

TEST REPORT
LIQUID LIMIT, PLASTIC LIMIT & PLASTICITY INDEX
BS 1377:Part 2:1990. Clause 4.3/5.3/5.4

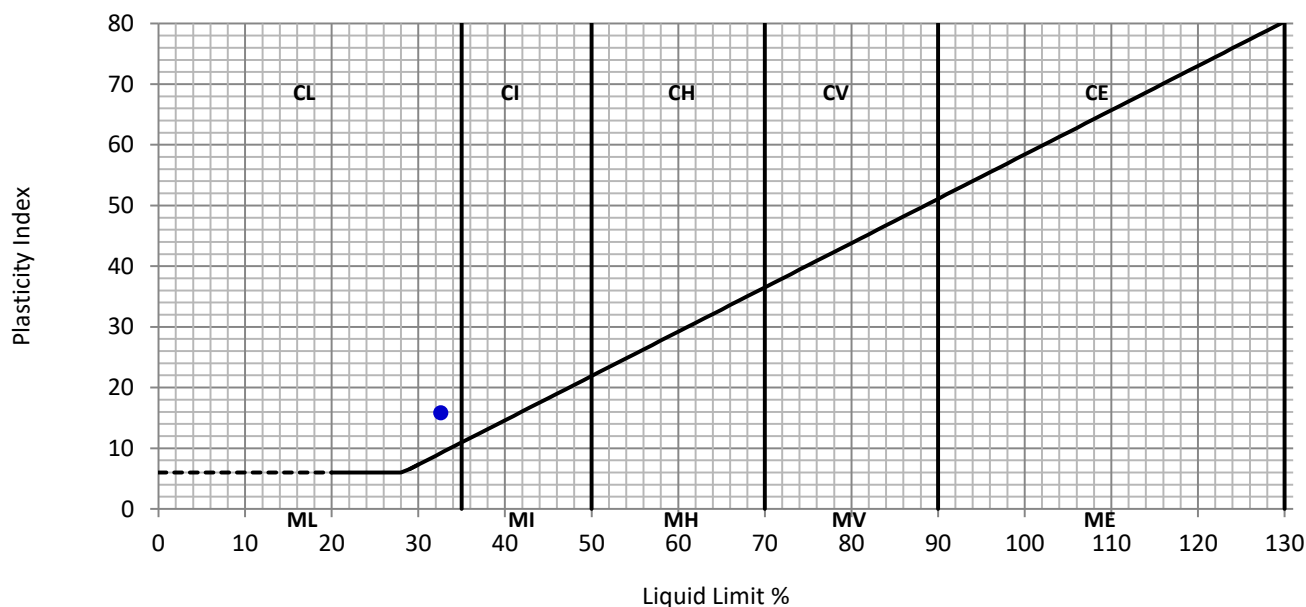
Project No:	D23449	Client:	Spectrum Geo
Project Name:	22181 - Blaendulais	Address:	Foxglove Cottage Cwm Risca Lane Bridgend CF32 0EH
ATS Sample No:	34757		

Site Ref / Hole ID:	WS04	Depth (m):	0.50 - 1.00
Sample No:		Sample Type:	Disturbed
Sampling Certificate Received:	No	Material Description:	Brown sandy gravelly CLAY
Location in Works:	N/a	Material Source:	Ex-Site
Date Sampled:	Unknown	Material Supplier:	Ex-Site
Sampled By:	Client	Specification:	BS1377
Date Received:	16 October 2023	Date Tested:	19 October 2023

Test Results

Liquid Limit	33	%
Plastic Limit	17	%
Plasticity Index	16	%

Preparation:	4.2.4 Sieved Specimen
Proportion retained on 425µm sieve:	32 %



Remarks:

QA Ref.

BS1377 - 2
Rev. 3.0



Apex Testing Solutions

Sturmi Way, Village Farm Industrial Est, Pyle,
Bridgend, CF33 6BZ
Tel: 01656 746762 Fax: 01656 749096



7771

Approver

A Grogan

A Grogan, Laboratory Manager

Date

21/10/2023

Fig.

