



PROPOSED DEVELOPMENT AT BRYN CEGIN BANGOR

POROSITY REPORT

July 2022
Suitability S1
Revision P02

Prepared on Behalf of:

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- A** Trial Pit Location Plan
- B** Trial Pit Log
- C** Porosity Test Calculations

1.0 Introduction

1.1 Project Background

1.1.1 Cadarn Consulting Engineers Ltd have been appointed by Huws Gray to undertake a surface water drainage design on the site of a proposed development at Bryn Cegin, Bangor.

1.1.2 As part of the surface water drainage design the method of surface water disposal should be undertaken in line with the SuDS Hierarchy outlined within CIRIA C753 'The SuDS Manual 2015' and the Statutory standards for sustainable drainage systems in Wales 2018. This hierarchy indicates that disposal into the ground via a soakaway structure must be the first method of surface water disposal considered. In order to determine whether this is a viable means of surface water disposal infiltration testing on site is required. This report contains the results and findings of the testing undertaken on site.

1.2 Scope of Porosity Report

1.2.1 The main purpose of the investigation was to undertake soil infiltration tests, in accordance with BRE Digest 365 and Approved Document H of the Building Regulations 2010, to determine if the underlying strata is suitable for utilising infiltration systems for the disposal of surface water run-off generated by the proposal.

1.2.2 This porosity report aims to provide knowledge and understanding of the soil infiltration characteristics encountered on site.

1.2.3 The purpose of the calculations and accompanying details provided are to determine the infiltration value for the soil in order to produce a drainage layout that complies with the relevant legislation of TAN 15, SuDS hierarchy and Approved Document H of the Building Regulations.

2.0 General Overview

- 2.1.1 The main purpose of the investigation was to undertake soil infiltration tests, in accordance with BRE Digest 365 and Approved Document H of the Building Regulations 2010, to determine if the underlying strata is suitable for utilising infiltration systems for the disposal of surface water run-off generated by the proposal. Due to time constraints, unfortunately it was not possible to comply with BRE 365 as the trial hole was only filled once.
- 2.1.2 On the 8th of July 2022, a site investigation was carried out which consisted of 7 trial holes, taken to a maximum depth of 3.1m. After further inspection of Trial pit No1, it revealed most of the strata was fill, made up of various layers of compacted shale/slate waste. Natural ground was found at 2.5 m depth where deposits of boulder clay was found.
- 2.1.3 Further 6 trial holes around the site was carried out to attempt to map out the depth of the underlying fill strata. Trial pit No 2 revealed the shale/slate fill strata went up to a depth of 0.8m
- 2.1.4 Trial pit No3 revealed coarse shale material that was very hard to excavate. Ground water was found at 1.2m.
- 2.1.5 Trial pit No4 revealed very gravelly sandy SILT with deposits of boulder clay up to 1.3 m deep where was to firm to excavate further.
- 2.1.6 Trail pit No5 that was closest to TP1 revealed the shale /slate waste up to 1.8m deep.
- 2.1.7 Trial pit No 6 revealed to be very gravelly sandy SILT followed by very firmly compacted shale/slate waste with frequent cobbles.
- 2.1.8 The trial pit located as per the attached trial pit location plan drawing contained within **Appendix A**.

3.0 Test Results

3.1.1 The soil infiltration calculations are summarised within **Table 1** below. Refer to the porosity test calculation sheet contained within **Appendix C** for further information.

3.1.2 The soil infiltration calculations are summarised within **Table 1** below. Refer to the porosity test calculation sheet contained within **Appendix C** for further information.

Table 1 – Test Results

Ref	Test N ^o	Depth	Ground Water Depth	Soil Infiltration Rate
Test 1	01	3.100m	N/A	1.47×10^{-04}
Test 2	02	2.600m	N/A	1.61×10^{-04}
Test 3	01	2.590m	N/A	1.43×10^{-04}

3.1.3 Trial pit logs containing information on the depths of strata encountered on site for TP-1 to TP-7 is contained within **Appendix B**.

