AGP21096_01

REPORT
ON THE
PROJECT APOLLO
GEOPHYSICAL SURVEY
FOR
IGSL LIMITED

5TH JULY 2021

apex geophysics

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PRIVATE AND CONFIDENTIAL

THE FINDINGS OF THIS REPORT ARE THE RESULT OF A GEOPHYSICAL SURVEY USING NON-INVASIVE SURVEY TECHNIQUES CARRIED OUT AT THE GROUND SURFACE. INTERPRETATIONS CONTAINED IN THIS REPORT ARE DERIVED FROM A KNOWLEDGE OF THE GROUND CONDITIONS, THE GEOPHYSICAL RESPONSES OF GROUND MATERIALS AND THE EXPERIENCE OF THE AUTHOR. APEX GEOPHYSICS LTD. HAS PREPARED THIS REPORT IN LINE WITH BEST CURRENT PRACTICE AND WITH ALL REASONABLE SKILL, CARE AND DILIGENCE IN CONSIDERATION OF THE LIMITS IMPOSED BY THE SURVEY TECHNIQUES USED AND THE RESOURCES DEVOTED TO IT BY AGREEMENT WITH THE CLIENT. THE INTERPRETATIVE BASIS OF THE CONCLUSIONS CONTAINED IN THIS REPORT SHOULD BE TAKEN INTO ACCOUNT IN ANY FUTURE USE OF THIS REPORT.

PROJECT NUMBER	AGP21096		
AUTHOR	**CHECKED**	**REPORT STATUS**	**DATE**
Kevin Galvin B. A. (Mod)	EurGeol Dr. Yvonne O'Connell P.Geo., Ph.D. (Geophysics)	v. 01	5th July 2021

CONTENTS

1. INTRODUCTION

APEX Geophysics Limited was requested by IGSL to carry out a geophysical survey for the DUB-1 Site in Profile Park, Grange Castle, County Dublin. The geophysical survey consisted of a site-specific soil resistivity survey to determine the resistivity of the subsurface materials (soil and bedrock) that make up the ground where earth electrodes are to be installed. The results will be used to design earth electrode systems for the new data centre buildings, 110kV GIS substation and gas generator plant.

1.1 Survey Objective

The objective of the geophysical survey was:

- to determine soil resistivity values.

1.2 Survey Rationale

The geophysical investigation consisted of soil resistivity testing. Soil resistivity is set out in IEEE 81-2012 Guide for Measuring Earth Resistivity, Ground impedance, and Earth Surface Potentials of a grounding system.

The methodology utilises the Wenner Constant Separation survey technique which determines the bulk resistivity of the ground material using the Wenner electrode array whereby four electrodes are placed in a line in the ground and a current is passed through the two outer electrodes. The potential difference is measured across the two inner electrodes. The measured potential is divided by the current value to obtain the resistance.

Further information on the detailed methodology of the geophysical method employed in this investigation is given in **APPENDIX A: DETAILED METHODOLOGY**.

2. RESULTS

The survey was carried out on the 25th July 2021 at the locations specified by the client. The locations are indicated on Drawing AGP21096_01.

2.1 Soil Resistivity

Measurements were taken with electrode '*a*' spacing and rod depths as set out by the client in Table 1. Two separate resistance readings were recorded for each spacing and the average resistance was used to calculate the resistivity.

Spacing (m)	1	2	2	3	4.5	6	9	14	18	27	36	54
Rod depth (mm)	50	50	50	100	100	100	150	150	150	200	200	200

Table 1: a-spacing and rod (electrode depth) as set out by the client.

The resistivity readings are set out in the following graphs and tables.

2.1.1 Location R1

Electrode Spacing (m)	Rod depth (mm)	R1	R1	Average Resistance (Ohm)	Resistivity (Ohm-m)
1	50	11	11	11.00	69.08
1.5	50	8.52	8.44	8.48	79.88
2	50	6.52	6.48	6.50	81.64
3	100	5.19	5.17	5.18	97.59
4.5	100	4.34	4.3	4.32	122.08
6	100	4.01	3.98	4.00	150.53
9	150	3.4	3.34	3.37	190.47
13.5	150	2.53	2.57	2.55	216.19
18	150	2.18	2.22	2.20	248.69
27	200	1.75	1.68	1.72	290.80
36	200	1.35	1.47	1.41	318.77

Table 2: Testing Traverse Number R1.

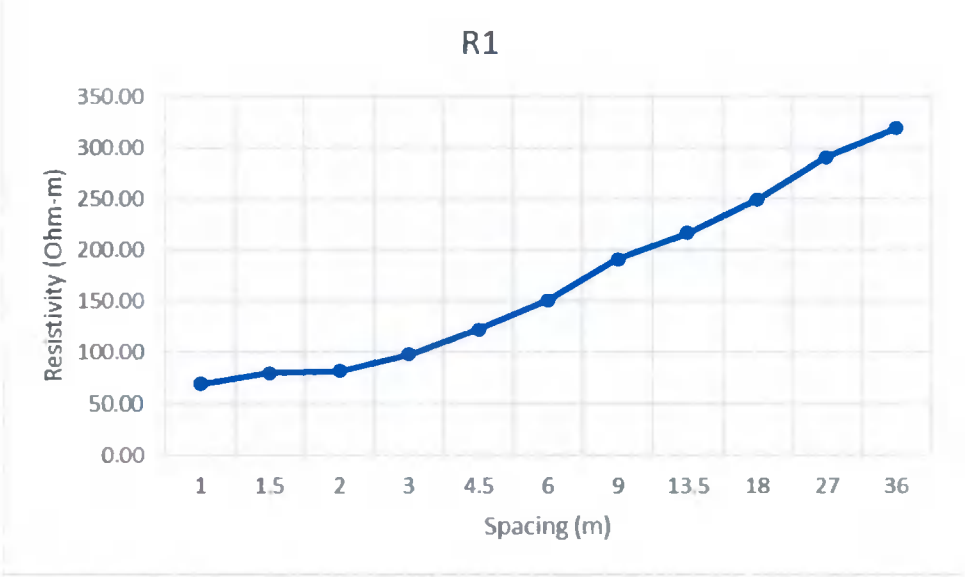


Figure 1: Curve of apparent resistivity of R1 against distance.

Location R2

Electrode Spacing (m)	Rod depth (mm)	R2	R2	Average Resistance (Ohm)	Resistivity (Ohm-m)
1	50	10.09	10.12	10.11	63.46
1.5	50	6.9	6.9	6.90	65.00
2	50	5.69	5.71	5.70	71.59
3	100	4.92	4.91	4.92	92.60
4.5	100	4.17	4.1	4.14	116.86
6	100	3.59	3.5	3.55	133.58
9	150	2.97	2.96	2.97	167.58
13.5	150	2.33	2.39	2.36	200.08
18	150	2.07	2.09	2.08	235.12
27	200	1.73	1.73	1.73	293.34
36	200	1.36	1.48	1.42	321.03
54	200	1.23	1.29	1.26	427.29

Table 3: Testing Traverse Number R2.

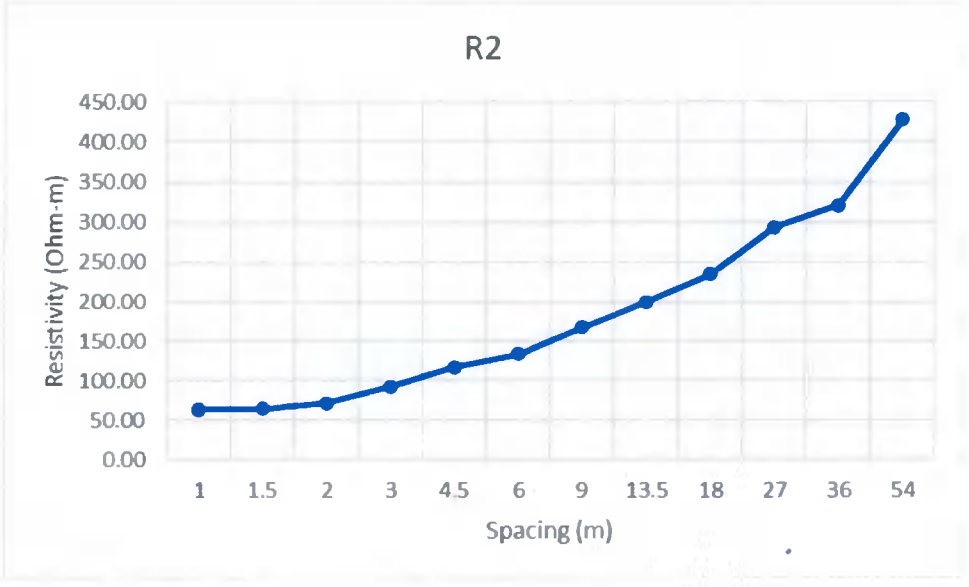


Figure 2: Curve of apparent resistivity of R2 against distance.

2.1.2 Location R3

Electrode Spacing (m)	Rod depth (mm)	R2	R2	Average Resistance (Ohm)	Resistivity (Ohm-m)
1	50	14.98	14.97	14.98	94.04
1.5	50	11.2	11.2	11.20	105.50
2	50	9.33	9.3	9.32	117.00
3	100	6.3	6.13	6.22	117.09
4.5	100	5.184	5.16	5.17	146.16
6	100	4.66	4.51	4.59	172.76
9	150	4.37	4.68	4.53	255.75
13.5	150	3.02	2.98	3.00	254.34
18	150	2.68	2.69	2.69	303.51
27	200	1.9	1.88	1.89	320.47
36	200	1.35	1.41	1.38	311.99

Table 4: Testing Traverse Number R3.

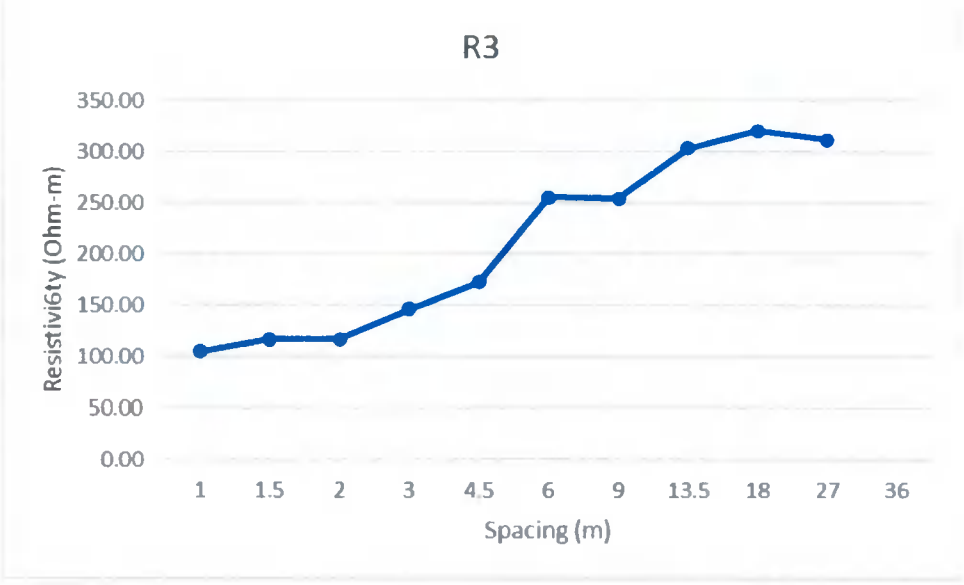


Figure 3: Curve of apparent resistivity of R3 against distance.

2.1.3 Location R4

Electrode Spacing (m)	Rod depth (mm)	R2	R2	Average Resistance (Ohm)	Resistivity (Ohm-m)
1	50	14.18	14.28	14.23	89.36
1.5	50	10.18	10.18	10.18	95.90
2	50	8.94	9.02	8.98	112.79
3	100	6.48	6.48	6.48	122.08
4.5	100	5.12	5.1	5.11	144.41
6	100	4.39	4.45	4.42	166.55
9	150	3.87	3.78	3.83	216.19
13.5	150	2.65	2.72	2.69	227.63
18	150	2.3	2.24	2.27	256.60
27	200	1.79	1.77	1.78	301.82
36	200	1.49	1.47	1.48	334.60
54	200	1.06	1.14	1.10	373.03

Table 5: Testing Traverse Number R4.

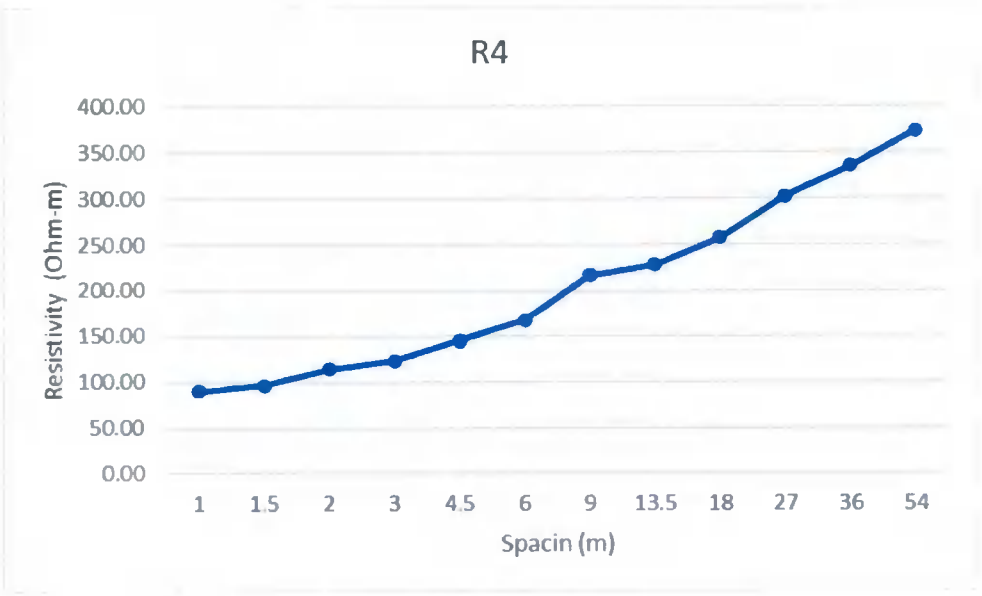


Figure 4: Curve of apparent resistivity of R4 against distance.

2.1.4 Location R5

Electrode Spacing (m)	Rod depth (mm)	R2	R2	Average Resistance (Ohm)	Resistivity (Ohm-m)
1	50	12.83	12.73	12.78	80.26
1.5	50	8.84	8.87	8.86	83.41
2	50	7.15	7.15	7.15	89.80
3	100	5.79	5.68	5.74	108.05
4.5	100	5.05	4.9	4.98	140.59
6	100	4.41	4.35	4.38	165.04
9	150	3.68	3.67	3.68	207.71
13.5	150	2.85	3.06	2.96	250.52
18	150	2.04	2.06	2.05	231.73
27	200	1.34	1.3	1.32	223.82
36	200	1.14	1.1	1.12	253.21

Table 6: Testing Traverse Number R5.

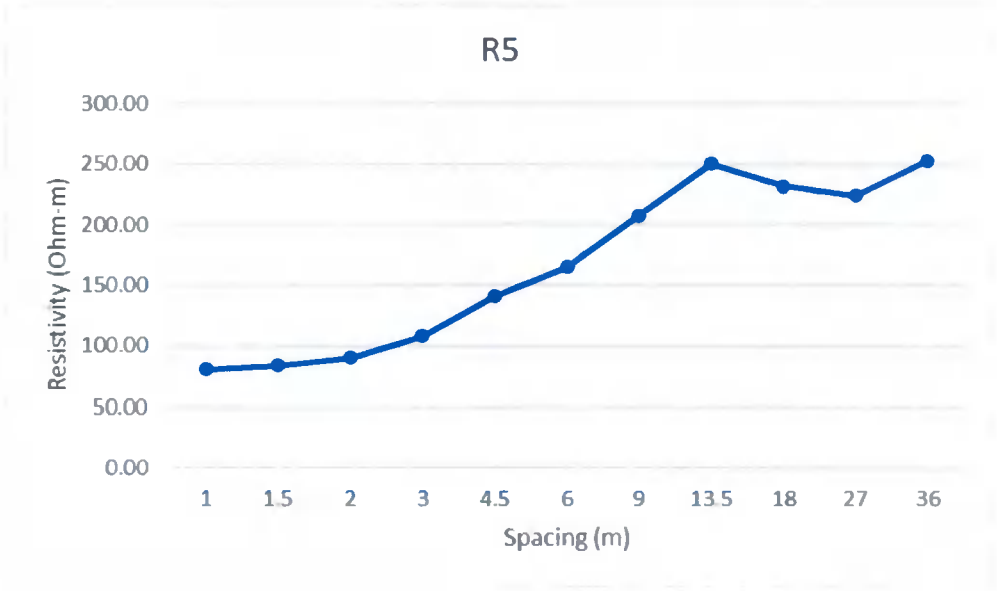


Figure 5: Curve of apparent resistivity of R5 against distance.

2.1.5 Location R6

Electrode Spacing (m)	Rod depth (mm)	R2	R2	Average Resistance (Ohm)	Resistivity (Ohm-m)
1	50	13.03	12.93	12.98	81.51
1.5	50	8.87	8.64	8.755	82.47
2	50	7.28	7.31	7.295	91.63
3	100	5.6	5.78	5.69	107.20
4.5	100	4.42	4.5	4.46	126.04
6	100	3.99	4.02	4.005	150.91
9	150	3.39	3.34	3.365	190.19
13.5	150	2.97	2.93	2.95	250.10
18	150	2.38	2.47	2.425	274.12
27	200	2.12	2.07	2.095	355.23

Table 7: Testing Traverse Number R6.