ATT



Unit 7-8 Hawarden Business Park
Manor Road (off Manor Lane)
Hawarden
Deeside
CH5 3US

Tel: (01244) 528777
email: hawardencustomerservices@alsglobal.com
Website: www.alsenvironmental.co.uk

Apex Testing Solutions Limited
Sturmi Way
Village Farm Industrial Estate
Pyle
Bridgend
CF33 6BZ

Attention: Laura Davies

CERTIFICATE OF ANALYSIS

Date of report Generation:	25 October 2023
Customer:	Apex Testing Solutions Limited
Sample Delivery Group (SDG):	231019-54
Your Reference:	D23449
Location:	Blaendulais
Report No:	708685
Order Number:	ATS 1866

We received 3 samples on Thursday October 19, 2023 and 3 of these samples were scheduled for analysis which was completed on Wednesday October 25, 2023. Accredited laboratory tests are defined within the report, but opinions, interpretations and on-site data expressed herein are outside the scope of ISO 17025 accreditation.

Should this report require incorporation into client reports, it must be used in its entirety and not simply with the data sections alone.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden.

All sample data is provided by the customer. The reported results relate to the sample supplied, and on the basis that this data is correct.

Incorrect sampling dates and/or sample information will affect the validity of results.

The customer is not permitted to reproduce this report except in full without the approval of the laboratory.

Approved By:

Sonia McWhan

Operations Manager





CERTIFICATE OF ANALYSIS

Validated

SDG: 231019-54
Client Ref.: D23449

Report Number: 708685
Location: Blaendulais

Superseded Report:

Received Sample Overview

Lab Sample No(s)	Customer Sample Ref.	AGS Ref.	Depth (m)	Sampled Date
28808066	WS2		0.70 - 1.00	17/10/2023
28808069	WS3		0.70 - 1.00	17/10/2023
28808072	WS4		0.50 - 1.00	17/10/2023

Only received samples which have had analysis scheduled will be shown on the following pages.



CERTIFICATE OF ANALYSIS

Validated

SDG: 231019-54

Report Number: 708685

Superseded Report:

Client Ref.: D23449

Location: Blaendulais

Results Legend



Test



No Determination Possible

Sample Types -

S - Soil/Solid
 UNS - Unspecified Solid
 GW - Ground Water
 SW - Surface Water
 LE - Land Leachate
 PL - Prepared Leachate
 PR - Process Water
 SA - Saline Water
 TE - Trade Effluent
 TS - Treated Sewage
 US - Untreated Sewage
 RE - Recreational Water
 DW - Drinking Water
 Non-regulatory
 UNL - Unspecified Liquid
 SL - Sludge
 G - Gas
 OTH - Other

Lab Sample No(s)

28808072
28808069
28808066

Customer
Sample Reference

WS4
WS3
WS2

AGS Reference

Depth (m)

0.50 - 1.00
0.70 - 1.00
0.70 - 1.00

Container

250g Amber Jar
(ALE210)
250g Amber Jar
(ALE210)
250g Amber Jar
(ALE210)

Sample Type

S
S
S

Anions by Kone (soil)

All

NDPs: 0
Tests: 3

X
X
X

Sample description

All

NDPs: 0
Tests: 3

X
X
X



CERTIFICATE OF ANALYSIS

Validated

SDG: 231019-54
Client Ref.: D23449

Report Number: 708685
Location: Blaendulais

Superseded Report:

Sample Descriptions

Grain Sizes

very fine	<0.063mm	fine	0.063mm - 0.1mm	medium	0.1mm - 2mm	coarse	2mm - 10mm	very coarse	>10mm
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Lab Sample No(s)	Customer Sample Ref.	Depth (m)	Colour	Description	Inclusions	Inclusions 2
28808066	WS2	0.70 - 1.00	Dark Brown	Sandy Clay Loam	Stones	Vegetation
28808069	WS3	0.70 - 1.00	Dark Brown	Silt Loam	None	Stones
28808072	WS4	0.50 - 1.00	Dark Brown	Sandy Clay Loam	Stones	None

These descriptions are only intended to act as a cross check if sample identities are questioned, and to provide a log of sample matrices with respect to MCERTS validation. They are not intended as full geological descriptions.