3.1.4 The results of the test undertaken on the 8th of July 2022 indicate that the use of soakaways as an infiltration method is considered to be a suitable method for surface water disposal for this site.

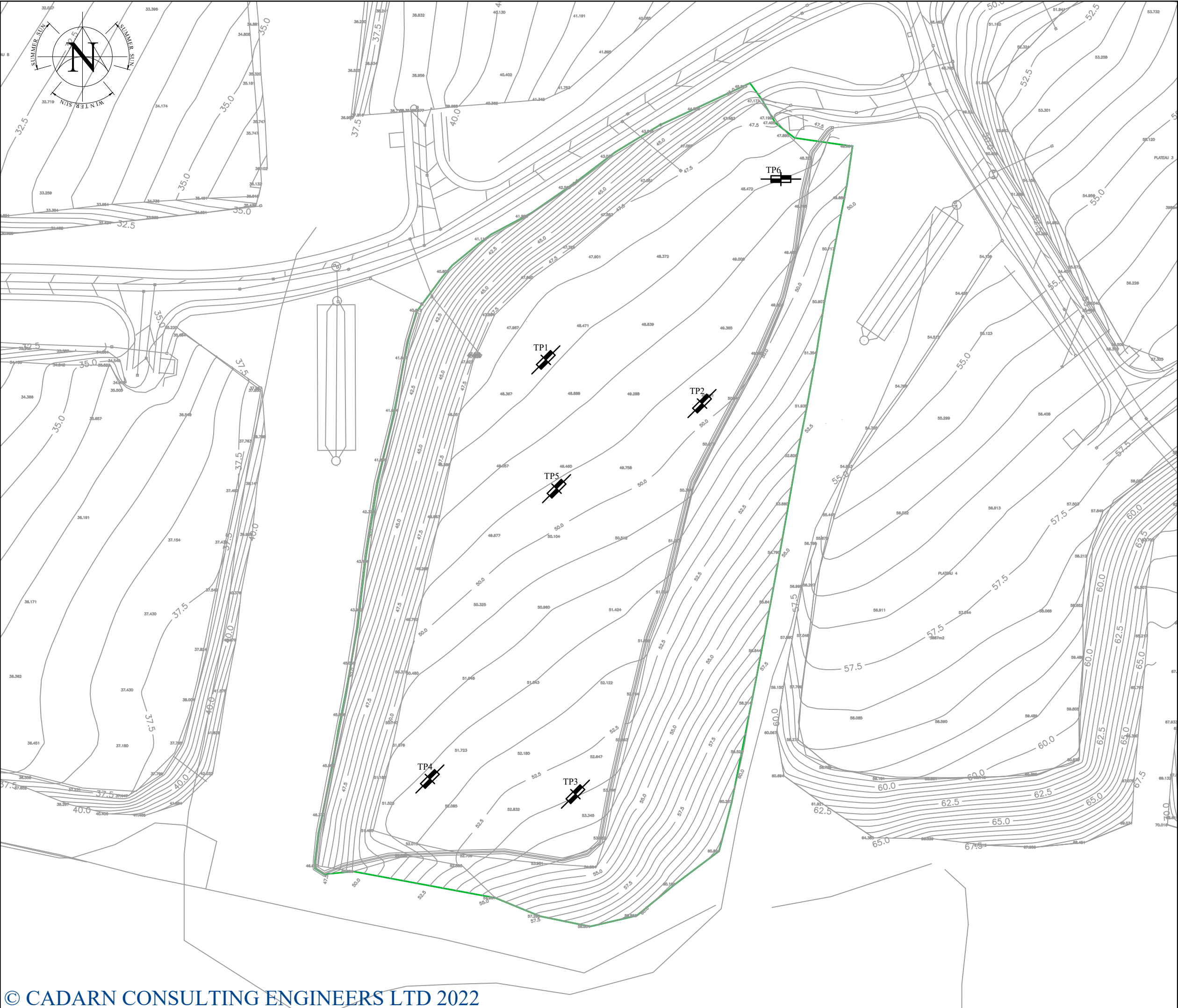
4.0 Conclusion

- 4.1.1 The results of the test undertaken on the 8th of July 2022 indicate that the use of soakaways as an infiltration method is suitable for surface water discharge.
- 4.1.2 Groundwater was encountered during excavations of TP3 when reached 1.2m. It was noted a ditch 5m from TP3 that runs the entire length of the site from the north to south along the east side of the site.