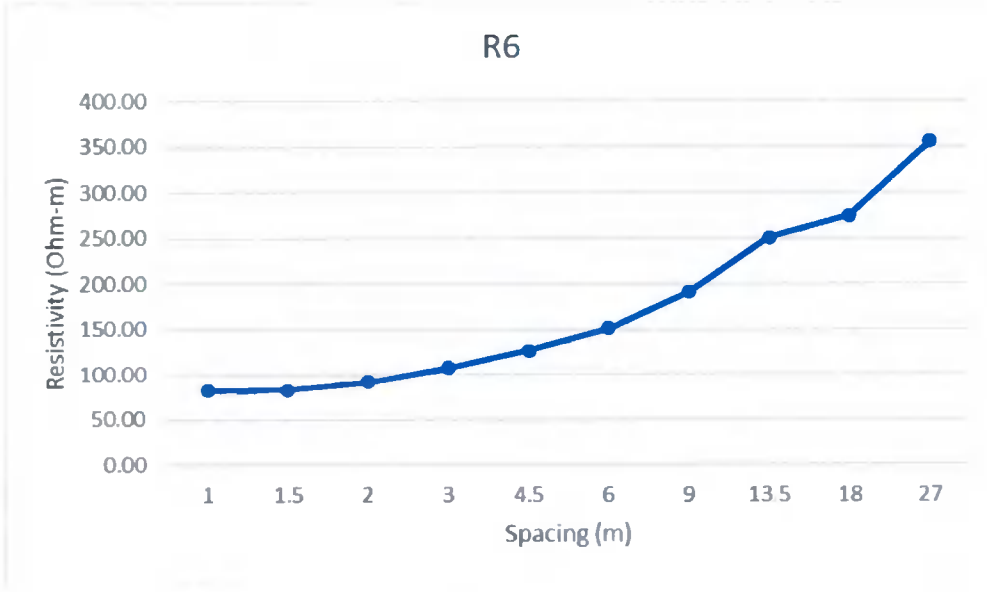


Figure 6: Curve of apparent resistivity of R6 against distance.

2.1.6 Location R7

Electrode Spacing (m)	Rod depth (mm)	R2	R2	Average Resistance (Ohm)	Resistivity (Ohm-m)
1	50	10.59	10.59	10.59	66.51
1.5	50	7.47	7.46	7.465	70.32
2	50	5.67	5.54	5.605	70.40
3	100	4.79	4.83	4.81	90.62
4.5	100	3.67	3.78	3.725	105.27
6	100	3.32	3.43	3.375	127.17
9	150	2.99	3.06	3.025	170.97
13.5	150	2.51	2.55	2.53	214.49
18	150	2.03	2.14	2.085	235.69
27	200	1.78	1.75	1.765	299.27
36	200	1.63	1.67	1.65	373.03
54	200	1.48	1.4	1.44	488.33

Table 8: Testing Traverse Number R7.

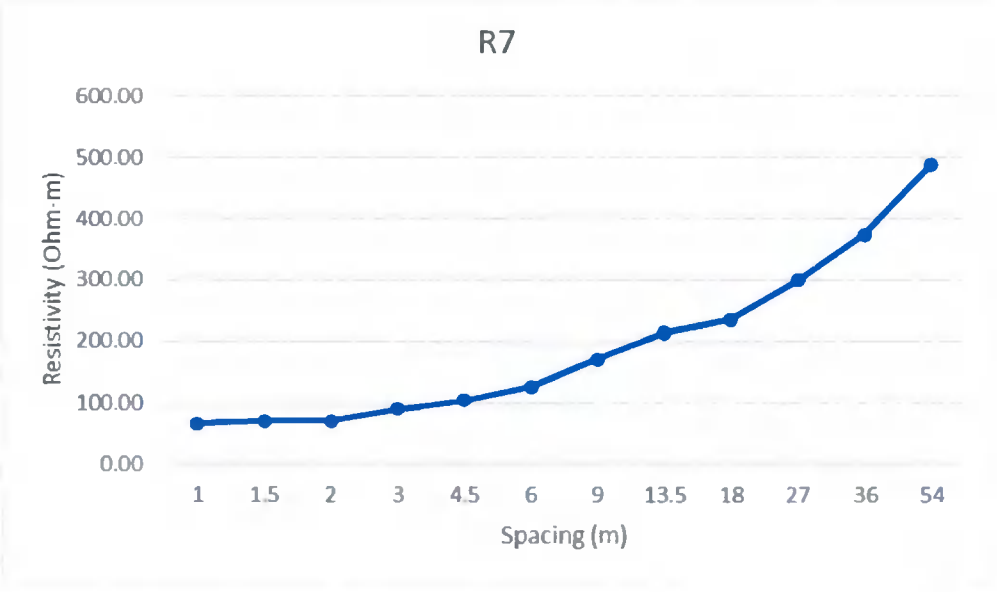


Figure 7: Curve of apparent resistivity of R7 against distance.

2.1.7 Location R8

Electrode Spacing (m)	Rod depth (mm)	R2	R2	Average Resistance (Ohm)	Resistivity (Ohm-m)
1	50	18.23	18.33	18.28	114.80
1.5	50	12.93	12.93	12.93	121.80
2	50	10.06	10.14	10.10	126.86
3	100	6.18	6.18	6.18	116.43
4.5	100	4.7	4.73	4.72	133.25
6	100	3.85	3.86	3.86	145.26
9	150	3.21	3.22	3.22	181.71
13.5	150	2.77	2.74	2.76	233.57
18	150	2.43	2.43	2.43	274.69
27	200	2.07	2.06	2.07	350.14

Table 9: Testing Traverse Number R8.

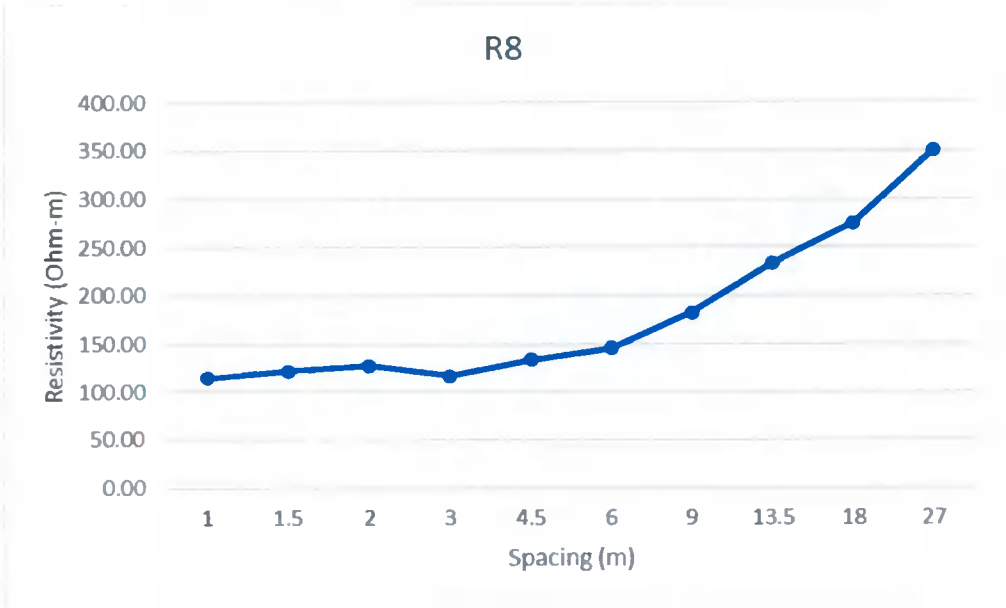


Figure 7: Curve of apparent resistivity of R7 against distance.

REFERENCES

IEEE Std 81-1983 (Guide for measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Ground System).

APPENDIX A: DETAILED METHODOLOGY

Soil Resistivity

Principles

The method used is the four-point method as described in IEEE Std 81-1983 (Guide for measuring Earth Resistivity, Ground Impedance and Earth Surface Potentials of a Ground System).

This method utilizes the equally spaced Wenner Array to determine the apparent resistivity of the ground material using four electrodes placed in a line in the ground and a current is passed through the two outer electrodes. The potential difference (V) is measured across the two inner electrodes. The measured potential is divided by the current value (I) to obtain the resistance (R) using the following formula: V/I=R.

The resistivity is determined from the measured resistance at each electrode spacing using the following standard formula for the Wenner array:

Resistivity (Ohm-m) $n = R * 2 * \pi * a$

Where R = measured resistance (Ohms) and a = inter-electrode spacing.

(IEEE Std 81-1983 states that use of an electrode spacing of a m gives approximately the average resistivity of the soil to a m, although general geophysical experience indicates that the effective depth of penetration for the Wenner array is approximately a/2 m).

Data Collection

Six sets of readings were recorded at each location on the 25th July 2021.

Data Processing

The field readings were converted to apparent resistivities.

Spatial Relocation

All the geophysical investigation were acquired using Trimble PRO-XR handheld GPS system using the settings listed below. This system allows collecting GPS data with sub metre accuracy.

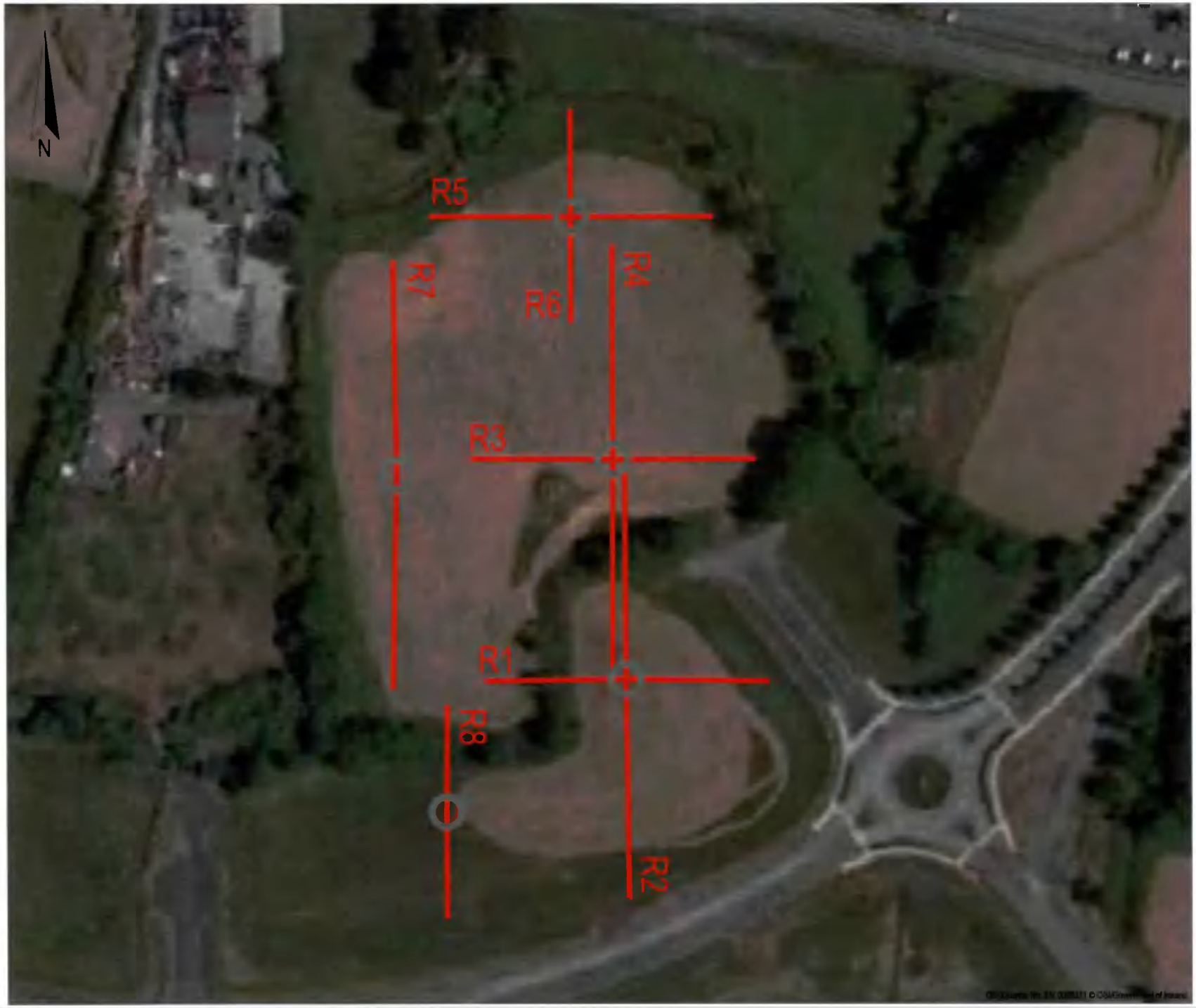
Projection:	Irish Transverse Mercator
Datum:	Ordnance
Coordinate units:	Metres
Altitude units:	Metres
Survey altitude reference:	MSL
Geoid model:	Republic of Ireland

APPENDIX B: DRAWINGS

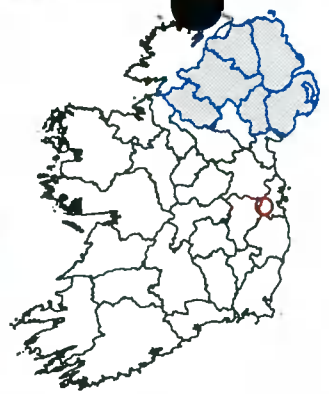
The location of the soil resistivity readings is presented in the following drawing:

AGP21096_01	Soil Resistivity Locations	1:2000 @ A4

SOIL R TIVITY LOCATIONS
SCALE 1:2000



INDEX MAP:



LEGEND:

R1 Soil Resistivity Measurement Extent

Soil Resistivity Measurement Point

The information displayed here is to be used in conjunction with AGP21096_01 Report on the Geophysical Investigation at Project Apollo for IGSL Ltd., APEX Geophysics Ltd. 2nd July 2021

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PROJECT	PROJECT APOLLO GEOPHYSICAL SURVEY
CLIENT	IGSL LIMITED
DRAWING NO	AGP21096_01
SCALE	AS INDICATED @ A4
DATE	05/07/2021

Version	Date	Drawn By	Checked
No.1	05/07/2021	KG	YOC

Appendix 8

Geotechnical Soil Laboratory Test Records

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2*, 4.3, 4.4 & 5.3

Report No. **R122612** Contract No. 23300 Contract Name: Project Apple , Grangecastle , Dublin

Customer Ramboll

Samples Received: 16/06/21 Date Tested: 16/06/21

BH/TP	Sample No.	Depth (m)	Lab. Ref	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
TP01	AA143084	0.5	A21/2775	B	14	32	17	15	68	WS	4.4	C L	Brown slightly sandy, slightly gravelly, CLAY
TP01	AA143087	1.5	A21/2776	B	18	37	20	17	52	WS	4.4	C I	Brown sandy gravelly CLAY
TP02	AA143090	1.0	A21/2777	B	9.4	27	17	10	45	WS	4.4	C L	Brown slightly sandy, gravelly, CLAY
TP03	AA143096	1.0	A21/2778	B	14	31	19	12	59	WS	4.4	C L	Brown slightly sandy, slightly gravelly, CLAY
TP03	AA143098	2.0	A21/2779	B	10	27	15	12	50	WS	4.4	C L	Grey slightly sandy, gravelly, CLAY with some cobbles
TP04	AA143100	1.0	A21/2780	B	18	34	18	16	68	WS	4.4	C L	Brown sandy gravelly CLAY
TP05	AA148061	1.0	A21/2781	B	19	37	19	18	88	WS	4.4	C I	Grey slightly sandy, slightly gravelly, CLAY
TP06	AA148066	0.6	A21/2783	B	27	42	22	20	73	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
TP07	AA148072	1.0	A21/2784	B	12	33	18	15	53	WS	4.4	C L	Brown slightly sandy, gravelly, CLAY
TP08	AA148074	0.5	A21/2785	B	14	43	22	21	62	WS	4.4	C I	Brown sandy gravelly CLAY
TP08	AA148076	1.8	A21/2786	B	18	37	17	20	48	WS	4.4	C I	Brown sandy gravelly CLAY
TP09	AA148078	0.6	A21/2787	B	19	38	19	19	70	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
TP10	AA148081	0.5	A21/2789	B	8	32	19	13	54	WS	4.4	C L	Grey clayey, sandy, GRAVEL with many cobbles
TP11	AA148085	1.0	A21/2790	B	22	40	23	17	70	WS	4.4	C I	Brown slightly sandy, slightly gravelly, CLAY
TP12	AA148090	0.5	A21/2791	B	17	35	20	15	78	WS	4.4	C L	Brown slightly sandy, slightly gravelly, CLAY

Notes:
Preparation: WS - Wet sieved; AR - As received; NP - Non plastic
Liquid Limit Clause: 4.3 Cone Penetrometer definitive method; 4.4 Cone Penetrometer one point method
Sample Type: B - Bulk Disturbed; U - Undisturbed

Remarks:
Results apply to the sample as received.
NOTE: *Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014
Opinions and interpretations are outside the scope of accreditation.
The results relate to the specimens tested. Any remaining material will be retained for one month.

IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by | Date: 07/07/21 | Page: 1 of 1

IGSL Ltd
Materials Laboratory
Unit J5, M7 Business Park
Newhall, Naas
Co. Kildare
045 846176

Test Report

Determination of Moisture Content, Liquid & Plastic Limits

Tested in accordance with BS1377:Part 2:1990, clauses 3.2*, 4.3, 4.4 & 5.3

Report No. **R122613** Contract No. 23300 Contract Name: Project Apple , Grangecastle , Dublin

Customer Ramboll

Samples Received: 16/06/21 Date Tested: 16/06/21

BH/TP	Sample No.	Depth (m)	Lab. Ref	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	% <425µm	Preparation	Liquid Limit Clause	Classification (BS5930)	Description
TP13	AA148093	1.0	A21/2793	B	14	41	19	22	60	WS	4.4	C I	Brown slightly sandy, gravelly, CLAY with some cobbles

Notes:
Preparation: WS - Wet sieved; AR - As received; NP - Non plastic
Liquid Limit Clause: 4.3 Cone Penetrometer definitive method; 4.4 Cone Penetrometer one point method
Sample Type: B - Bulk Disturbed; U - Undisturbed

Remarks:
Results apply to the sample as received.
NOTE: *Clause 3.2 of BS1377 is a "withdrawn" standard due to publication of ISO17892-1:2014
Opinions and interpretations are outside the scope of accreditation.
The results relate to the specimens tested. Any remaining material will be retained for one month

IGSL Ltd Materials Laboratory

Persons authorized to approve reports
H Byrne (Laboratory Manager)

Approved by	Date	Page
	07/07/21	1 of 1

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

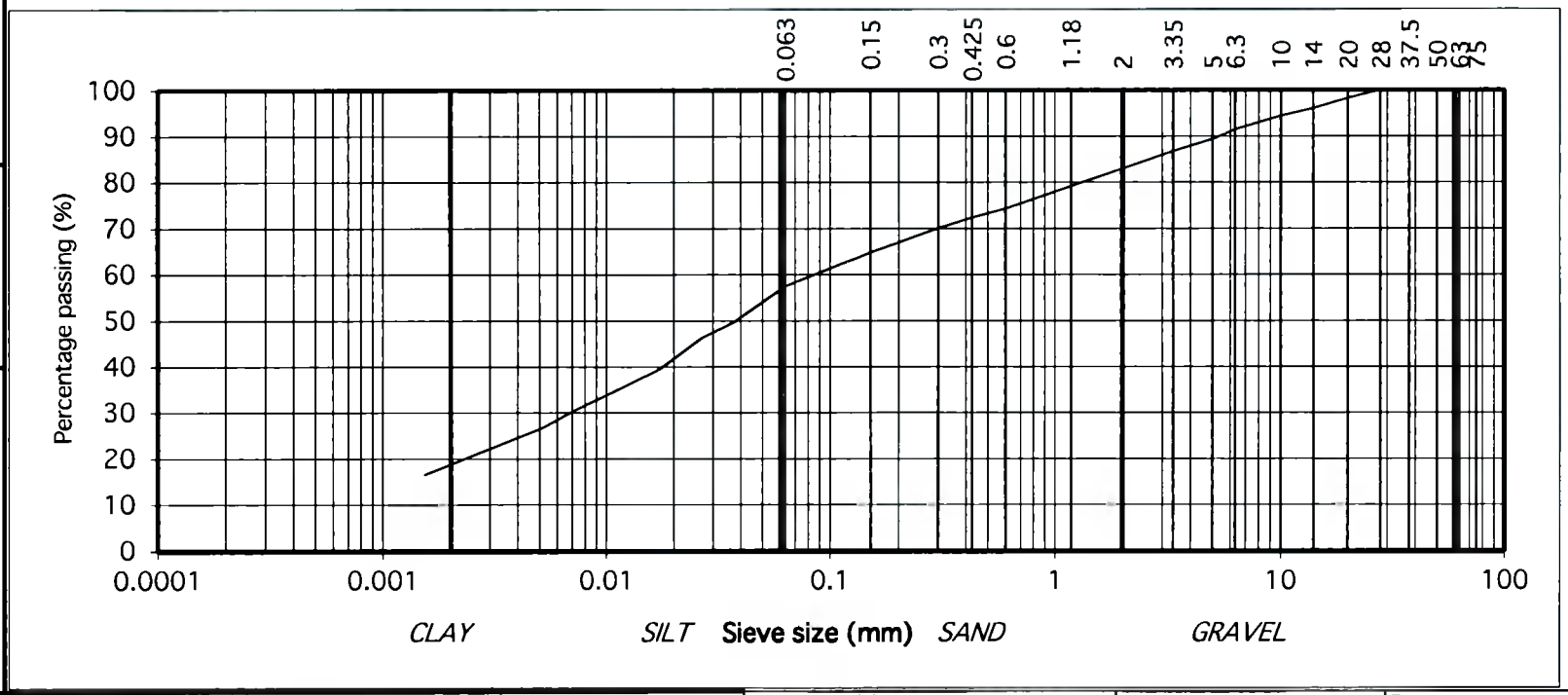
ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 15-21

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	98	
14	96	
10	94	
6.3	91	
5	89	
3.35	87	
2	83	
1.18	79	SAND
0.6	74	
0.425	72	
0.3	70	
0.15	65	
0.063	57	SILT/CLAY
0.037	50	
0.027	46	
0.017	39	
0.010	34	
0.007	31	
0.005	27	
0.002	17	

Contract No.	23300	Report No.	R123778	
Contract Name:	Project Appollo , Grangecastle , Dublin 22			
BH/TP* :	TP01			
Sample No.*	AA143084	Lab. Sample No.		A21/2775
Sample Type:	B			
Depth* (m)	0.50	Customer:	Ramboll	
Date Received	16/06/2021	Date Testing started		16/06/2021
Description:	Brown slightly sandy, slightly gravelly, CLAY			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



IGSL Ltd Materials Laboratory

Approved by:	Date:	Page no:
H Byrne	07/07/21	1 of 1

Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

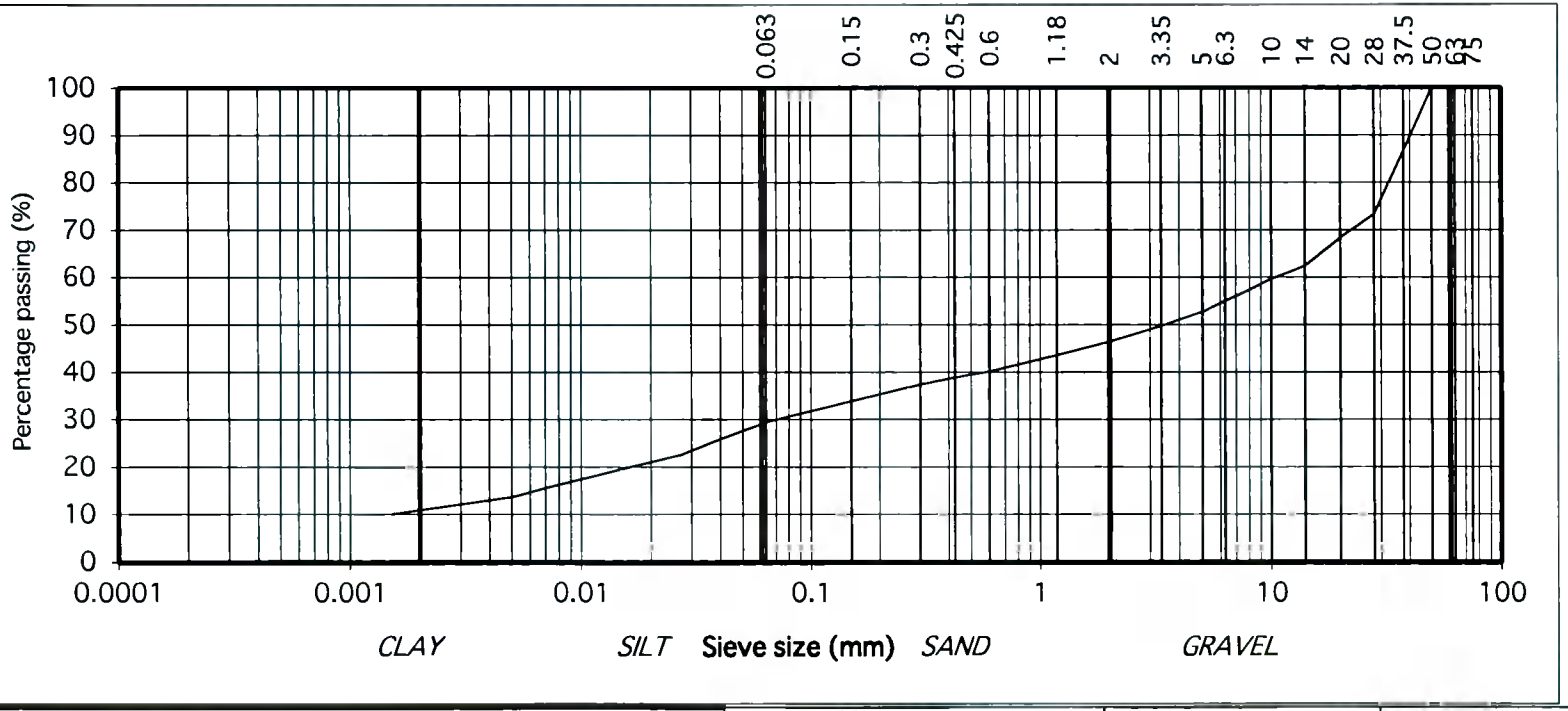
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 123T

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	87	
28	73	
20	68	
14	62	
10	60	
6.3	55	
5	53	
3.35	50	
2	46	
1.18	44	SAND
0.6	40	
0.425	39	
0.3	37	
0.15	34	
0.063	29	SILT/CLAY
0.037	25	
0.027	23	
0.017	20	
0.010	18	
0.007	16	
0.005	14	
0.002	10	

Contract No.	23300	Report No.	R123779	
Contract Name:	Project Appollo , Grangecastle , Dublin 22			
BH/TP* :	TP02			
Sample No.*	AA143090	Lab. Sample No.		A21/2777
Sample Type:	B			
Depth* (m)	1.00	Customer:	Ramboll	
Date Received	16/06/2021	Date Testing started		16/06/2021
Description:	Brown slightly sandy, gravelly, CLAY			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
This report shall not be reproduced except in full without the written approval of the Laboratory.

Remarks: Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

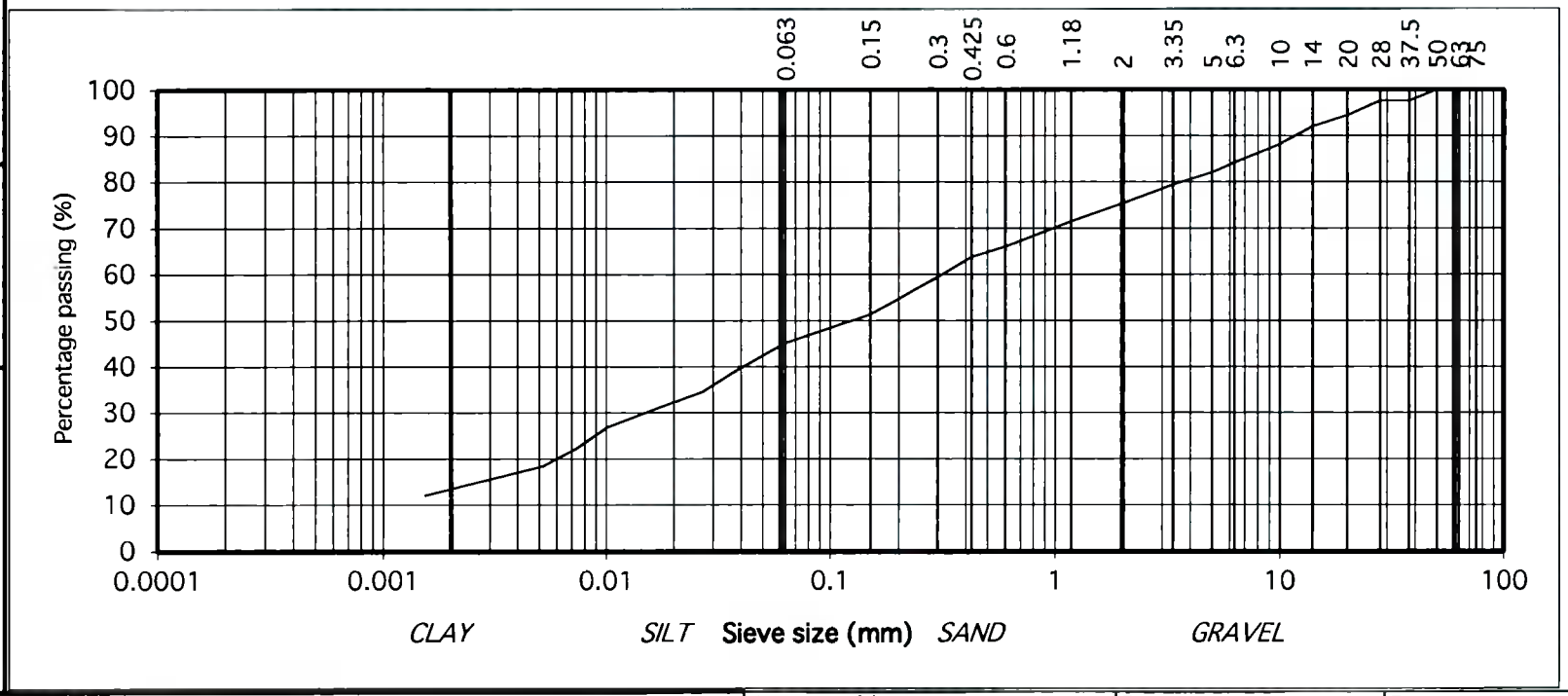
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	98	
28	98	
20	94	
14	92	
10	88	
6.3	84	
5	82	
3.35	79	
2	75	
1.18	71	SAND
0.6	66	
0.425	64	
0.3	59	
0.15	51	
0.063	45	SILT/CLAY
0.037	39	
0.027	35	
0.017	31	
0.010	27	
0.007	22	
0.005	18	
0.002	12	

Contract No.	23300	Report No.	R123780	
Contract Name:	Project Appollo , Grangecastle , Dublin 22			
BH/TP* :	TP03			
Sample No.*	AA143096	Lab. Sample No.		A21/2778
Sample Type:	B			
Depth* (m)	1.00	Customer:	Ramboll	
Date Received	16/06/2021	Date Testing started		16/06/2021
Description:	Brown slightly sandy, slightly gravelly, CLAY			

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.



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Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING
DETAILED IN SCOPE REG NO. 171

particle size	% passing	
75	83	COBBLES
63	83	
50	78	GRAVEL
37.5	70	
28	70	
20	68	
14	64	
10	61	
6.3	55	
5	52	
3.35	48	
2	44	
1.18	40	SAND
0.6	37	
0.425	36	
0.3	34	
0.15	29	
0.063	27	SILT/CLAY
0.037	23	
0.027	20	
0.017	18	
0.010	17	
0.007	15	
0.005	14	
0.001	12	

Contract No. 23300 Report No. R123781
Contract Name: Project Appollo , Grangecastle , Dublin 22
BH/TP* : TP03
Sample No.* AA143098 Lab. Sample No. A21/2779
Sample Type: B
Depth* (m) 2.00 Customer: Ramboll
Date Received 16/06/2021 Date Testing started 16/06/2021
Description: Grey slightly sandy, gravelly, CLAY with some cobbles

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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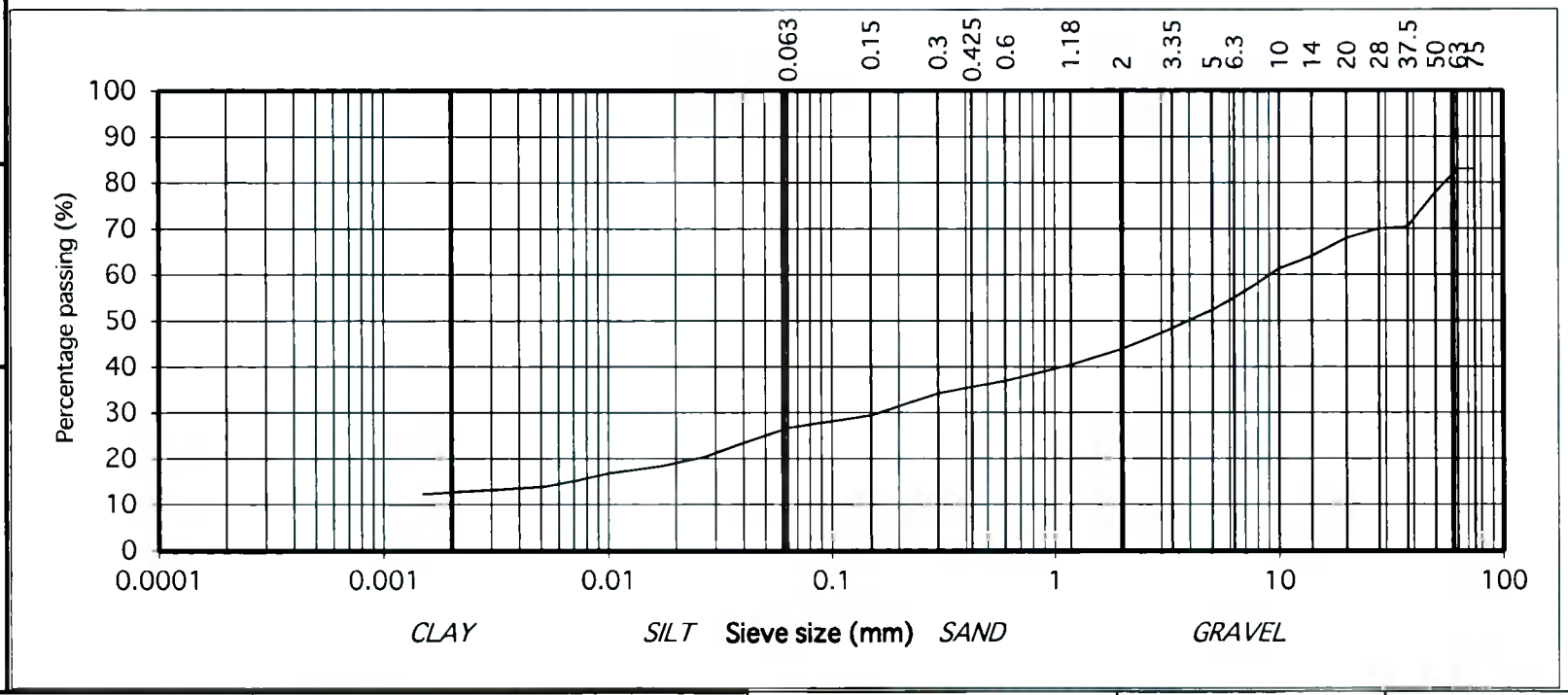