We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample.

Other coarse granular materials such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

SDG: 231019-54

Report Number: 708685

Superseded Report:

Client Ref.: D23449

Location: Blaendulais

[illegible]



CERTIFICATE OF ANALYSIS

Validated

SDG: 231019-54
Client Ref.: D23449

Report Number: 708685
Location: Blaendulais

Superseded Report:

Table of Results - Appendix

Method No	Description
PM024	Soil preparation including homogenisation, moisture screens of soils for Asbestos Containing Material
TM243	Mixed Anions In Soils By Kone

NA = not applicable.

Chemical testing (unless subcontracted) performed at ALS Laboratories (UK) Limited Hawarden (Method codes TM).



CERTIFICATE OF ANALYSIS

Validated

SDG: 231019-54
Client Ref.: D23449

Report Number: 708685
Location: Blaendulais

Superseded Report:

Test Completion Dates

Lab Sample No(s)	28808066	28808069	28808072
Customer Sample Ref.	WS2	WS3	WS4
AGS Ref.			
Depth	0.70 - 1.00	0.70 - 1.00	0.50 - 1.00
Type	Soil/Solid (S)	Soil/Solid (S)	Soil/Solid (S)
Anions by Kone (soil)	25-Oct-2023	25-Oct-2023	25-Oct-2023
Sample description	19-Oct-2023	19-Oct-2023	19-Oct-2023



CERTIFICATE OF ANALYSIS

SDG: 231019-54
Client Ref: D23449

Report Number: 708685
Location: Blaendulais

Superseded Report:

Appendix

1. Results are expressed on a dry weight basis (dried at 35°C) for all soil analyses except for the following: NRA and CEN Leach tests, flash point LOI, pH, ammonium as NH₄ by the BRE method, VOC TICs and SVOC TICs.

2. If sufficient sample is received a sub sample will be retained free of charge for 15 days after analysis is completed (e-mailed) for all sample types unless the sample is destroyed on testing. The prepared soil sub sample that is analysed for asbestos will be retained for a period of 6 months after the analysis date. All bulk samples will be retained for a period of 6 months after the analysis date. All samples received and not scheduled will be disposed of 15 days after the date of receipt unless we are instructed to the contrary. Once the initial period has expired, a storage charge will be applied for each month or part thereof until the client cancels the request for sample storage. ALS reserve the right to charge for samples received and stored but not analysed.

3. With respect to turnaround, we will always endeavour to meet client requirements wherever possible, but turnaround times cannot be absolutely guaranteed due to so many variables beyond our control.

4. We take responsibility for any test performed by sub-contractors (marked with an asterisk). We endeavour to use UKAS/MCERTS Accredited Laboratories, who either complete a quality questionnaire or are audited by ourselves. For some determinands there are no UKAS/MCERTS Accredited Laboratories, in this instance a laboratory with a known track record will be utilised.

5. If no separate volatile sample is supplied by the client, or if a headspace or sediment is present in the volatile sample, the integrity of the data may be compromised. This will be flagged up as an invalid VOC on the test schedule and the result marked as deviating on the test certificate.

6. NDP - No determination possible due to insufficient/unsuitable sample.

7. Results relate only to the items tested.

8. LoDs (Limit of Detection) for wet tests reported on a dry weight basis are not corrected for moisture content.

9. **Surrogate recoveries** - Surrogates are added to your sample to monitor recovery of the test requested. A % recovery is reported, results are not corrected for the recovery measured. Typical recoveries for organics tests are 70-130%. Recoveries in soils are affected by organic rich or clay rich matrices. Waters can be affected by remediation fluids or high amounts of sediment. Test results are only ever reported if all of the associated quality checks pass; it is assumed that all recoveries outside of the values above are due to matrix affect.