APPENDICES

APPENDIX A

Trial Pit Location Plan



NOTES

- DO NOT SCALE FROM THIS DRAWING.
- ALL LEVELS IN METRES UNLESS NOTED OTHERWISE ON DRAWING.
- ALL DIMENSIONS AND LEVELS TO BE CHECKED ON SITE PRIOR TO UNDERTAKING ANY WORKS, ORDERING MATERIALS OR FABRICATING ANY COMPONENTS
- THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL OTHER RELEVANT ENGINEER'S AND ARCHITECT'S DRAWINGS AND RELEVANT SPECIFICATION CLAUSES.

KEY

 DENOTES PROPOSED SITE BOUNDARY.

 **TP0**
DENOTES LOCATION OF TRAIL PIT.

**NOT FOR
CONSTRUCTION**

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PROPOSED TRAIL PIT LOCATION PLAN							

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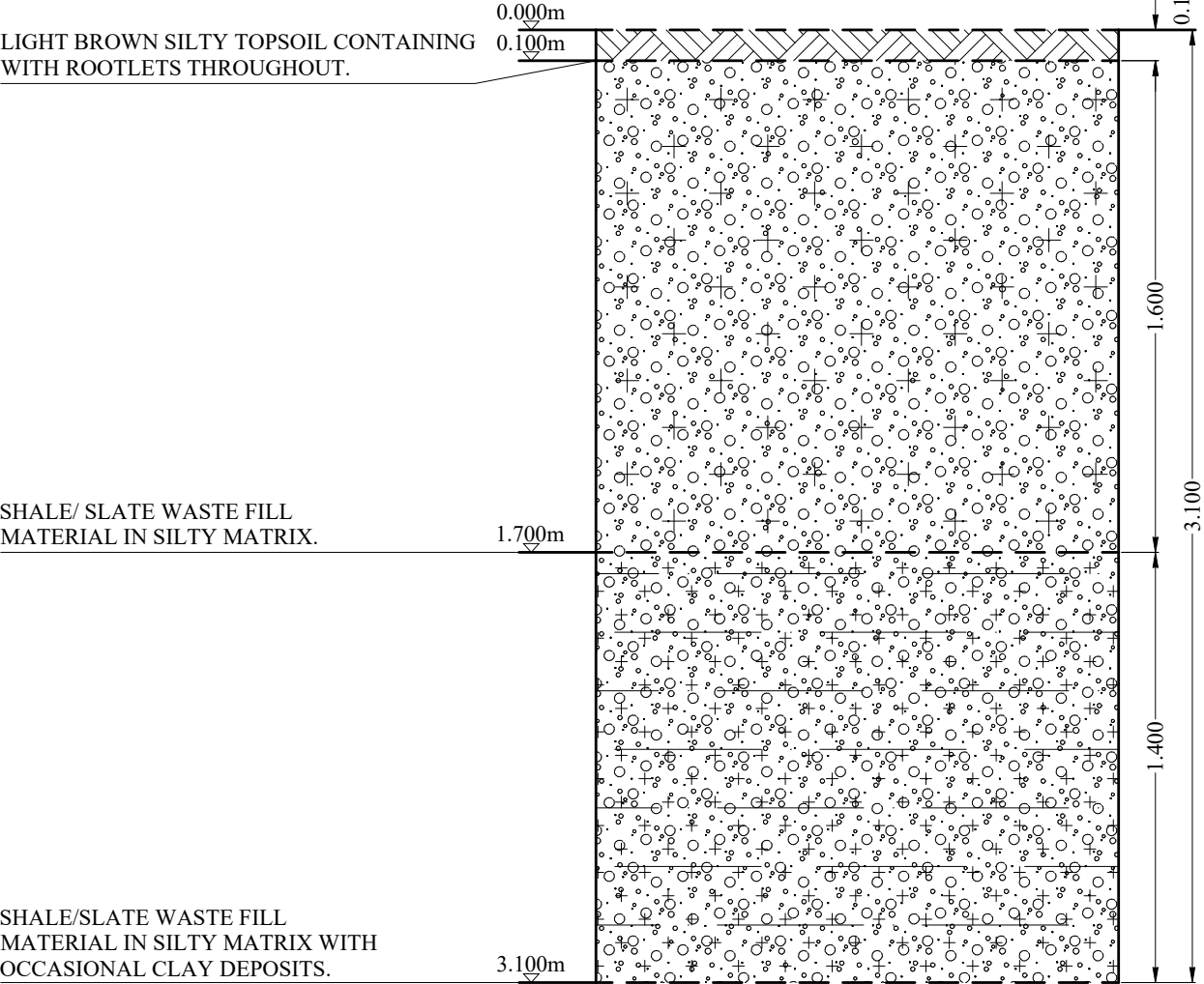


