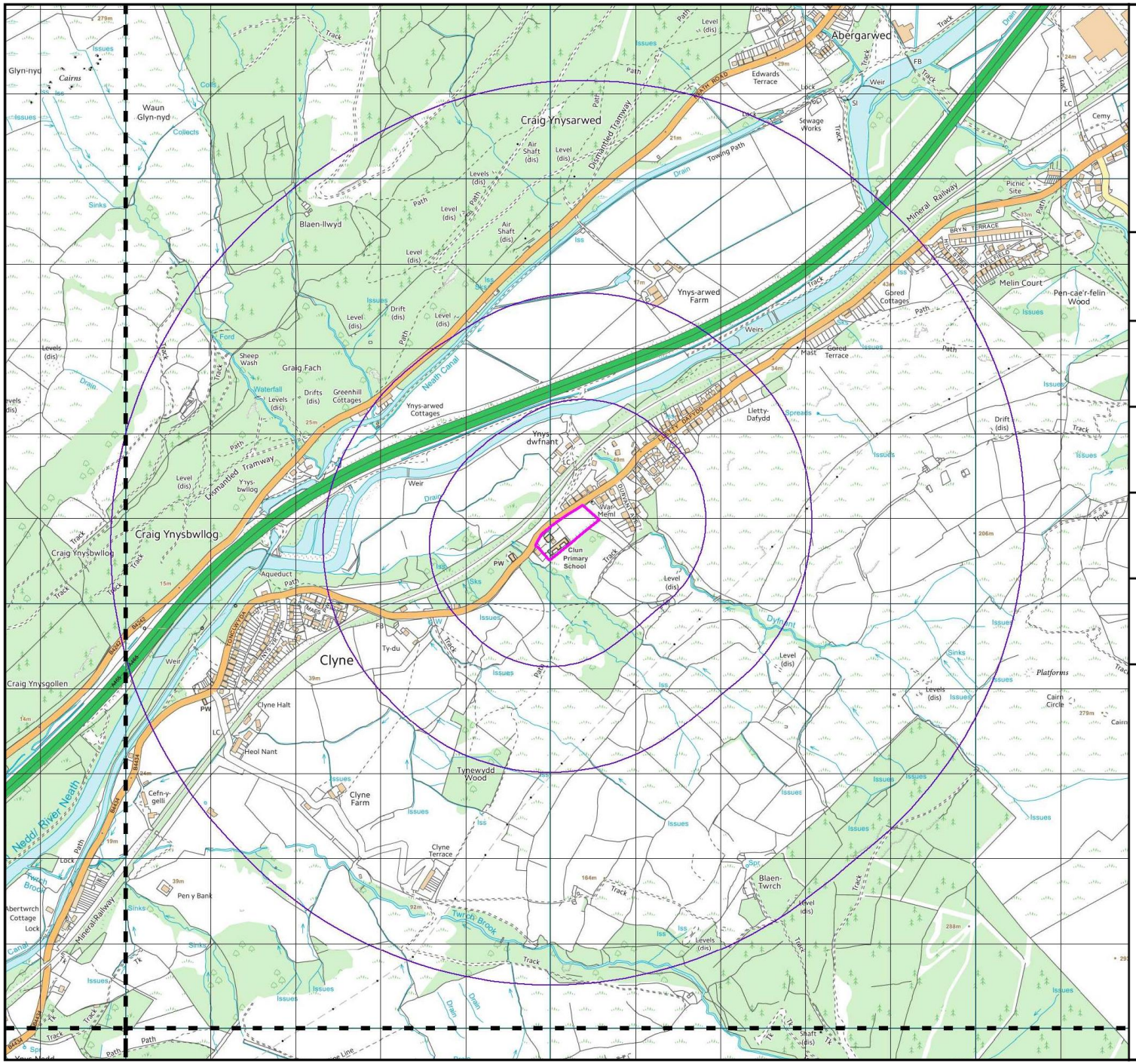
Sample Retention and Disposal

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

terra firma

DRAWINGS



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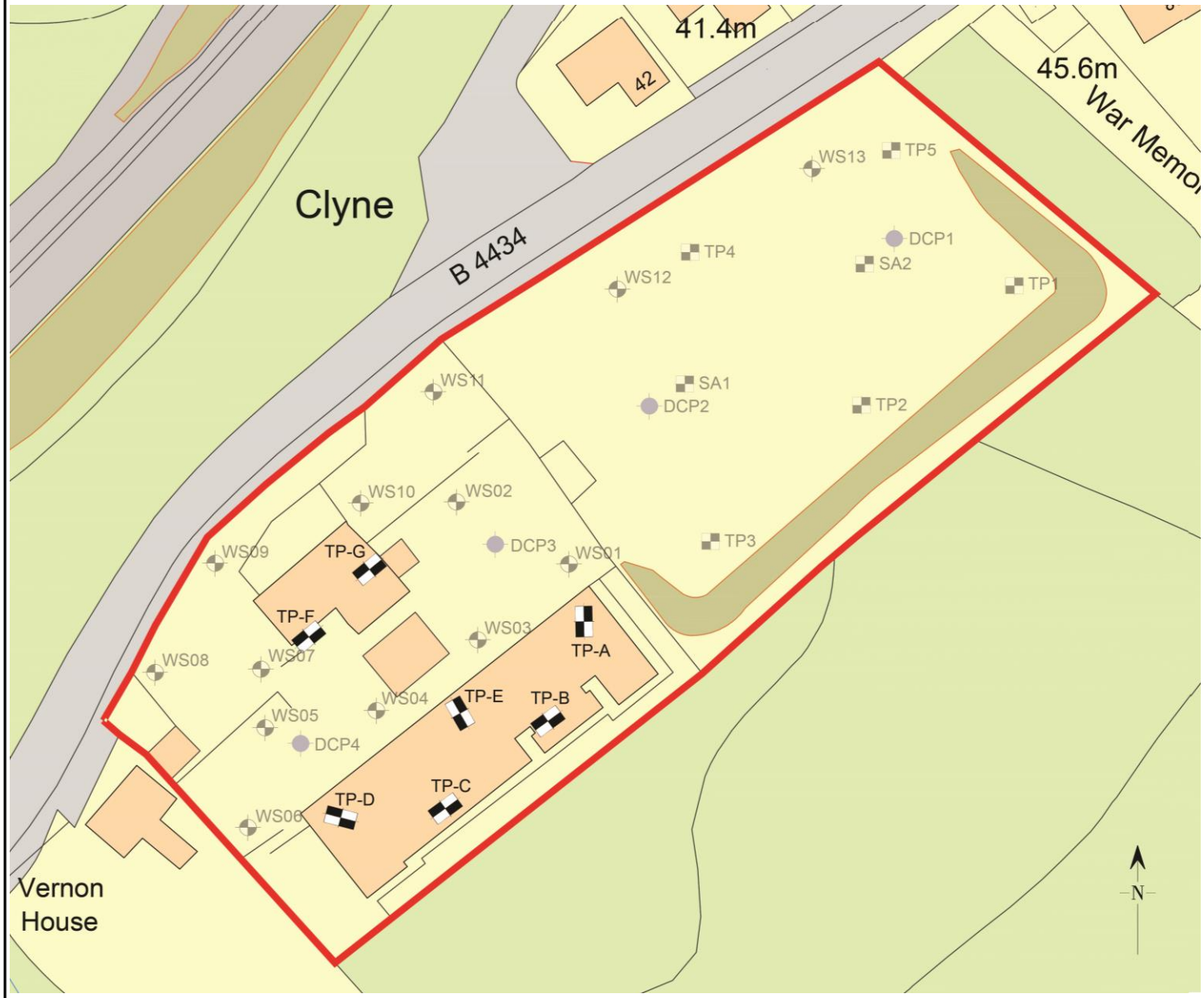
Job Number:	14242
Job Title:	Clyne Primary School
Drawing Title:	Site Location
Drawing Number:	01
Scale:	Not To Scale

North



terrafirma

Job Number:

14242

Job Title:

Clyne Primary School

Drawing Title:

Current Site Layout

Drawing Number:

02

Scale:

Not To Scale

Legend:

Approximate position of 2017 windowless sampling borehole

Approximate position of 2017 machine excavated trial pit

Approximate position of 2017 dynamic cone penetrometer test

Approximate position of 2020 machine excavated trial pit