10. Stones/debris are not routinely removed. We always endeavour to take a representative sub sample from the received sample.

11. In certain circumstances the method detection limit may be elevated due to the sample being outside the calibration range. Other factors that may contribute to this include possible interferences. In both cases the sample would be diluted which would cause the method detection limit to be raised.

12. For dried and crushed preparations of soils volatile loss may occur e.g volatile mercury

13. For leachate preparations other than Zero Headspace Extraction (ZHE) volatile loss may occur.

14. For the BSEN 12457-3 two batch process to allow the cumulative release to be calculated, the volume of the leachate produced is measured and filtered for all tests. We therefore cannot carry out any unfiltered analysis. The tests affected include volatiles GCFID/GCMS and all subcontracted analysis.

15. Analysis and identification of specific compounds using GCFID is by retention time only, and we routinely calibrate and quantify for benzene, toluene, ethylbenzenes and xylenes (BTX). For total volatiles in the C5-C12 range, the total area of the chromatogram is integrated and expressed as ug/kg or ug/l. Although this analysis is commonly used for the quantification of gasoline range organics (GRO), the system will also detect other compounds such as chlorinated solvents, and this may lead to a falsely high result with respect to hydrocarbons only. It is not possible to specifically identify these non-hydrocarbons, as standards are not routinely run for any other compounds, and for more definitive identification, volatiles by GCMS should be utilised.

16. We are accredited to MCERTS for sand, clay and loam/topsoil, or any of these materials - whether these are derived from naturally occurring soil profiles, or from fill/made ground, as long as these materials constitute the major part of the sample. Other coarse granular material such as concrete, gravel and brick are not accredited if they comprise the major part of the sample.

17 Data retention. All records, communications and reports pertaining to the analysis are archived for seven years from the date of issue of the final report.

General

18. **Tentatively Identified Compounds (TICs)** are non-target peaks in VOC and SVOC analysis. All non-target peaks detected with a concentration above the LoD are subjected to a mass spectral library search. Non-target peaks with a library search confidence of >75% are reported based on the best mass spectral library match. When a non-target peak with a library search confidence of <75% is detected it is reported as "mixed hydrocarbons". Non-target compounds identified from the scan data are semi-quantified relative to one of the deuterated internal standards, under the same chromatographic conditions as the target compounds. This result is reported as a semi-quantitative value and reported as Tentatively Identified Compounds (TICs). TICs are outside the scope of UKAS accreditation and are not moisture corrected.

19. Sample Deviations

If a sample is classed as deviated then the associated results may be compromised.

1	Container with Headspace provided for volatiles analysis
2	Incorrect container received
3	Deviation from method
4	Matrix interference
♦	Sample holding time exceeded in laboratory
@	Sample holding time exceeded due to late arrival of instructions or samples
§	Sampled on date not provided

20. Asbestos

When requested, the individual sub sample scheduled will be analysed in house for the presence of asbestos fibres and asbestos containing material by our documented in house method TM048 based on HSG 248 (2021), which is accredited to ISO17025. If a specific asbestos fibre type is not found this will be reported as "Not detected". If no asbestos fibre types are found all will be reported as "Not detected" and the sub sample analysed deemed to be clear of asbestos. If an asbestos fibre type is found it will be reported as detected (for each fibre type found). Testing can be carried out on asbestos positive samples, but, due to Health and Safety considerations, may be replaced by alternative tests or reported as No Determination Possible (NDP). The quantity of asbestos present is not determined unless specifically requested.

Identification of Asbestos in Bulk Materials & Soils

The results for identification of asbestos in bulk materials and soils are obtained from supplied bulk materials and soils which have been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining, based on HSG 248 (2021).

The results for identification of asbestos in soils are obtained from a homogenised sub sample which has been examined to determine the presence of asbestos fibres using ALS (Hawarden) in-house method of transmitted/polarised light microscopy and central stop dispersion staining.