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APPENDIX B

Trial Pit Log



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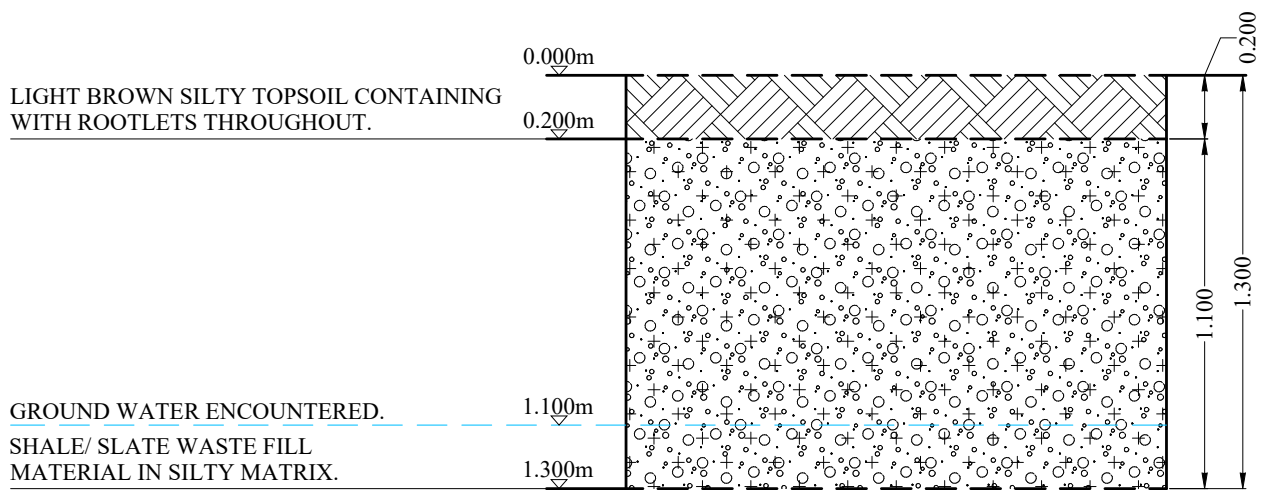
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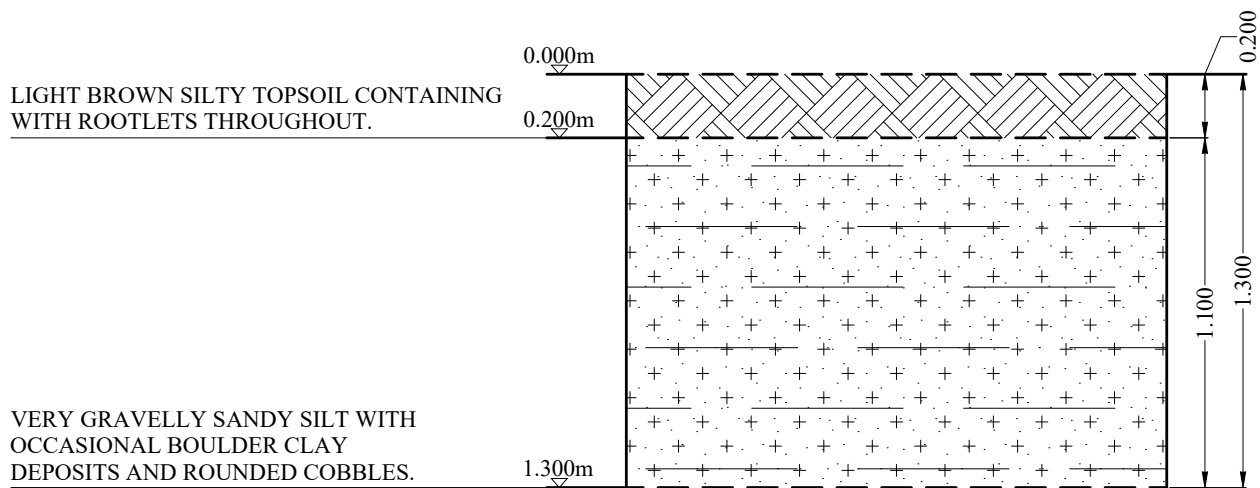
PROJECT TITLE:
HUWS GRAY, BRYN CEGIN
INDUSTRIAL ESTATE, LLANDYGAI