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

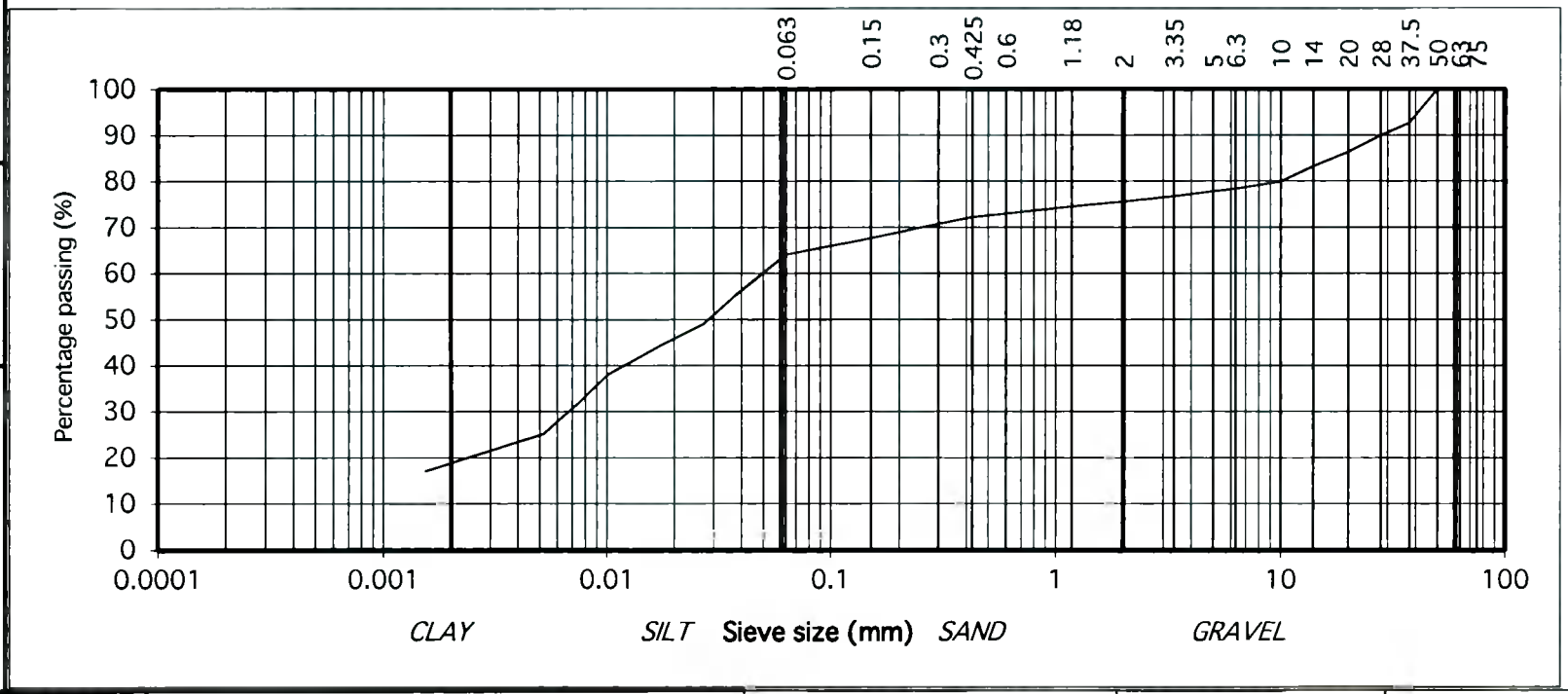
ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO 1331

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	93	
28	90	
20	86	
14	83	
10	80	
6.3	78	
5	78	
3.35	77	
2	76	
1.18	74	SAND
0.6	73	
0.425	72	
0.3	71	
0.15	68	
0.063	64	SILT/CLAY
0.037	55	
0.027	49	
0.017	44	
0.010	38	
0.007	31	
0.005	25	
0.002	17	

Contract No.	23300	Report No.	R123782	
Contract Name:	Project Appollo , Grangecastle , Dublin 22			
BH/TP* :	TP05			
Sample No.*	AA148061	Lab. Sample No.		A21/2781
Sample Type:	B			
Depth* (m)	1.00	Customer:	Ramboll	
Date Received	16/06/2021	Date Testing started		16/06/2021
Description:	Grey slightly sandy, slightly gravelly, CLAY			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO 1321

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	100	
20	100	
14	98	
10	97	
6.3	95	
5	94	
3.35	91	
2	87	
1.18	83	SAND
0.6	80	
0.425	79	
0.3	77	
0.15	74	
0.063	67	SILT/CLAY
0.037	58	
0.027	51	
0.017	46	
0.010	40	
0.007	34	
0.005	28	
0.002	20	

Contract No. 23300 Report No. R123783
Contract Name: Project Appollo , Grangecastle , Dublin 22
BH/TP* : TP06
Sample No.* AA148066 Lab. Sample No. A21/2783
Sample Type: B
Depth* (m) 0.60 Customer: Ramboll
Date Received 16/06/2021 Date Testing started 16/06/2021
Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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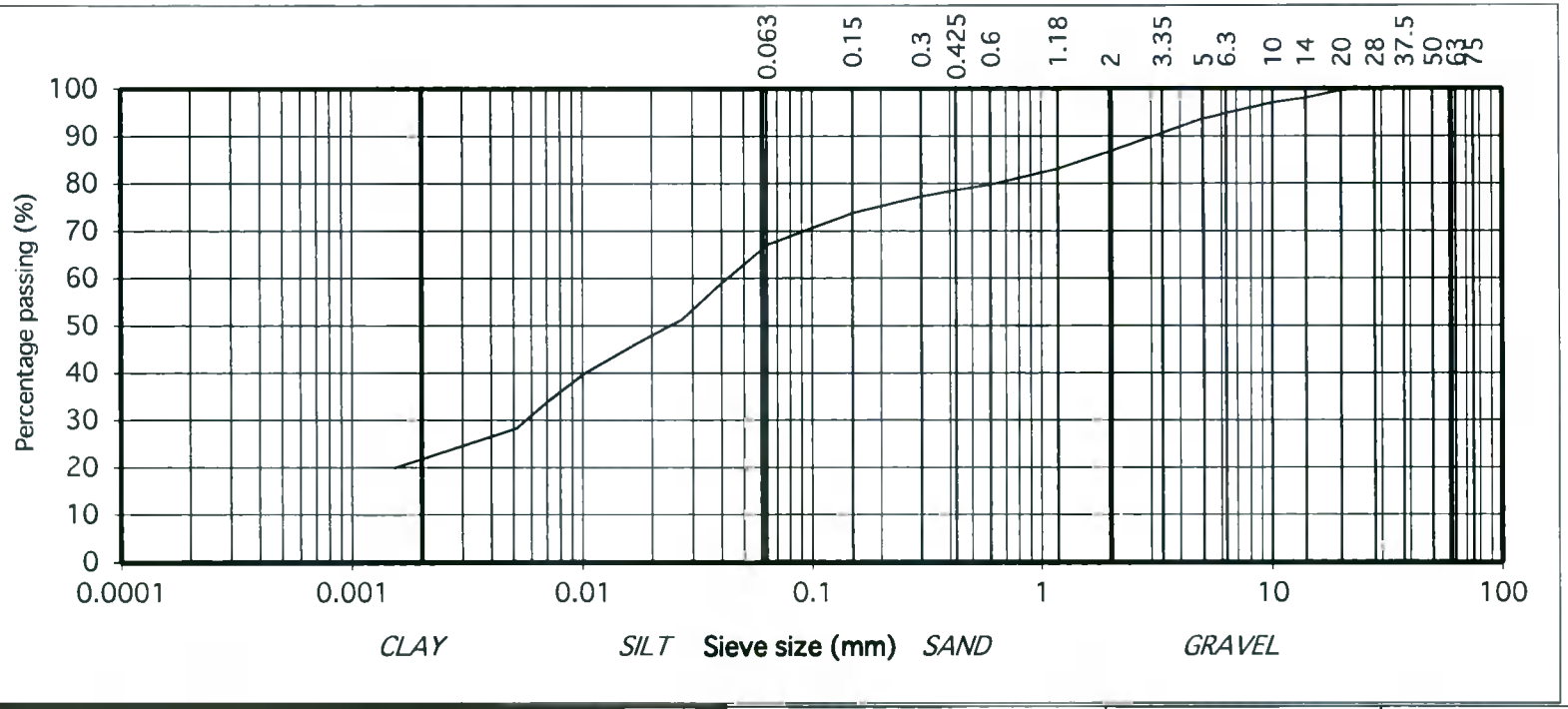

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCHEDULE REG NO. 153S

particle size	% passing	
75	100	COBBLES
63	100	
50	91	GRAVEL
37.5	86	
28	82	
20	78	
14	76	
10	73	
6.3	69	
5	67	
3.35	66	
2	64	
1.18	60	SAND
0.6	56	
0.425	54	
0.3	52	
0.15	47	
0.063	40	SILT/CLAY
0.037	35	
0.027	31	
0.017	28	
0.010	24	
0.007	21	
0.005	19	
0.002	14	

Contract No.	23300	Report No.	R123784	
Contract Name:	Project Appollo , Grangecastle , Dublin 22			
BH/TP* :	TP07			
Sample No.*	AA148072	Lab. Sample No.		A21/2784
Sample Type:	B			
Depth* (m)	1.00	Customer:	Ramboll	
Date Received	16/06/2021	Date Testing started		16/06/2021
Description:	Brown slightly sandy, gravelly, CLAY			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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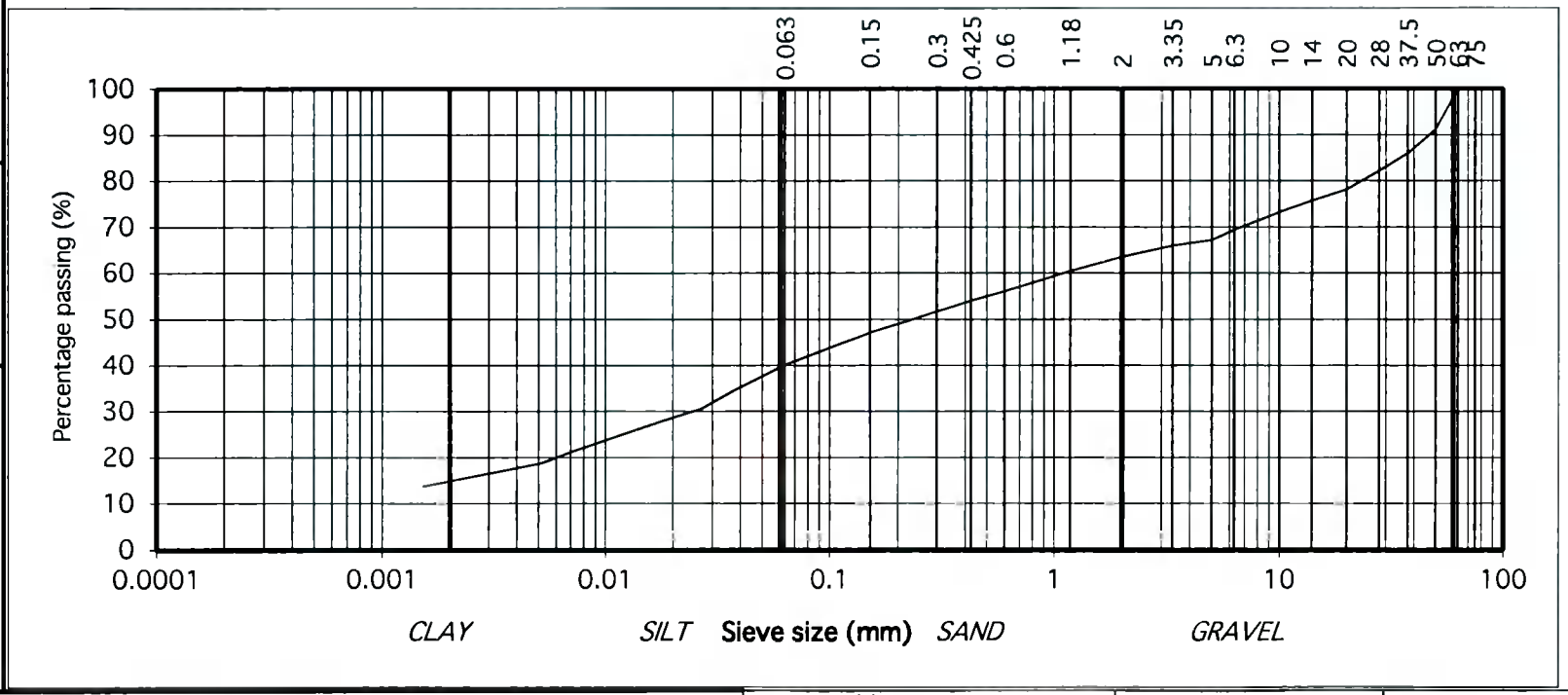
Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	97	
28	97	
20	97	
14	97	
10	95	
6.3	91	
5	90	
3.35	87	
2	83	
1.18	80	SAND
0.6	76	
0.425	74	
0.3	71	
0.15	68	
0.063	63	SILT/CLAY
0.038	53	
0.027	44	
0.018	38	
0.010	32	
0.007	26	
0.005	23	
0.002	17	

Contract No.	23300	Report No.	R123785	
Contract Name:	Project Appollo , Grangecastle , Dublin 22			
BH/TP* :	TP09			
Sample No.*	AA148078	Lab. Sample No.		A21/2787
Sample Type:	B			
Depth* (m)	0.60	Customer:	Ramboll	
Date Received	16/06/2021	Date Testing started		16/06/2021
Description:	Brown slightly sandy, slightly gravelly, CLAY			

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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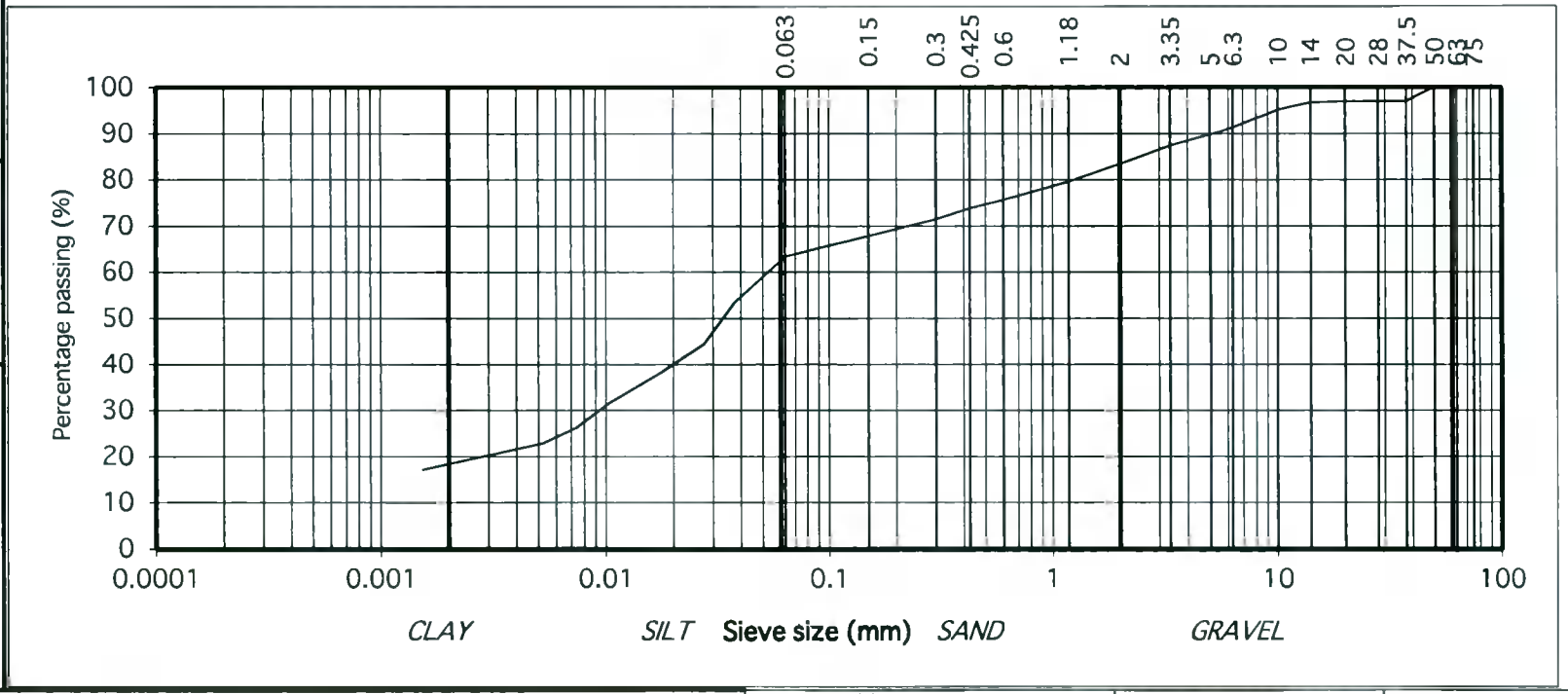
Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .



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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO 1151

particle size	% passing	
75	62	COBBLES
63	54	
50	41	GRAVEL
37.5	38	
28	36	
20	31	
14	29	
10	28	
6.3	26	
5	25	
3.35	25	
2	24	
1.18	23	SAND
0.6	23	
0.425	23	
0.3	22	
0.15	20	
0.063	18	SILT/CLAY

Contract No. 23300 Report No. R123786

Contract Name: Project Appollo , Grangecastle , Dublin 22

BH/TP* : TP10

Sample No.* AA148081 Lab. Sample No. A21/2789

Sample Type: B

Depth* (m) 0.50 Customer: Ramboll

Date Received 16/06/2021 Date Testing started 16/06/2021

Description: Grey clayey, sandy, GRAVEL with many cobbles

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2 Sample size did not meet the requirements of BS1377

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.