Asbestos Type	Common Name
Chrysotile	White Asbestos
Amosite	Brown Asbestos
Crocidolite	Blue Asbestos
Fibrous Actinolite	-
Fibrous Anthophyllite	-
Fibrous Tremolite	-

Visual Estimation Of Fibre Content

Estimation of fibre content is not permitted as part of our UKAS accredited test other than: - Trace - Where only one or two asbestos fibres were identified.

Respirable Fibres

Respirable fibres are defined as fibres of <3 µm diameter, longer than 5 µm and with aspect ratios of at least 3:1 that can be inhaled into the lower regions of the lung and are generally acknowledged to be most important predictor of hazard and risk for cancers of the lung.

Further guidance on typical asbestos fibre content of manufactured products can be found in HSG 264.

The identification of asbestos containing materials and soils falls within our schedule of tests for which we hold UKAS accreditation, however opinions, interpretations and all other information contained in the report are outside the scope of UKAS accreditation.

APPENDIX D

Groundwater Monitoring

APPENDIX E

Photographic Plates



10/10/23

PROJECT

BLAENDUL AIS

PROJECT NO

22181

TR

SA01

DEPTH (M)

GL 1.20

FACE







10/10/23

PROJECT

BLAENDUL AIS

PROJECT NO

22181

TP

SA03

DEPTH (M)

GL 0.90

FACE











10/10/23

PROJECT BLAENDUL AIS
PROJECT NO 22181
TP TP 05
DEPTH (M) GL  0.70
FACE



10/10/23

PROJECT
PROJECT NO
TP
DEPTH (M)
FACE

BLAENDUL AIS

22181

WS 01

GL 1.50

NK 1.00-1.50



10/10/23

PROJECT
PROJECT NO
TP
DEPTH (M)
FACE

BLAENDUL AIS

22181

WS 02

GL  1.30



10/10/23

PROJECT
PROJECT NO
TP
DEPTH (M)
FACE

BLAENDUL AIS

22181

WS 03

GL  0.90



1-0/10/23

PROJECT
PROJECT NO
TP
DEPTH (M)
FACE

BLAENDUL AIS

22181

WS 04

GL  1.00



1-0/10/23

PROJECT

BLAENDUL AIS

PROJECT NO

22181

TP

WS 05

DEPTH (M)

GL ~~0.45~~ 0.45

FACE



100 200 300 400 500 600



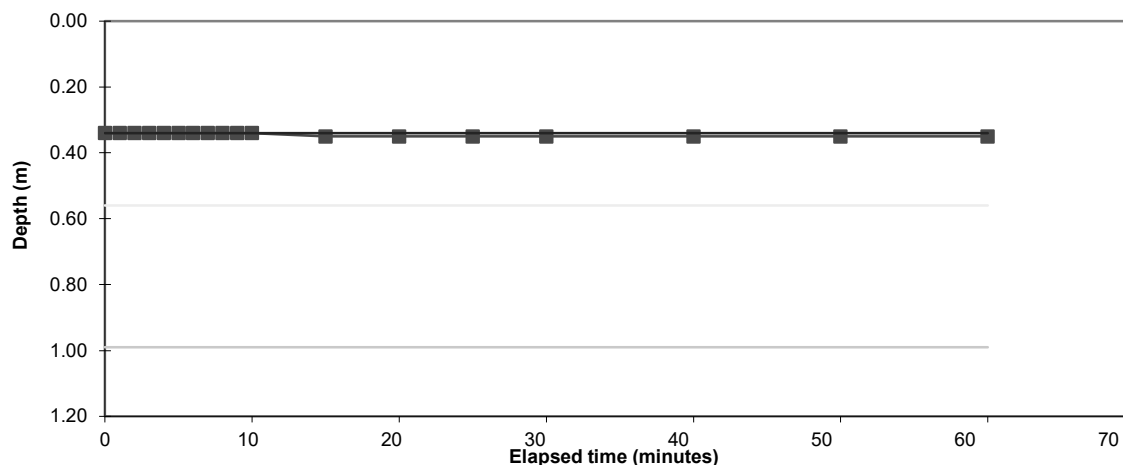
APPENDIX F

Soakaway Testing

Soakaway Test Results

Trial Pit No: SA01 Test No: 1 Date: 10.10.2023
 Length (m): 1.00
 Width (m): 0.30 Granular infill: NA
 Depth (m): 1.20 Porosity of infill: 1 (assumed)