CADARN
CONSULTING ENGINEERS

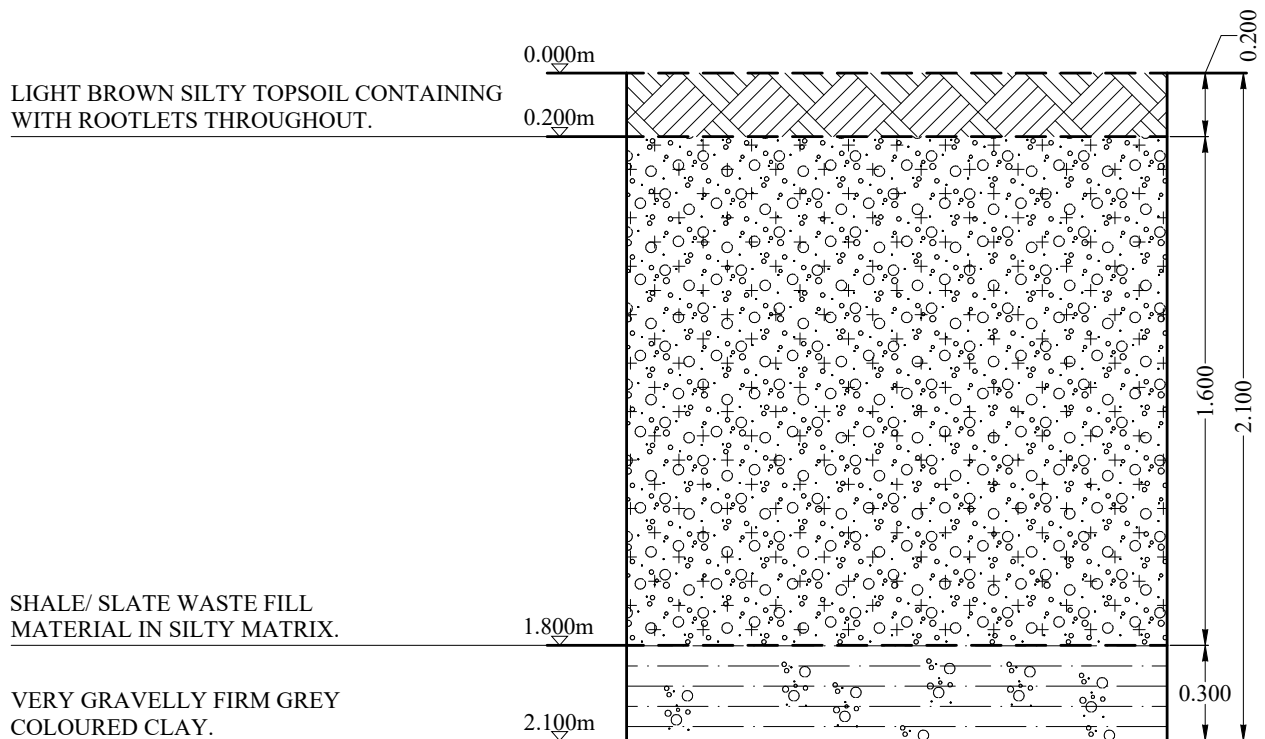
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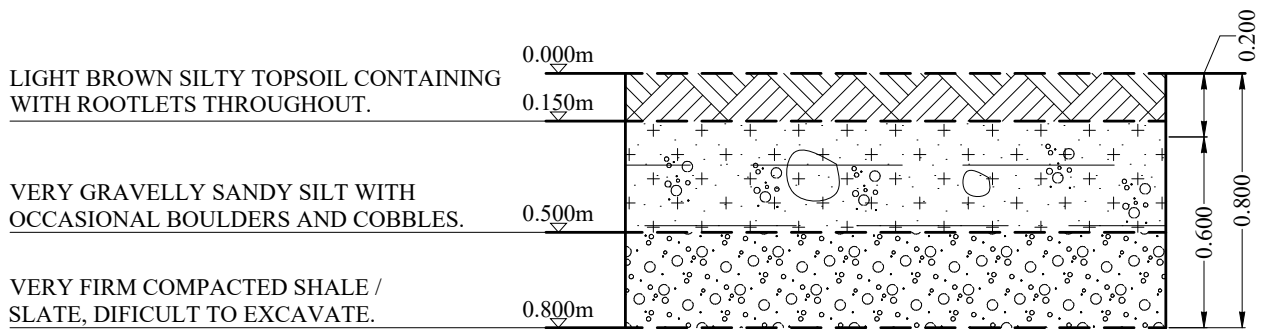