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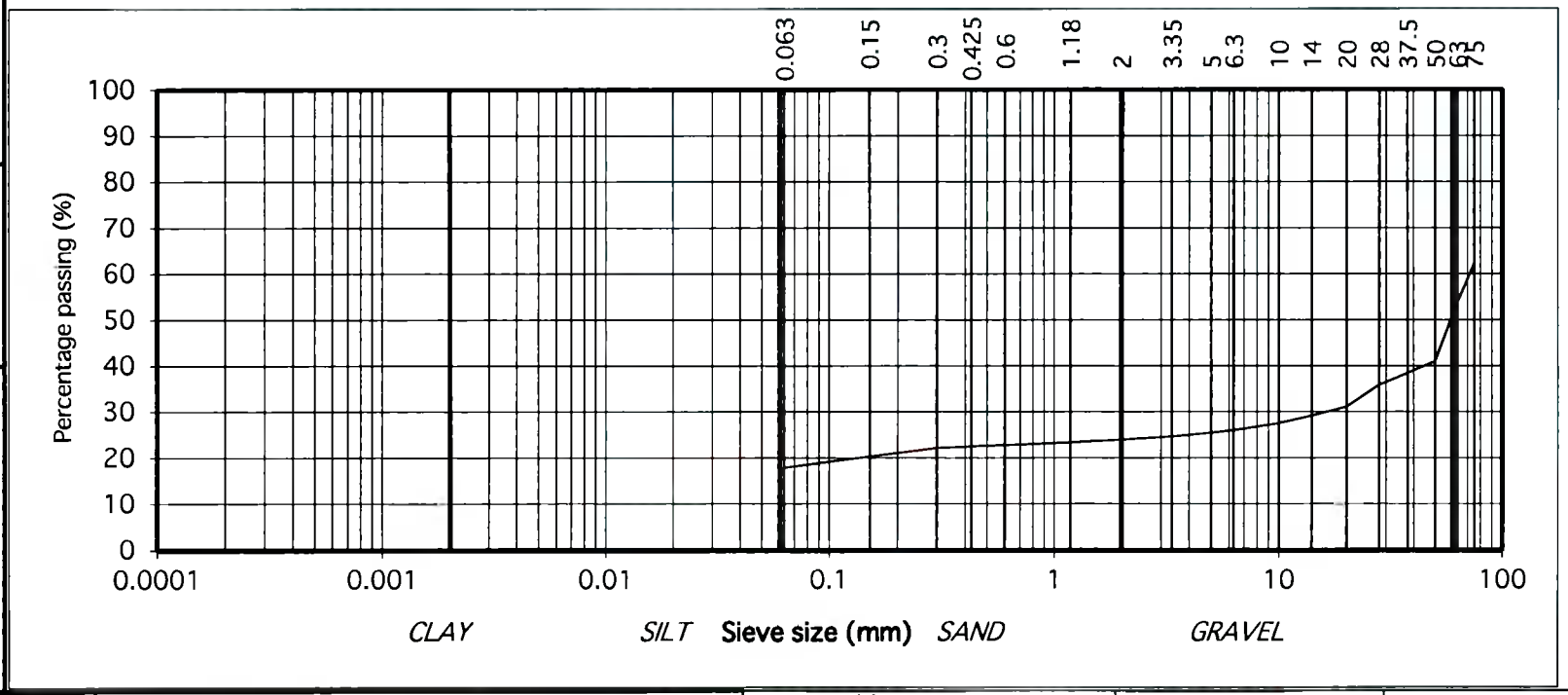

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	94	
28	93	
20	88	
14	87	
10	84	
6.3	83	
5	79	
3.35	77	
2	76	
1.18	75	SAND
0.6	74	
0.425	74	
0.3	73	
0.15	72	
0.063	68	SILT/CLAY
0.037	59	
0.027	52	
0.017	47	
0.010	41	
0.007	35	
0.005	29	
0.002	23	

Contract No. 23300 Report No. R123787
Contract Name: Project Appollo , Grangecastle , Dublin 22
BH/TP* : TP11
Sample No.* AA148085 Lab. Sample No. A21/2790
Sample Type: B
Depth* (m) 1.00 Customer: Ramboll
Date Received 16/06/2021 Date Testing started 16/06/2021
Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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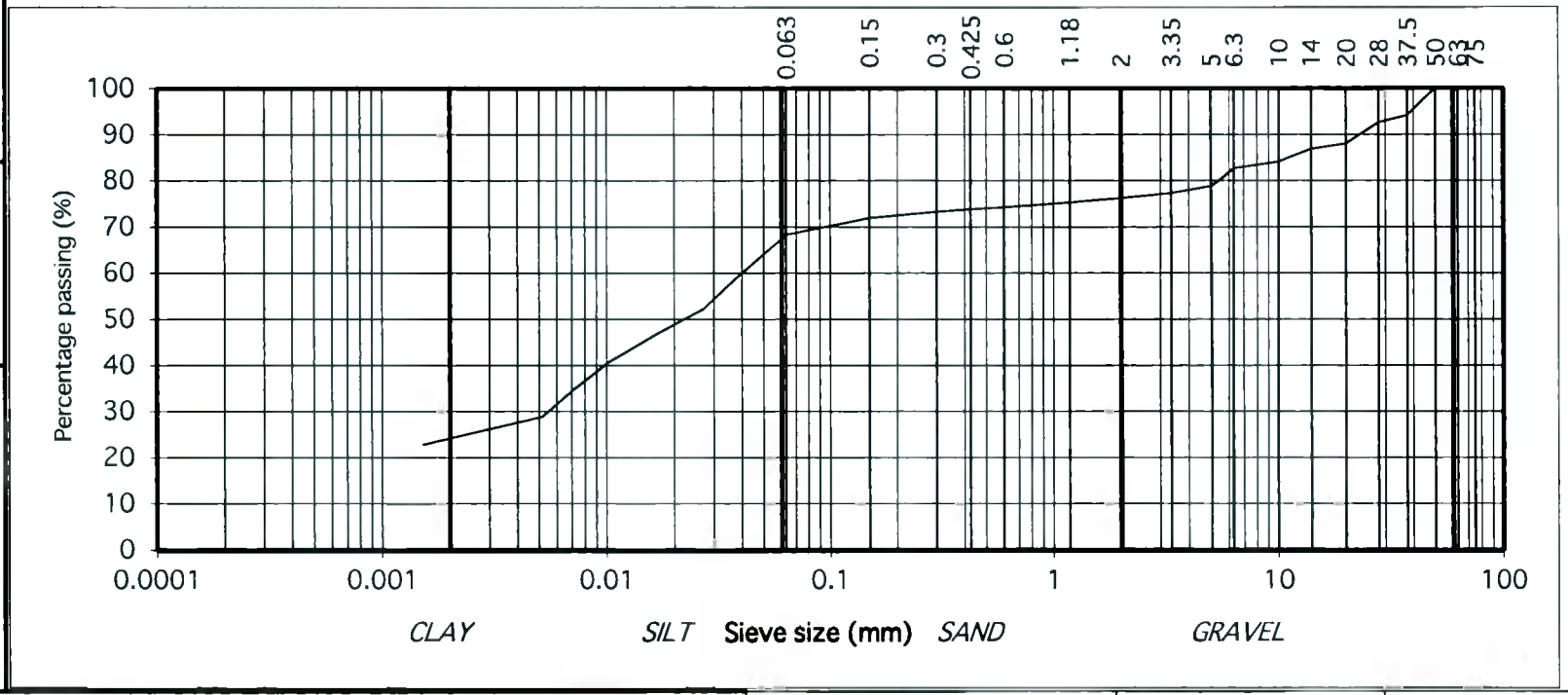

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Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT

Determination of Particle Size Distribution

Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**

(note: Sedimentation stage not accredited)

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO 1331

particle size	% passing	
75	100	COBBLES
63	100	
50	100	GRAVEL
37.5	100	
28	99	
20	98	
14	97	
10	96	
6.3	94	
5	93	
3.35	91	
2	89	
1.18	87	SAND
0.6	84	
0.425	82	
0.3	80	
0.15	76	
0.063	70	SILT/CLAY
0.037	60	
0.027	53	
0.017	48	
0.010	41	
0.007	36	
0.005	30	
0.002	19	

Contract No. 23300 Report No. R123788

Contract Name: Project Appollo , Grangecastle , Dublin 22

BH/TP* : TP12

Sample No.* AA148088 Lab. Sample No. A21/2792

Sample Type: B

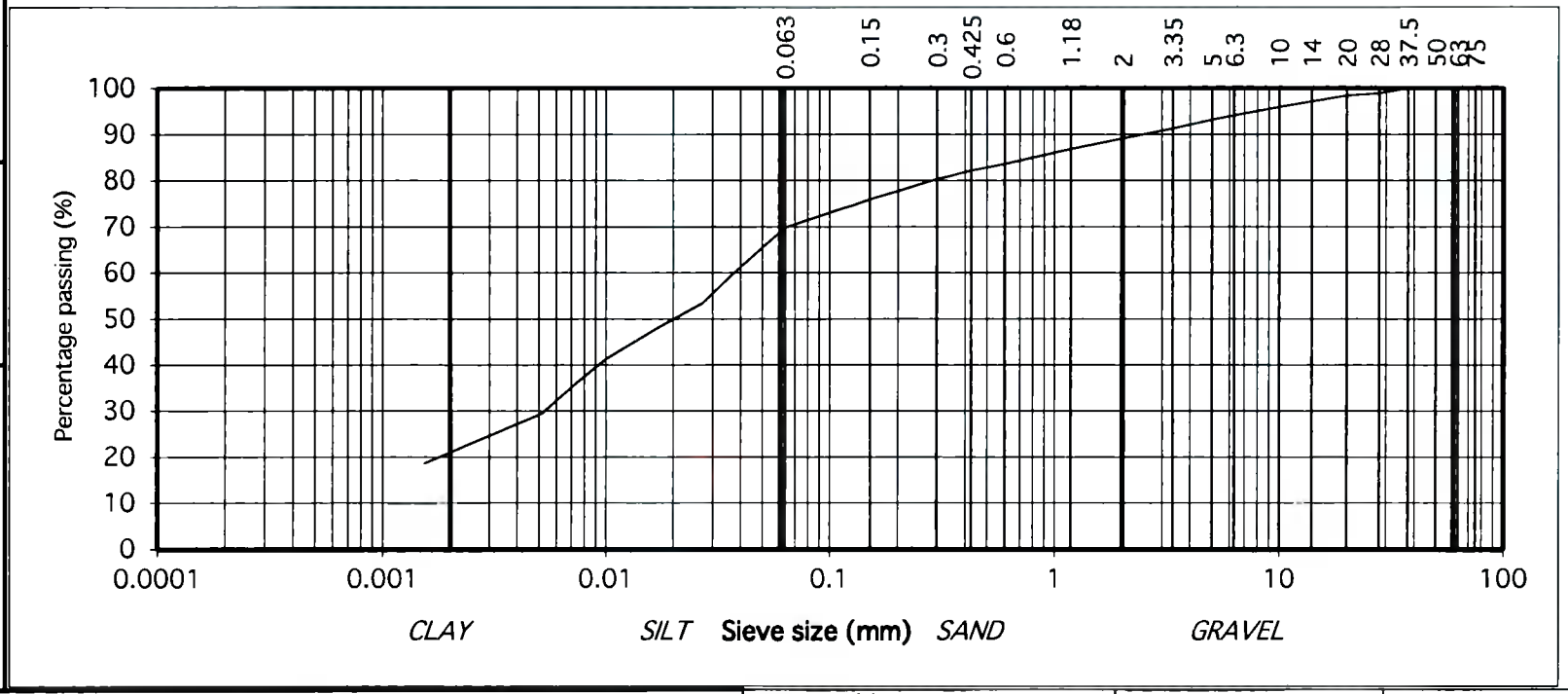
Depth* (m) 0.50 Customer: Ramboll

Date Received 16/06/2021 Date Testing started 16/06/2021

Description: Brown slightly sandy, slightly gravelly, CLAY

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.



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Approved by:	Date:	Page no:
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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

TEST REPORT
Determination of Particle Size Distribution
Tested in accordance with: BS1377:Part2:1990 , clause 9.2 & 9.5**
(note: Sedimentation stage not accredited)

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

particle size	% passing	
75	100	COBBLES
63	93	
50	76	GRAVEL
37.5	70	
28	67	
20	64	
14	62	
10	59	
6.3	57	
5	55	
3.35	53	
2	50	
1.18	47	SAND
0.6	45	
0.425	44	
0.3	42	
0.15	40	
0.063	37	SILT/CLAY
0.037	32	
0.027	29	
0.017	26	
0.010	22	
0.007	19	
0.005	17	
0.002	13	

Contract No. 23300 Report No. R123789
Contract Name: Project Appollo , Grangecastle , Dublin 22
BH/TP* : TP13
Sample No.* AA148093 Lab. Sample No. A21/2793
Sample Type: B
Depth* (m) 1.00 Customer: Ramboll
Date Received 16/06/2021 Date Testing started 16/06/2021
Description: Brown slightly sandy, gravelly, CLAY with some cobbles

Remarks Note: **Clause 9.2 and Clause 9.5 of BS1377:Part 2:1990 have been superseded by ISO17892-4:2016 .

Results relate only to the specimen tested in as received condition unless otherwise noted. * denotes Customer supplied information. Opinions and interpretations are outside the scope of accreditation.
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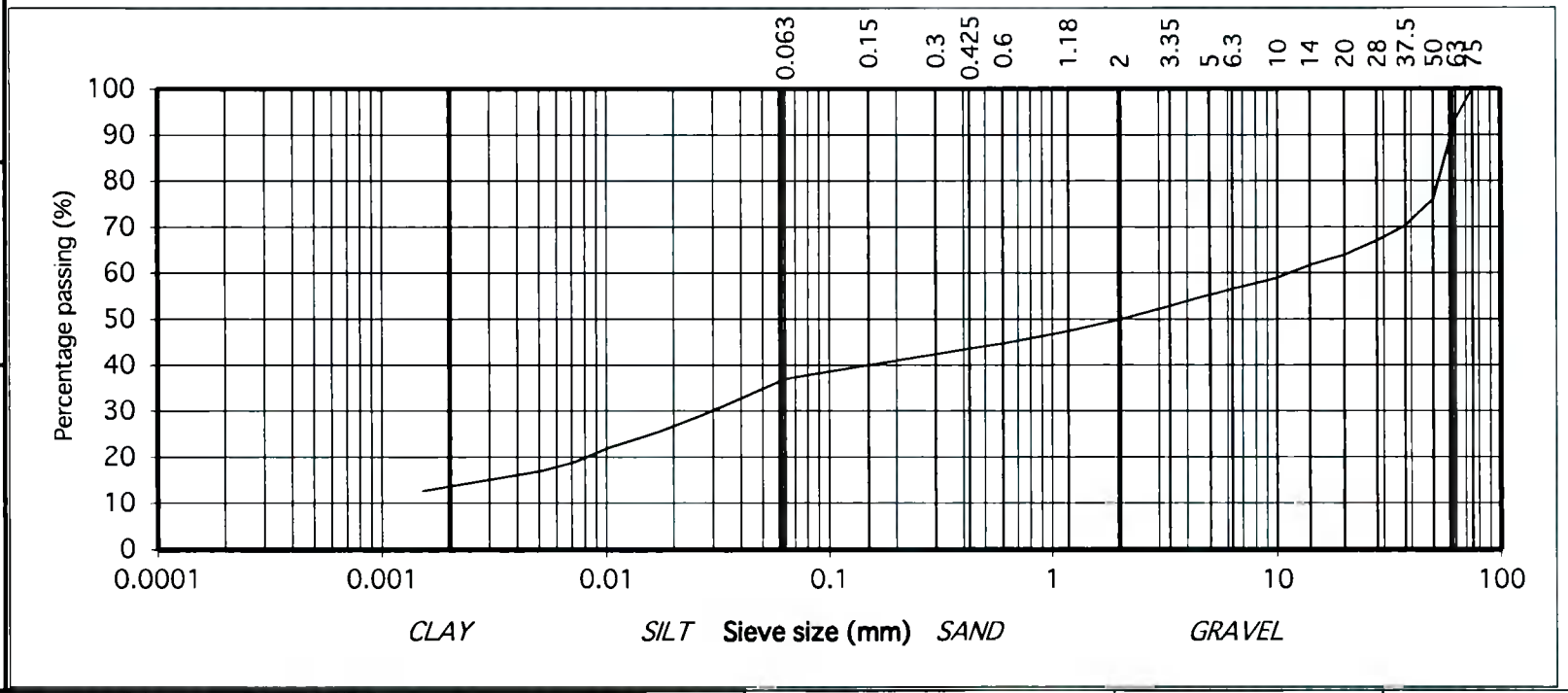

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Persons authorised to approve report: J Barrett (Quality Manager) H Byrne (Laboratory Manager)

IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124172**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP01
Sample No.*	AA143084
Depth* (m)	0.50
Sample Type:	B
Lab Sample No.	A21/2775
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	29/06/21
Sample Cert:	Not Provided
Moisture Content (%):	17
% Particles > 20mm (By dry mass):	35
MCV:	9
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY

Results relate only to the specimen tested, in as received condition unless otherwise noted.
Opinions and interpretations are outside the scope of accreditation.
* denotes Customer supplied information.
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Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124176**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP01
Sample No.*	AA143084
Depth* (m)	0.50
Sample Type:	B
Lab Sample No.	A21/2775
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	02/07/21
Sample Cert:	Not Provided
Moisture Content (%):	17
% Particles > 20mm (By dry mass):	35
MCV:	12.4
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY

Results relate only to the specimen tested, in as received condition unless otherwise noted.
Opinions and interpretations are outside the scope of accreditation.
* denotes Customer supplied information.
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Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

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IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas
Co. Kildare
045 899324

Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124177**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP01
Sample No.*	AA143084
Depth* (m)	0.50
Sample Type:	B
Lab Sample No.	A21/2775
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	02/07/21
Sample Cert:	Not Provided
Moisture Content (%):	16
% Particles > 20mm (By dry mass):	35
MCV:	13.8
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124178**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP01
Sample No.*	AA143084
Depth* (m)	0.50
Sample Type:	B
Lab Sample No.	A21/2775
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	02/07/21
Sample Cert:	Not Provided
Moisture Content (%):	15
% Particles > 20mm (By dry mass):	35
MCV:	16.8
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R123790**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP03
Sample No.*	AA143096
Depth* (m)	1.00
Sample Type:	B
Lab Sample No.	A21/2778
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	29/06/21
Sample Cert:	Not Provided
Moisture Content (%):	20
% Particles > 20mm (By dry mass):	70
MCV:	14.2
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124171**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP06
Sample No.*	AA148066
Depth* (m)	0.60
Sample Type:	B
Lab Sample No.	A21/2783
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	29/06/21
Sample Cert:	Not Provided
Moisture Content (%):	17
% Particles > 20mm (By dry mass):	68
MCV:	10.6
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124190**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP06
Sample No.*	AA148066
Depth* (m)	0.60
Sample Type:	B
Lab Sample No.	A21/2783
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	06/07/21
Sample Cert:	Not Provided
Moisture Content (%):	14
% Particles > 20mm (By dry mass):	68
MCV:	12.6
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY 1% Lime added

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124191**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP06
Sample No.*	AA148066
Depth* (m)	0.60
Sample Type:	B
Lab Sample No.	A21/2783
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	06/07/21
Sample Cert:	Not Provided
Moisture Content (%):	14
% Particles > 20mm (By dry mass):	68
MCV:	17
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY 2% Lime added

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124192**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP06
Sample No.*	AA148066
Depth* (m)	0.60
Sample Type:	B
Lab Sample No.	A21/2783
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	06/07/21
Sample Cert:	Not Provided
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	68
MCV:	17.2
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY 3% Lime added

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Determination of Moisture Condition Value at Natural Moisture Content

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Report No.	**R123791**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP07
Sample No.*	AA148072
Depth* (m)	1.00
Sample Type:	B
Lab Sample No.	A21/2784
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	29/06/21
Sample Cert:	Not Provided
Moisture Content (%):	13
% Particles > 20mm (By dry mass):	68
MCV:	12
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, gravelly, CLAY

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

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Report No.	**R123793**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP10
Sample No.*	AA148081
Depth* (m)	0.50
Sample Type:	B
Lab Sample No.	A21/2789
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	29/06/21
Sample Cert:	Not Provided
Moisture Content (%):	12
% Particles > 20mm (By dry mass):	80
MCV:	12.8
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Grey clayey, sandy, GRAVEL with many cobbles

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124173**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP12
Sample No.*	AA143084
Depth* (m)	0.50
Sample Type:	B
Lab Sample No.	A21/2792
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	29/06/21
Sample Cert:	Not Provided
Moisture Content (%):	18
% Particles > 20mm (By dry mass):	9
MCV:	10.3
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124184**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP12
Sample No.*	AA143084
Depth* (m)	0.50
Sample Type:	B
Lab Sample No.	A21/2792
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	02/07/21
Sample Cert:	Not Provided
Moisture Content (%):	16
% Particles > 20mm (By dry mass):	9
MCV:	13.2
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY 1% Lime added

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124183**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP12
Sample No.*	AA143084
Depth* (m)	0.50
Sample Type:	B
Lab Sample No.	A21/2792
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	02/07/21
Sample Cert:	Not Provided
Moisture Content (%):	16
% Particles > 20mm (By dry mass):	9
MCV:	15
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY 2% Lime added

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Test Report

Determination of Moisture Condition Value at Natural Moisture Content

Tested in accordance with BS1377:Part 4:1990, clause 5.4

Report No.	**R124185**
Contract No.	23300
Contract Name:	Project Appollo , Grangecastle , Dublin 22
Customer:	Ramboll
BH/TP*	TP12
Sample No.*	AA143084
Depth* (m)	0.50
Sample Type:	B
Lab Sample No.	A21/2792
Source* (if applicable)	N/A
Material Type* (if applicable):	B
Sample Received:	16/06/21
Date Tested:	02/07/21
Sample Cert:	Not Provided
Moisture Content (%):	15
% Particles > 20mm (By dry mass):	9
MCV:	16.4
Interpretation of Plot:	Steepest Straight Line
Description of Soil:	Brown slightly sandy, slightly gravelly, CLAY 3% Lime added

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1391

Report No. R124636 Contract No. 23300

Contract Name: Project Appollo , Grangecastle , Dublin 22

Location*: TP01

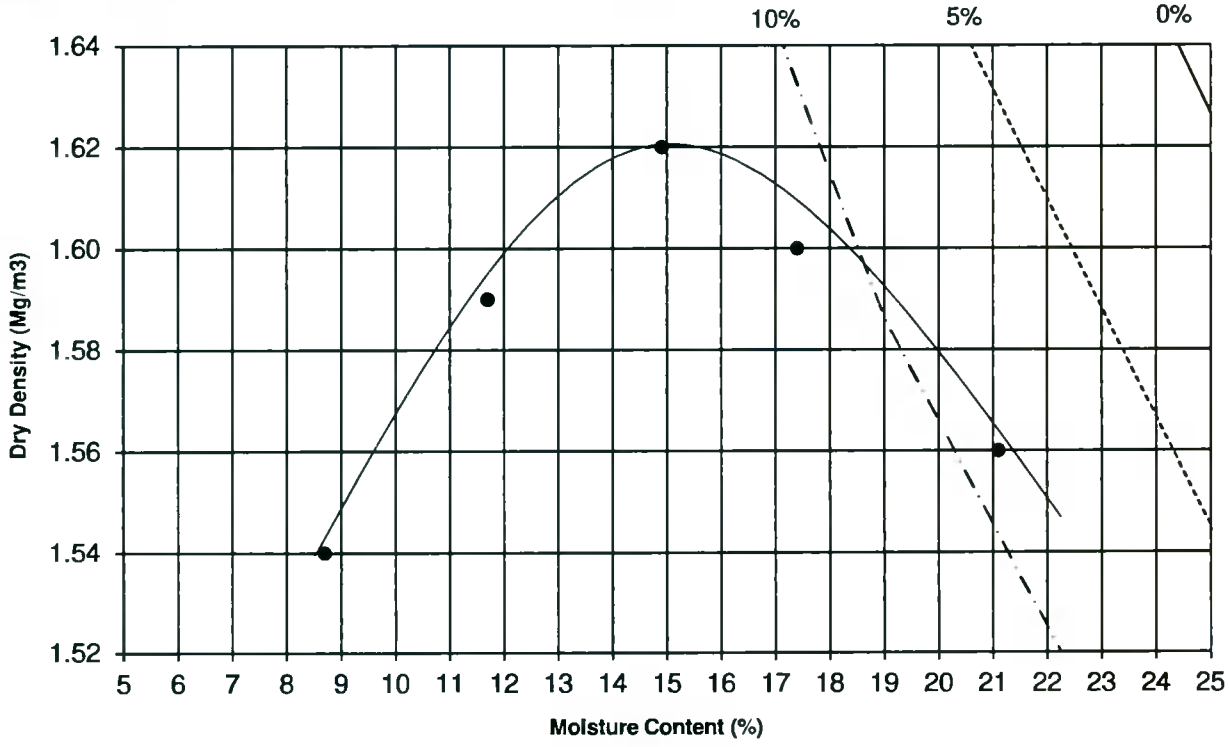
Sample No*. AA148084 Depth* (m) 1 Material Type B

Lab sample no. A21/2775 Customer: Ramboll

Date Received: 16/06/2021 Test Method: 2.5 KG Rammer

Date Tested: 07/07/2021 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.62	1.59	1.54	1.60	1.56	0.00	
Moisture Content (%)	15	12	9	17	21	0	



Maximum Dry Density (Mg/m^3): 1.62 Optimum Moisture Content (%): 15

Description: Brown slightly sandy, slightly gravelly, CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 31

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R124058 Contract No. 23300

Contract Name: Project Appollo , Grangecastle , Dublin 22

Location*: TP 03

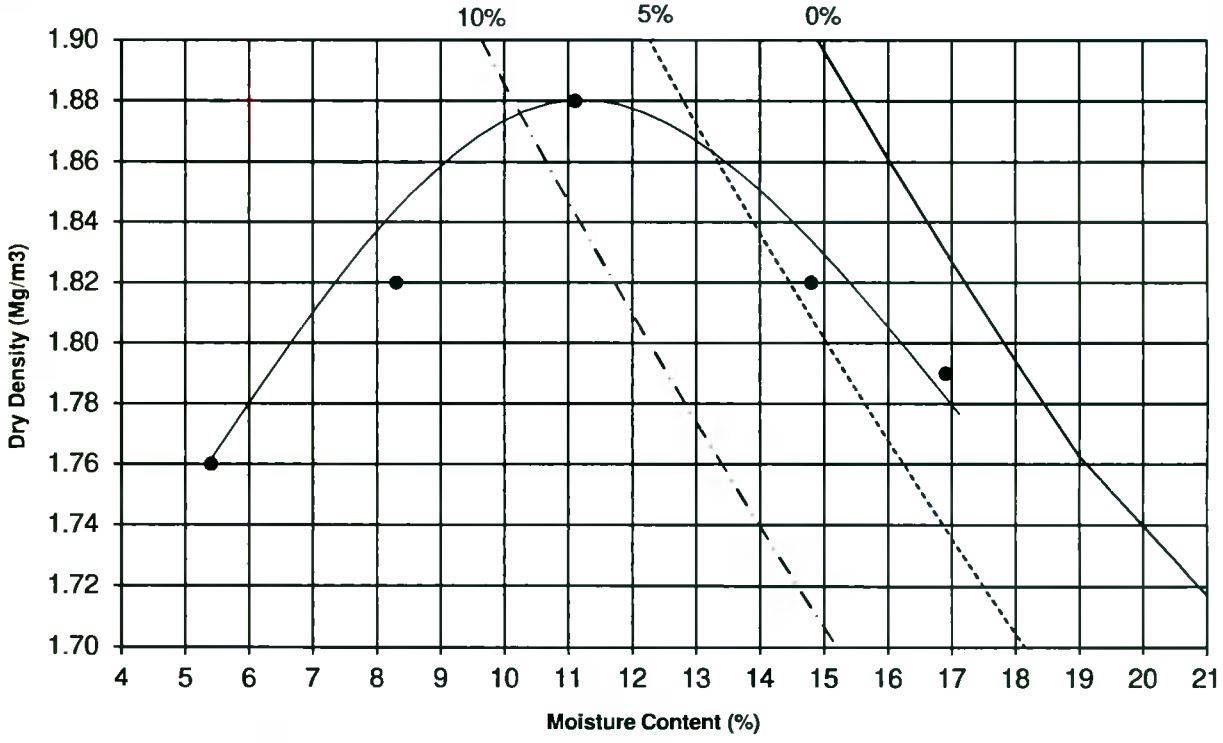
Sample No*. AA143096 Depth* (m) 1 Material Type B

Lab sample no. A21/2778 Customer: Ramboll

Date Received: 16/06/2021 Test Method: 2.5 KG Rammer

Date Tested: 06/07/2021 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.79	1.82	1.88	1.82	1.76	0.00	
Moisture Content (%)	17	15	11	8.3	5.4	0	



Maximum Dry Density (Mg/m^3): 1.88 Optimum Moisture Content (%): 11

Description: Brown slightly sandy, slightly gravelly, CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 60

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R124637 Contract No. 23300

Contract Name: Project Appollo , Grangecastle , Dublin 22

Location*: TP06

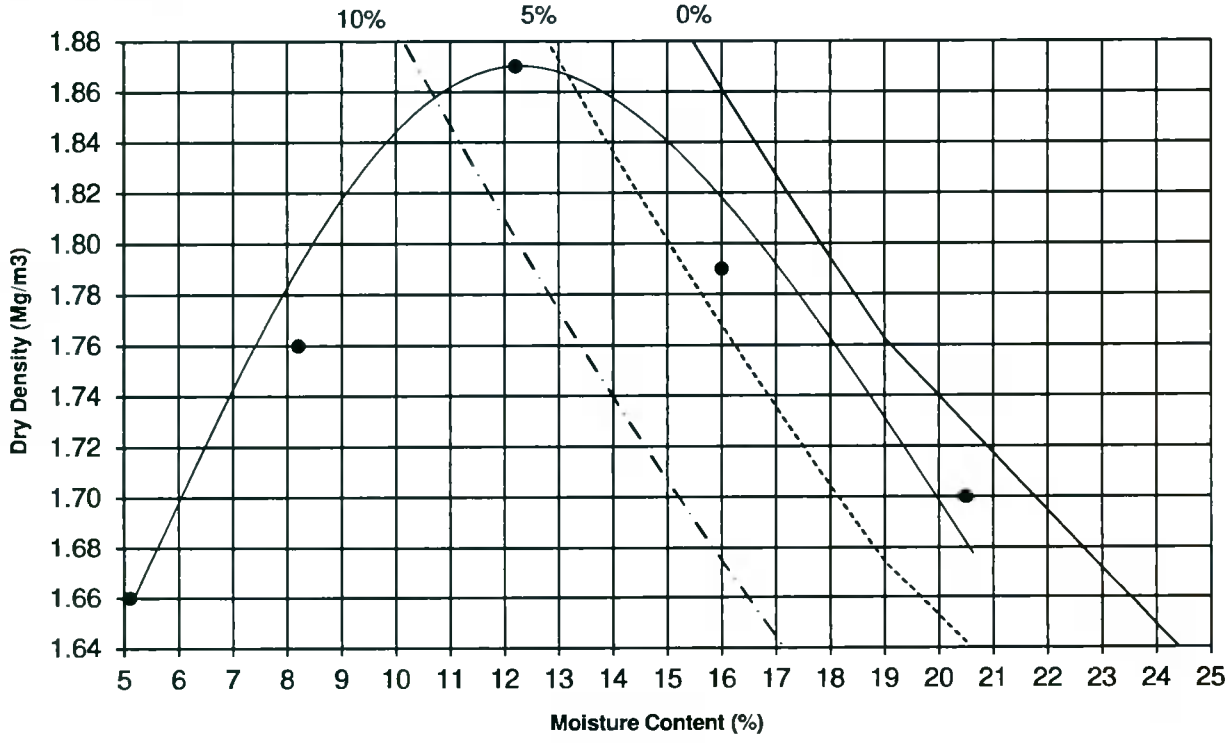
Sample No*. AA148066 Depth* (m) 1 Material Type B

Lab sample no. A21/2783 Customer: Ramboll

Date Received: 16/06/2021 Test Method: 2.5 KG Rammer

Date Tested: 07/07/2021 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.66	1.70	1.79	1.87	1.76	0.00	
Moisture Content (%)	5	21	16	12	8	0	



Maximum Dry Density (Mg/m^3): 1.87 Optimum Moisture Content (%): 12

Description: Brown slightly sandy, slightly gravelly, CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 26

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Dry Density/Moisture Content Relationship

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ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R123969 Contract No. 23300

Contract Name: Project Appollo , Grangecastle , Dublin 22

Location*: TP07

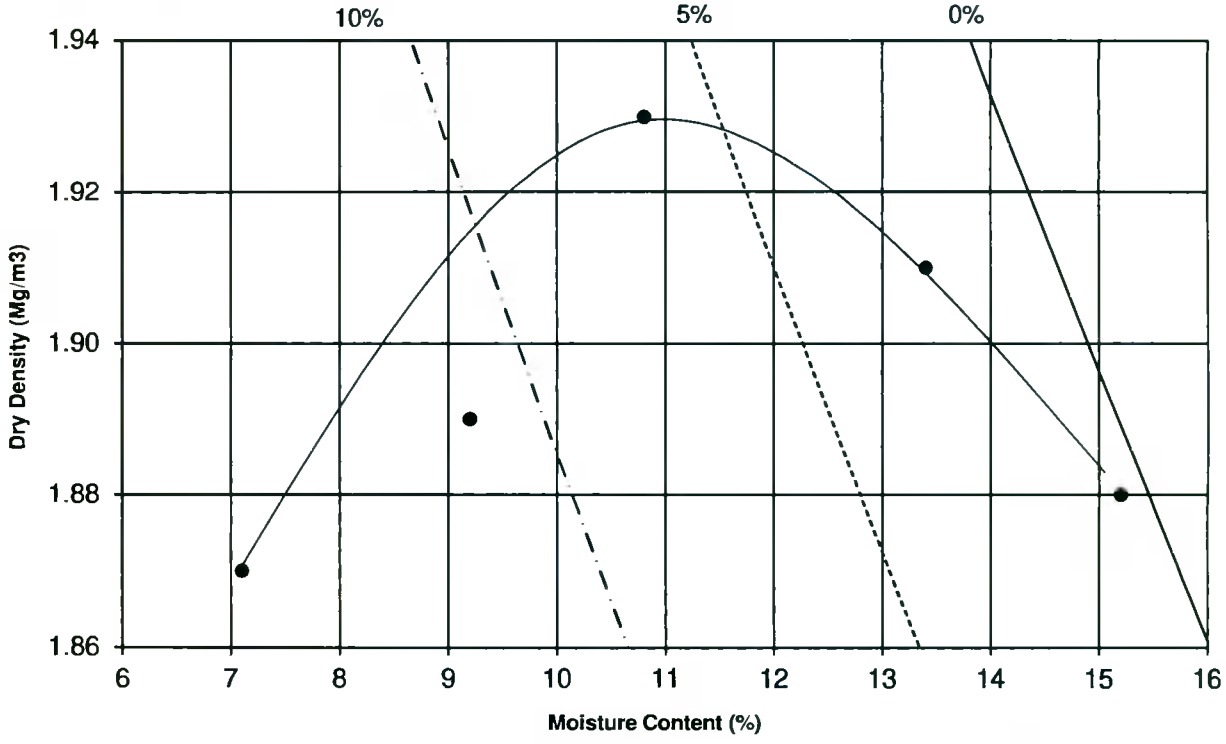
Sample No*. AA148072 Depth* (m) 1 Material Type B