Elapsed time (minutes)	Water Depth (metres)	Elapsed time (minutes)	Water Depth (metres)
0	0.34	30	0.35
1	0.34	40	0.35
2	0.34	50	0.35
3	0.34	60	0.35
4	0.34		
5	0.34		
6	0.34		
7	0.34		
8	0.34		
9	0.34		
10	0.34		
15	0.35		
20	0.35		
25	0.35		



Water depth at start of test (m): 0.34
 75% effective depth (m): 0.56 Elapsed time (mins): #N/A
 50% effective depth (m): 0.77 Elapsed time (mins): #N/A
 25% effective depth (m): 0.99
 Empty depth (m): 1.20

Volume outflow between 75% and 25% effective depth (m³):
 Mean surface area of outflow (m²): 1.42
 (side area at 50% effective depth + base area)
 Time for outflow between 75% and 25% effective depth (mins):

Soil infiltration rate (m/s): Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate

Remarks

Notes:
 Results processed following BRE 365 (1991)
 Water depths measured below ground level

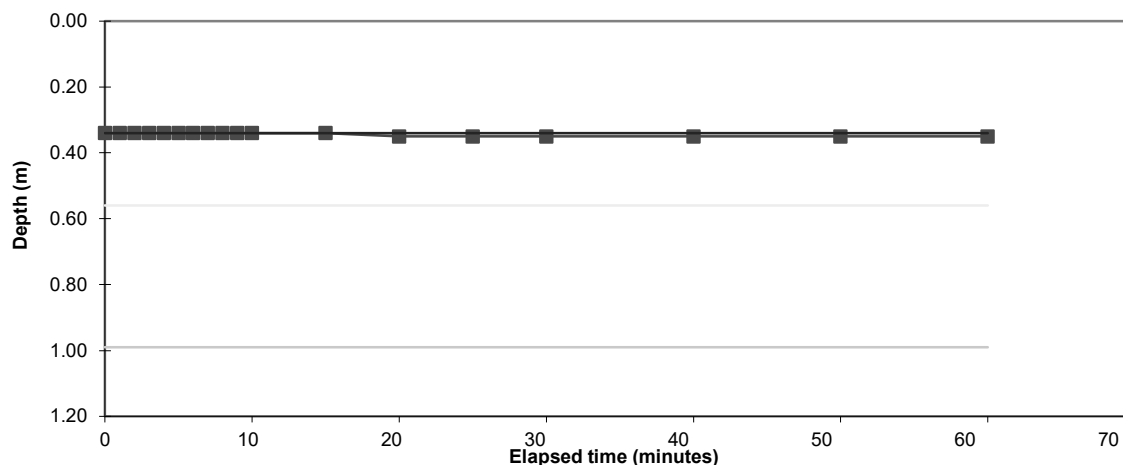
Project Blaendulais
 Project No. 22181
 Carried out for TRJ

Figure
SA1_01

Soakaway Test Results

Trial Pit No: SA01 Test No: 2 Date: 10.10.2023
 Length (m): 1.00
 Width (m): 0.30 Granular infill: NA
 Depth (m): 1.20 Porosity of infill: 1 (assumed)

Elapsed time (minutes)	Water Depth (metres)	Elapsed time (minutes)	Water Depth (metres)
0	0.34	30	0.35
1	0.34	40	0.35
2	0.34	50	0.35
3	0.34	60	0.35
4	0.34		
5	0.34		
6	0.34		
7	0.34		
8	0.34		
9	0.34		
10	0.34		
15	0.34		
20	0.35		
25	0.35		