										<div>DRAWING No.:</div> <table><tr><td>PROJECT</td><td>ORIGINATOR</td><td>VOL.</td><td>LOC.</td><td>TYPE</td><td>ROLE</td></tr><tr><td>017321</td><td>CCE</td><td>V1</td><td>XX</td><td>40:40:01</td><td>C</td></tr><tr><td>50:30</td><td>0023</td><td>S1</td><td>P01</td><td></td><td></td></tr><tr><td colspan="2">CLASSIFICATION</td><td>No.</td><td>SUITABILITY</td><td colspan="2">REVISION</td></tr></table>										PROJECT	ORIGINATOR	VOL.	LOC.	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Address: CADARN Consulting Engineers Ltd,
Suite B,
Anglesey Business Centre,
Bryn Cefni,
Llangefni,
LL77 7XA

E-mail: Admin@cadarnconsulting.co.uk

Tel: 01407 730912



										<div>DRAWING No.:</div> <table><tr><td>PROJECT</td><td>ORIGINATOR</td><td>VOL.</td><td>LOC.</td><td>TYPE</td><td>ROLE</td></tr><tr><td>017321</td><td>CCE</td><td>V1</td><td>XX</td><td>40:40:01</td><td>C</td></tr><tr><td>50:30</td><td>0024</td><td>S1</td><td>P01</td><td></td><td></td></tr><tr><td colspan="2">CLASSIFICATION</td><td>No.</td><td>SUITABILITY</td><td>REVISION</td><td></td></tr></table>					PROJECT	ORIGINATOR	VOL.	LOC.	TYPE	ROLE	017321	CCE	V1	XX	40:40:01	C	50:30	0024	S1	P01			CLASSIFICATION		No.	SUITABILITY	REVISION		<div>PROJECT TITLE:</div> <div>HUWS GRAY, BRYN CEGIN INDUSTRIAL ESTATE, LLANDYGAI</div>					<div></div>				
PROJECT	ORIGINATOR	VOL.	LOC.	TYPE	ROLE																																											
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<table><tr><td>S1</td><td>Rev</td><td>Date</td><td>Description</td><td>Chg</td><td>CMA</td><td>App'd</td><td>Audit</td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>										S1	Rev	Date	Description	Chg	CMA	App'd	Audit																															
S1	Rev	Date	Description	Chg	CMA	App'd	Audit																																									