Lab sample no. A21/2784 Customer: Ramboll

Date Received: 16/06/2021 Test Method: 2.5 KG Rammer

Date Tested: 07/07/2021 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.91	1.87	1.89	1.93	1.88	0.00	
Moisture Content (%)	13	7	9	11	15	0	



Maximum Dry Density (Mg/m^3): 1.93 Optimum Moisture Content (%): 11

Description: Brown slightly sandy, gravelly, CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 61

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Test Report

Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 IVNAB ACCREDITED TESTING DETAILS IN SCOPE REG NO. 134T

Report No. R123970 Contract No. 23300

Contract Name: Project Appollo , Grangecastle , Dublin 22

Location*: TP10

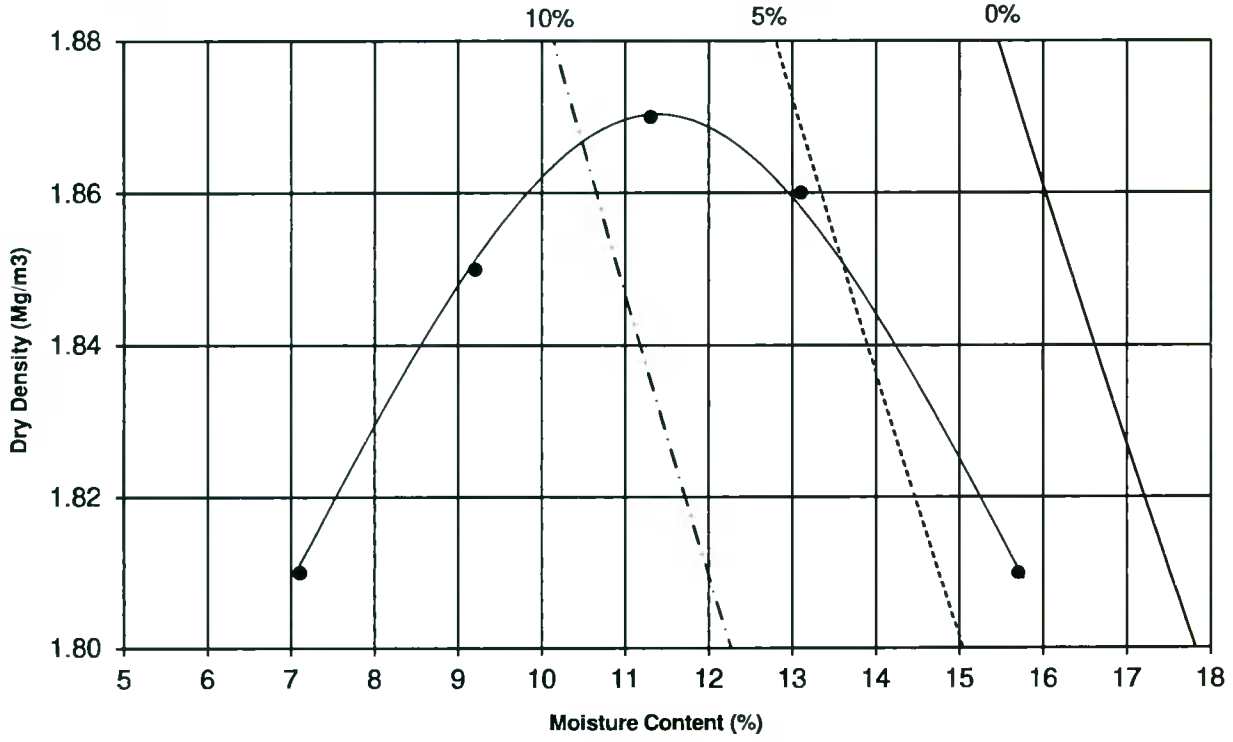
Sample No*. AA148081 Depth* (m) 0.5 Material Type B

Lab sample no. A21/2789 Customer: Ramboll

Date Received: 16/06/2021 Test Method: 2.5 KG Rammer

Date Tested: 06/07/2021 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.87	1.81	1.85	1.86	1.81	0.00	
Moisture Content (%)	11	7	9	13	16	0	



Maximum Dry Density (Mg/m^3): 1.87 Optimum Moisture Content (%): 11

Description: Grey clayey, sandy, GRAVEL with many cobbles

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 72

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Dry Density/Moisture Content Relationship

Tested in accordance with BS1377:Part 4:1990

ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No. R124638 Contract No. 23300

Contract Name: Project Appollo , Grangecastle , Dublin 22

Location*: TP12

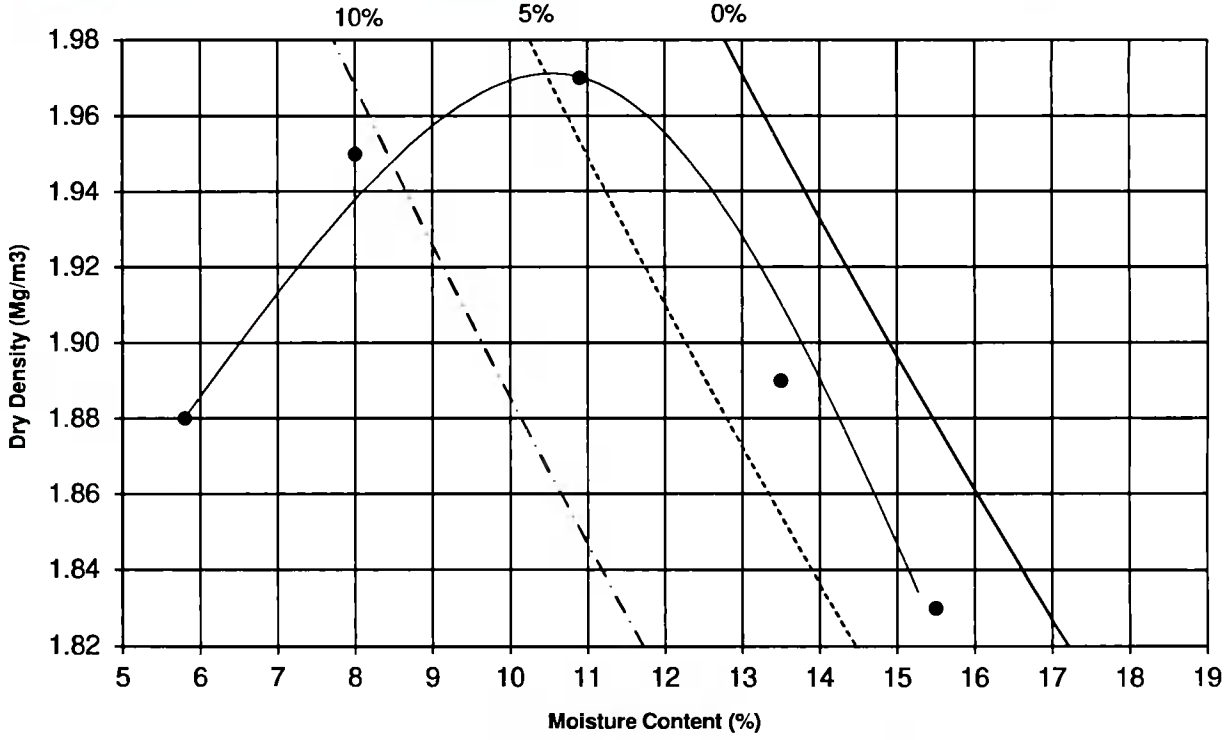
Sample No*. AA148088 Depth* (m) 1 Material Type B

Lab sample no. A21/2792 Customer: Ramboll

Date Received: 16/06/2021 Test Method: 2.5 KG Rammer

Date Tested: 07/07/2021 BS1377:Part 4:1990 3.3

Dry Density (Mg/m^3)	1.83	1.89	1.97	1.95	1.88	0.00	
Moisture Content (%)	16	14	11	8	6	0	



Maximum Dry Density (Mg/m^3): 1.97 Optimum Moisture Content (%): 11

Description: Brown slightly sandy, slightly gravelly, CLAY

Sample Preparation: Material passing 20mm ~~Single~~ / Separate samples used

Particle Density (Mg/m^3): 2.65 Particle Density: Assumed

% retained on 20/37.5mm sieve: 7

Results relate only to the specimen tested, in as received condition unless otherwise noted.
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Persons authorised to approve reports
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

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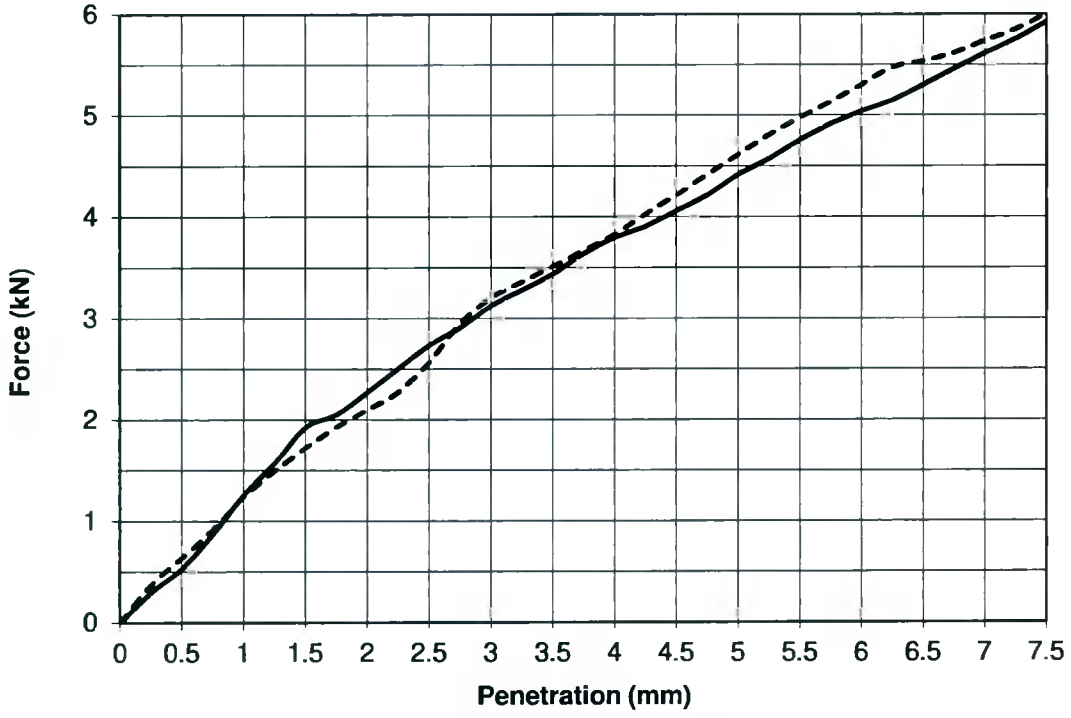
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING

Report No.	R123267	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	25/06/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.16
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.88
% Material >20mm:	31		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**23**	**23**
Moisture Content %	15	15

Results relate only to the specimen tested, in as received condition unless otherwise noted

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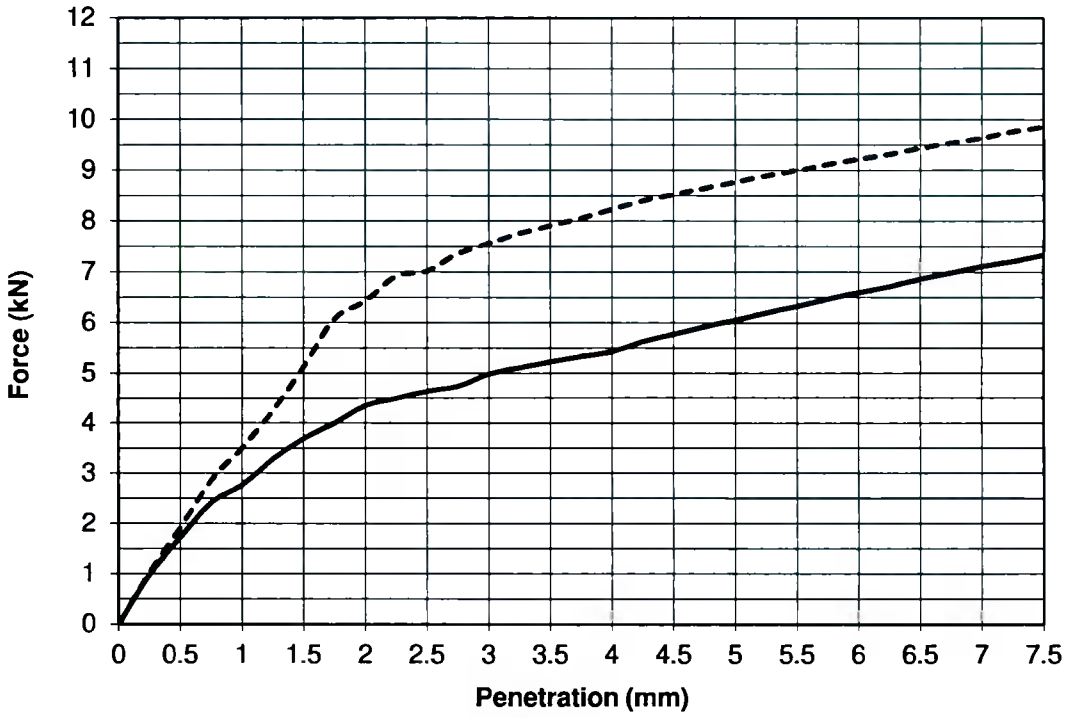
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 INAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 137T

Report No.	R123793	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	28/06/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 1% Lime/3 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.21
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.91
% Material >20mm:	31		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**35**	**53**
Moisture Content %	16	15

Results relate only to the specimen tested, in as received condition unless otherwise noted

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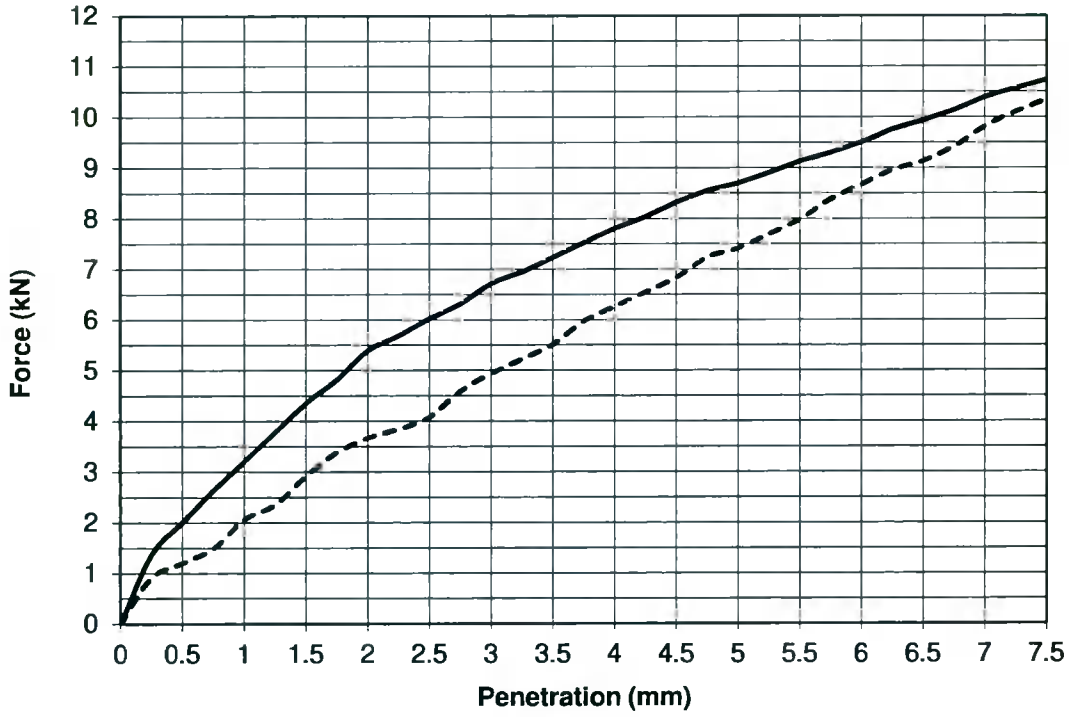
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1

Report No.	R124639	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 1% Lime/7 Days Soaked		
Initial Condition:	Soaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.19
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.91
% Material >20mm:	33		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**46**	**37**
Moisture Content %	14	15

Results relate only to the specimen tested, in as received condition unless otherwise noted