Water depth at start of test (m): 0.34
 75% effective depth (m): 0.56 Elapsed time (mins): #N/A
 50% effective depth (m): 0.77 Elapsed time (mins): #N/A
 25% effective depth (m): 0.99
 Empty depth (m): 1.20

Volume outflow between 75% and 25% effective depth (m³):
 Mean surface area of outflow (m²): 1.42
 (side area at 50% effective depth + base area)
 Time for outflow between 75% and 25% effective depth (mins):

Soil infiltration rate (m/s): Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate

Remarks

Notes:
 Results processed following BRE 365 (1991)
 Water depths measured below ground level

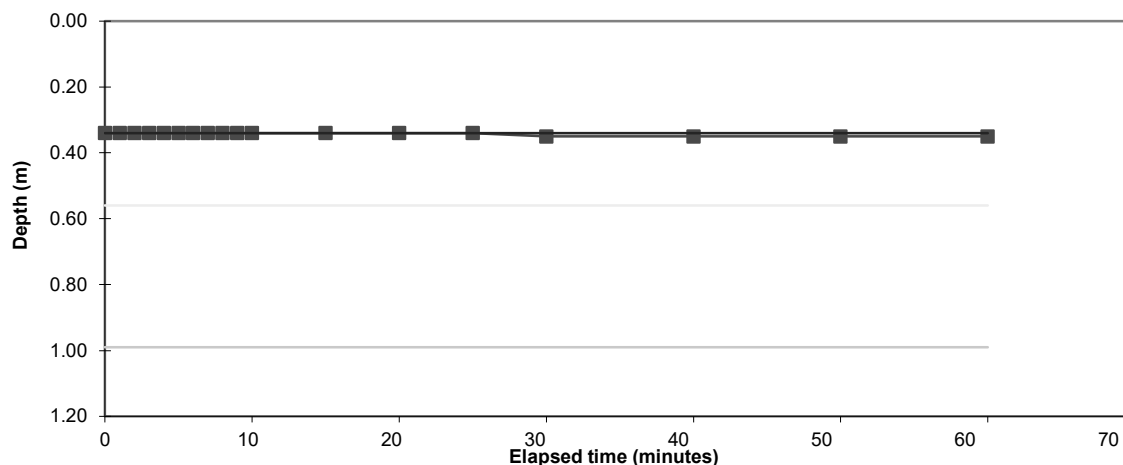
Project Blaendulais
 Project No. 22181
 Carried out for TRJ

Figure
SA1_02

Soakaway Test Results

Trial Pit No: SA01 Test No: 3 Date: 10.10.2023
 Length (m): 1.00
 Width (m): 0.30 Granular infill: NA
 Depth (m): 1.20 Porosity of infill: 1 (assumed)

Elapsed time (minutes)	Water Depth (metres)	Elapsed time (minutes)	Water Depth (metres)
0	0.34	30	0.35
1	0.34	40	0.35
2	0.34	50	0.35
3	0.34	60	0.35
4	0.34		
5	0.34		
6	0.34		
7	0.34		
8	0.34		
9	0.34		
10	0.34		
15	0.34		
20	0.34		
25	0.34		



Water depth at start of test (m): 0.34
 75% effective depth (m): 0.56 Elapsed time (mins): #N/A
 50% effective depth (m): 0.77
 25% effective depth (m): 0.99 Elapsed time (mins): #N/A
 Empty depth (m): 1.20

Volume outflow between 75% and 25% effective depth (m³):
 Mean surface area of outflow (m²): 1.42
 (side area at 50% effective depth + base area)
 Time for outflow between 75% and 25% effective depth (mins):

Soil infiltration rate (m/s): **Test incomplete as 25% effective depth not achieved. Unable to reliably determine soil infiltration rate**

Remarks

Notes:
 Results processed following BRE 365 (1991)
 Water depths measured below ground level

Project: Blaendulais
 Project No.: 22181
 Carried out for: TRJ

Figure
SA1_03