APPENDIX C

Porosity Test Calculations

TP1 - INFILTRATION CALCUALTIONS

Site: Huws Gray, Bryn Cegin, Bangor

Doc Ref: Job Ref - 17321 (Test 1)

Trial Pit Dimensions: Length (m) 1.200 Width (m) 0.300 Depth (m) 3.100

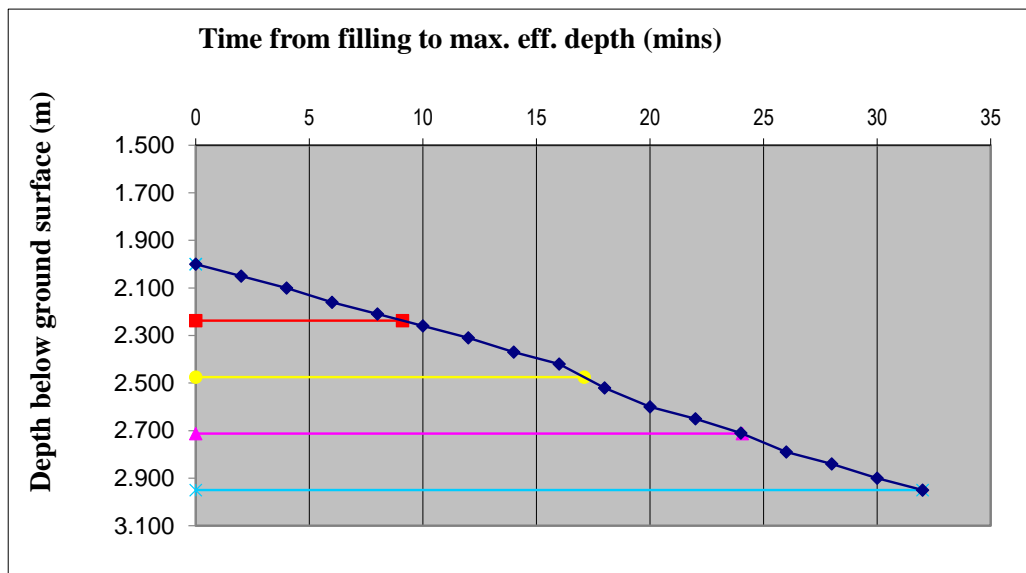
Depth of Groundwater from GL (m): N/A **Thus Effective depth (m) =** 1.100

Time (mins)	Depth of water from (m)	Rate of change (m/min)
0	2.000	
2	2.050	0.0250
4	2.100	0.0250
6	2.160	0.0300
8	2.210	0.0250
10	2.260	0.0250
12	2.310	0.0250
14	2.370	0.0300
16	2.420	0.0250
18	2.520	0.0500
20	2.600	0.0400
22	2.650	0.0250
24	2.710	0.0300
26	2.790	0.0400
28	2.840	0.0250
30	2.900	0.0300
32	2.950	0.0250

Volume Outflow, Vp75-25	0.171 m ³
Surface Area, ap50	1.298 m ²
Time Taken, tp75-25	14.96 min

Soil Infiltration Rate, f	1.47E-04 m/s
Over Effective depth of	1.100 m
Part H Vp	1.89 s/mm

depth (%Full)	depth (m)	time (min)
0	2.950	0
	2.950	32.00
25	2.713	0.00
	2.713	24.06
50	2.475	0
	2.475	17.10
75	2.238	0
	2.238	9.10
100	2.000	0
	2.000	0.00



TP1 - INFILTRATION CALCUALTIONS

Site: Huws Gray, Bryn Cegin, Bangor

Doc Ref: Job Ref - 17321 (Test 2)

Trial Pit Dimensions:

Length (m) 1.200 Width (m) 0.300 Depth (m) 2.600

Depth of Groundwater from GL (m):

N/A

Thus Effective depth (m) =

0.640

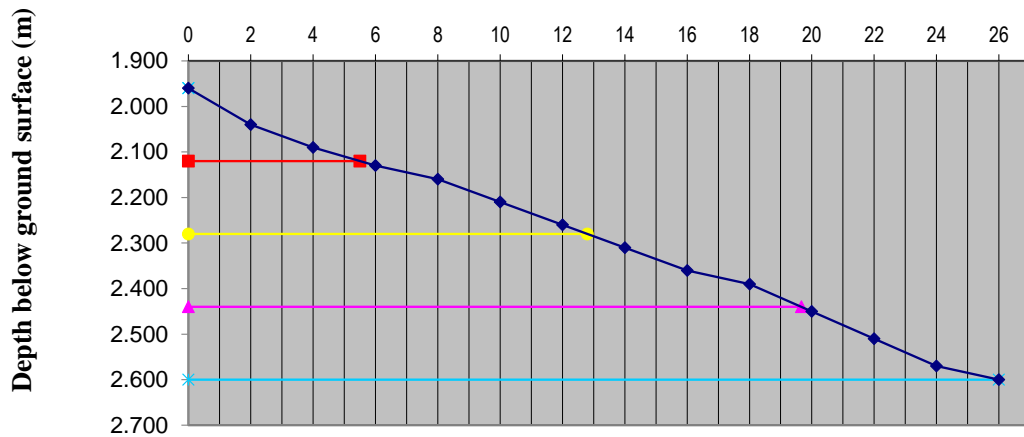
Time (mins)	Depth of water from GL (m)	Rate of change (m/min)
0	1.960	
2	2.040	0.0400
4	2.090	0.0250
6	2.130	0.0200
8	2.160	0.0150
10	2.210	0.0250
12	2.260	0.0250
14	2.310	0.0250
16	2.360	0.0250
18	2.390	0.0150
20	2.450	0.0300
22	2.510	0.0300
24	2.570	0.0300
26	2.600	0.0150

Volume Outflow, V_{p75-25}	0.115 m ³
Surface Area, a_{p50}	0.840 m ²
Time Taken, t_{p75-25}	14.17 min

Soil Infiltration Rate, f	1.61E-04 m/s
Over Effective depth of	0.640 m
Part H V_p	2.66 s/mm

depth (%Full)	depth (m)	time (min)
0	2.600	0
	2.600	26.00
25	2.440	0.00
	2.440	19.67
50	2.280	0
	2.280	12.80
75	2.120	0
	2.120	5.50
100	1.960	0
	1.960	0.00

Time from filling to max. eff. depth (mins)



TP1 - INFILTRATION CALCUALTIONS

Site: Huws Gray, Bryn Cegin, Bangor

Doc Ref: Job Ref - 17321 (Test 3)

Trial Pit Dimensions:

Length (m) 1.200

Width (m) 0.300

Depth (m) 2.590

Depth of Groundwater from GL (m):

N/A

Thus Effective depth (m) =

0.590

Time (mins)	Depth of water from GL (m)	Rate of change (m/min)
0	2.000	
2	2.090	0.0450
4	2.140	0.0250
6	2.200	0.0300
8	2.230	0.0150
10	2.280	0.0250
12	2.310	0.0150
14	2.340	0.0150
16	2.380	0.0200
18	2.410	0.0150
20	2.450	0.0200
22	2.470	0.0100
24	2.495	0.0125
26	2.515	0.0100
28	2.540	0.0125
30	2.570	0.0150
32	2.590	0.0100

Volume Outflow, Vp75-25	0.106 m ³
Surface Area, ap50	0.803 m ²
Time Taken, tp75-25	15.38 min

Soil Infiltration Rate, f	1.43E-04 m/s
Over Effective depth of	0.590 m
Part H Vp	3.13 s/mm

depth (%Full)	depth (m)	time (min)
0	2.590	0
	2.590	32.00
25	2.443	0.00
	2.443	19.63
50	2.295	0
	2.295	11.00
75	2.148	0
	2.148	4.25
100	2.000	0
	2.000	0.00