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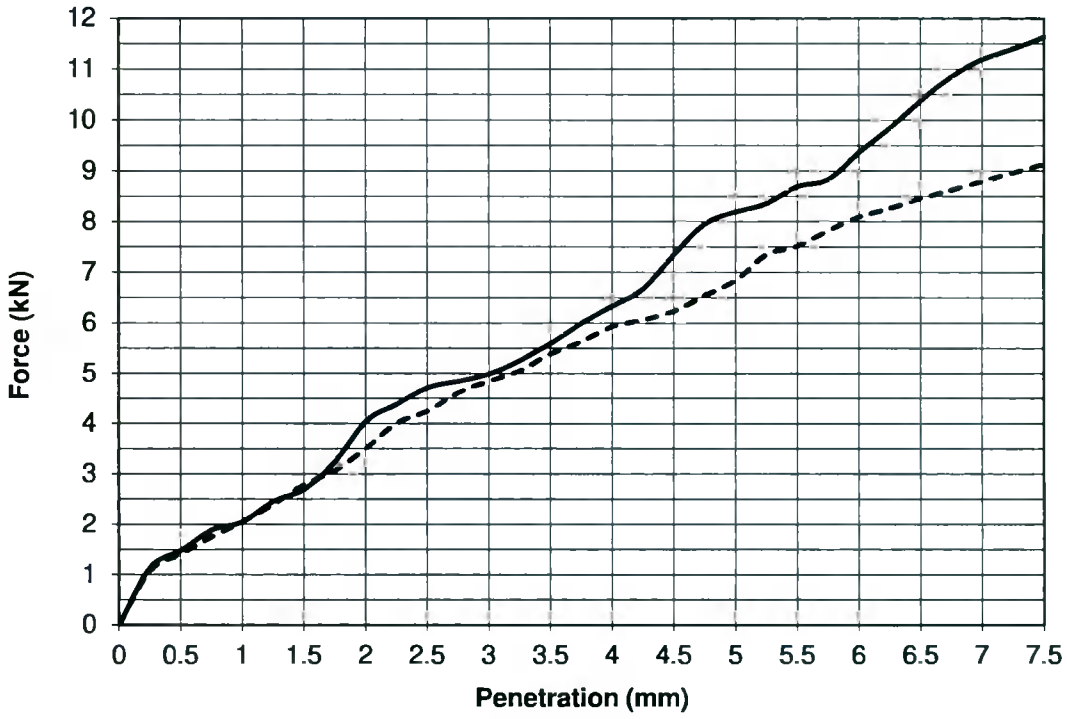
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1201

Report No.	R124644	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 1% Lime/14 Days Soaked		
Initial Condition:	Soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.09
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.83
% Material >20mm:	33		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**41**	**34**
Moisture Content %	14	14

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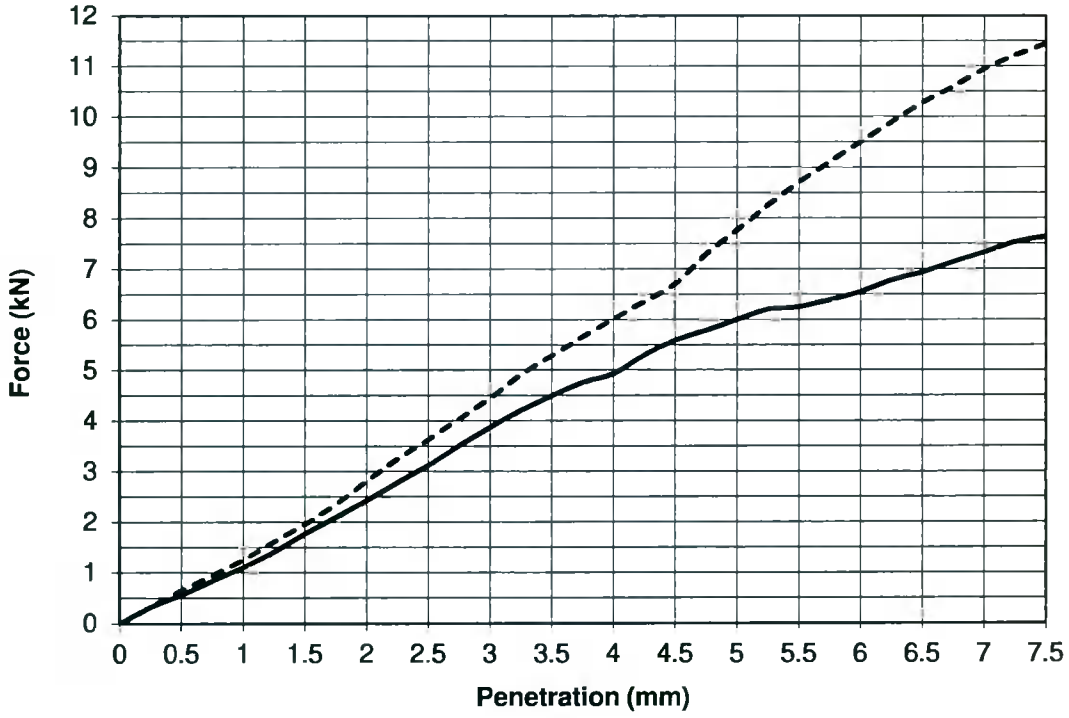
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILS IN SCOPE REG NO. 1321

Report No.	R124173	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	07/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 2% Lime/3 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.16
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.87
% Material >20mm:	31		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**31**	**39**
Moisture Content %	15	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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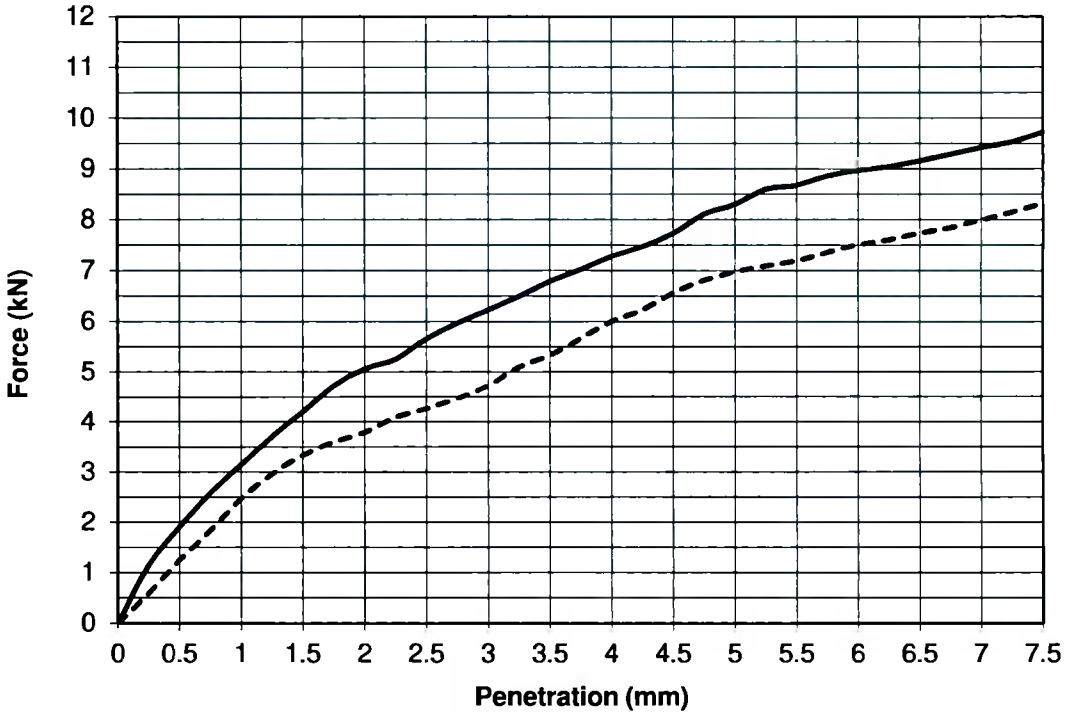
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1331

Report No.	R124640	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 2% Lime/7 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.12
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.84
% Material >20mm:	33		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**43**	**35**
Moisture Content %	14	15

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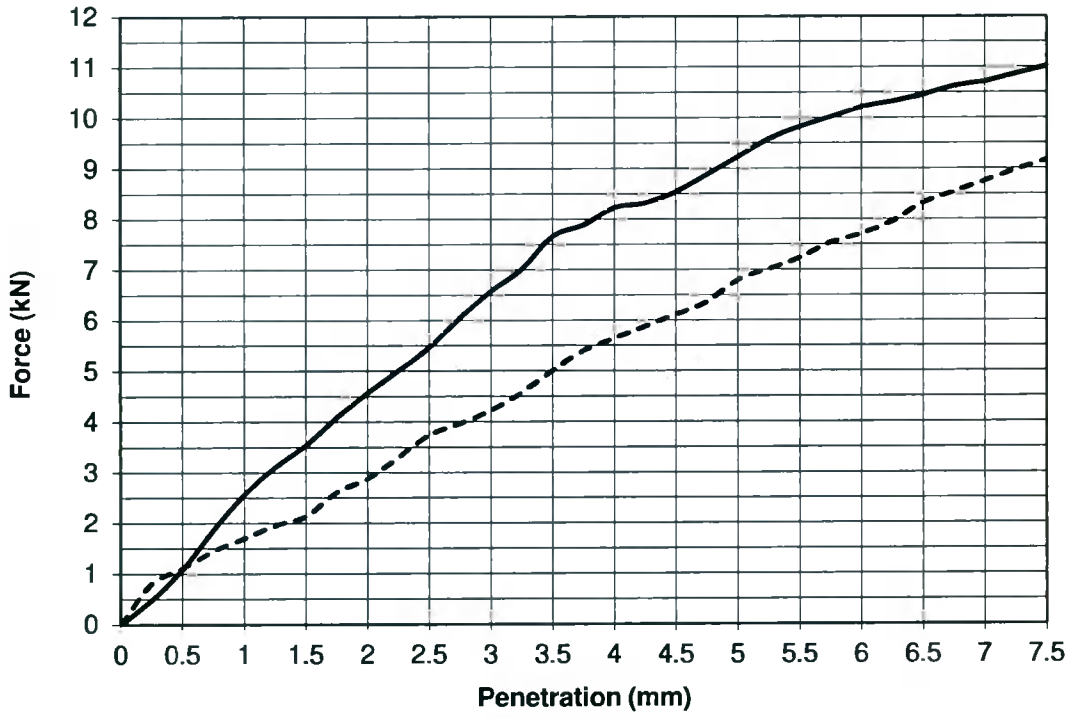
TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124645	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 2% Lime/14 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.08
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.83
% Material >20mm:	33		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**47**	**34**
Moisture Content %	14	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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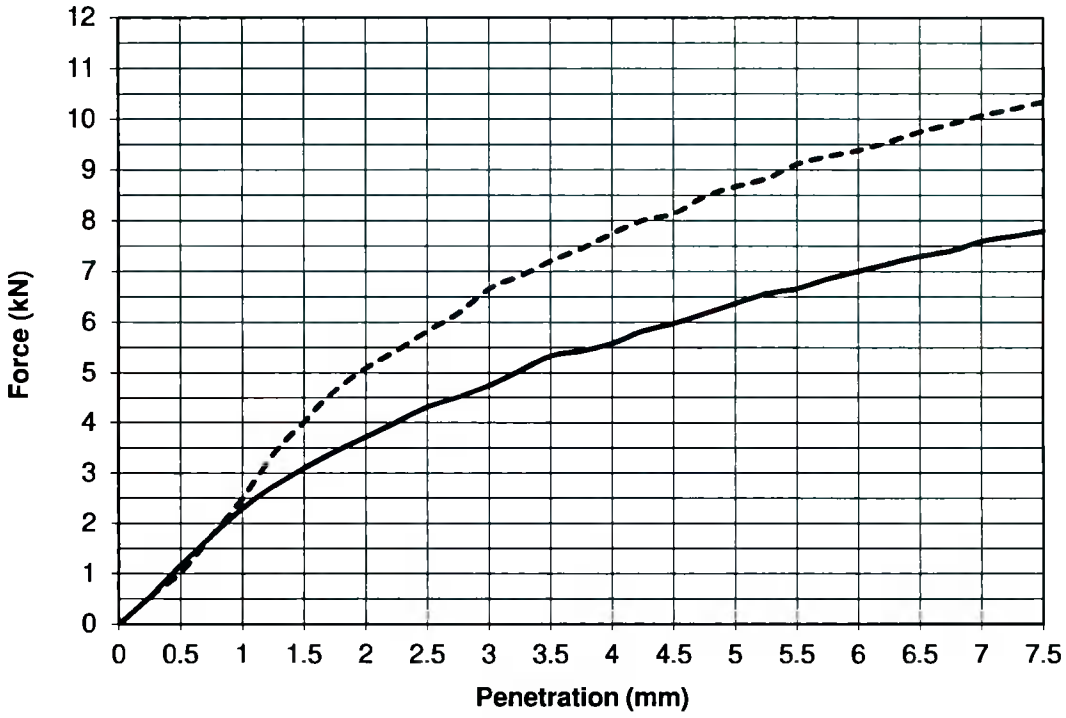
TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124174	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	07/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 3% Lime/3 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.17
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.90
% Material >20mm:	33		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**31**	**44**
Moisture Content %	14	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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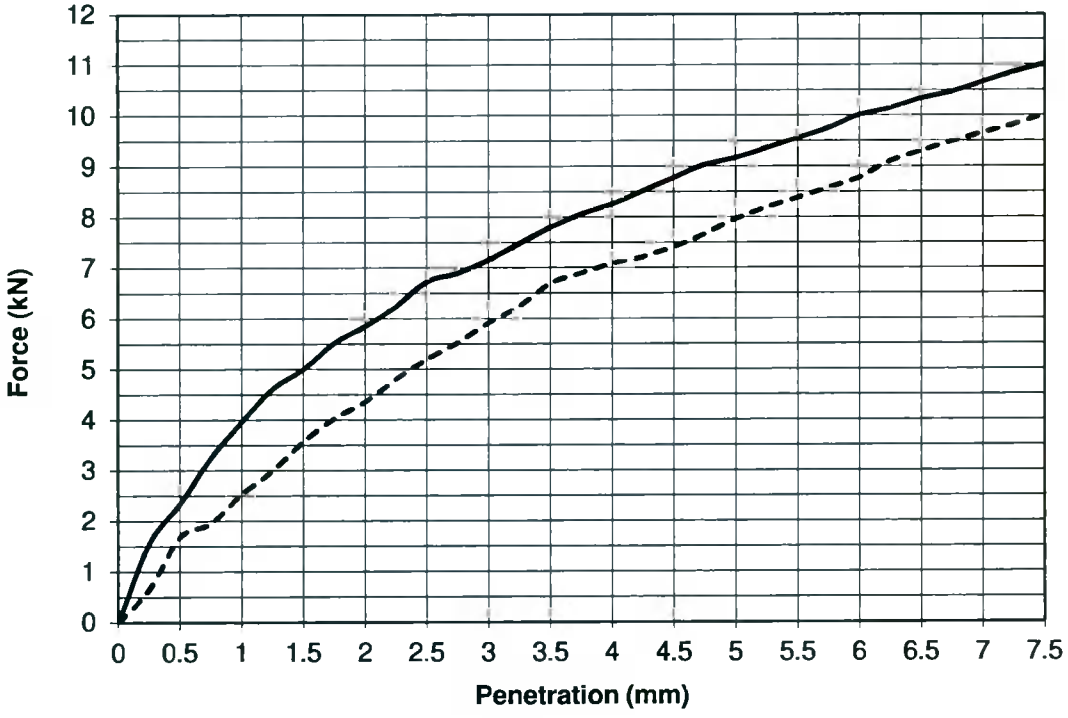
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124641	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 3% Lime/7 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.14
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.90
% Material >20mm:	33		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**51**	**39**
Moisture Content %	14	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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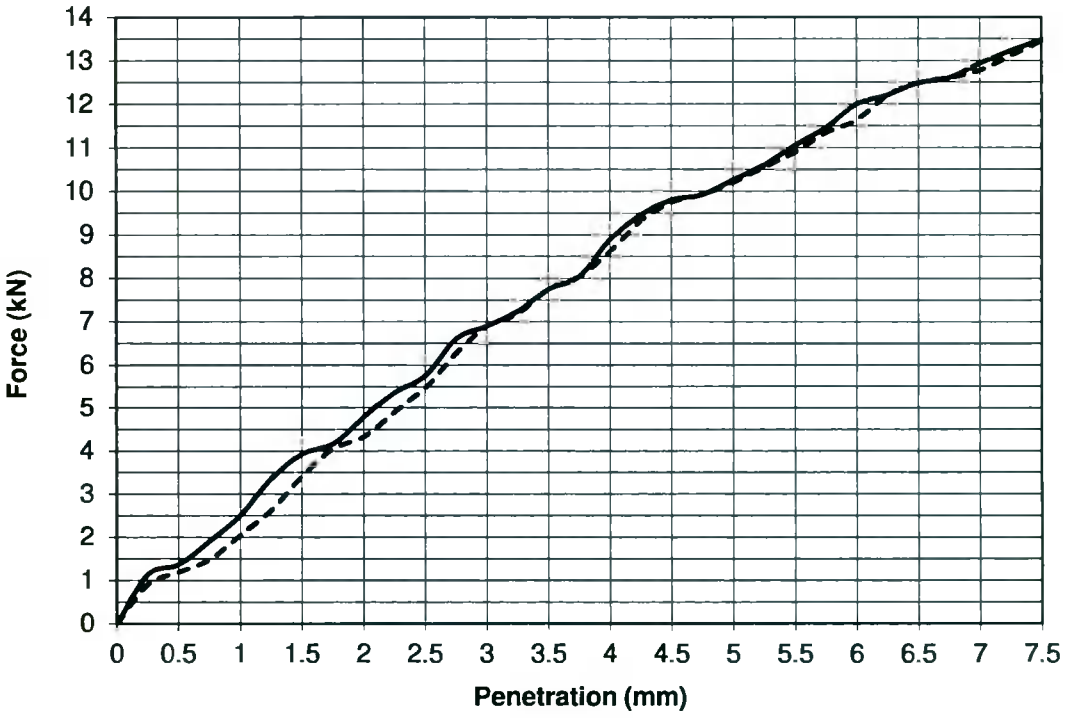
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 INAB ACCREDITED TESTING

Report No.	R124643	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 3% Lime/14 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	13	Bulk Density (Mg/m^3):	2.10
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.86
% Material >20mm:	33		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**51**	**51**
Moisture Content %	13	13

Results relate only to the specimen tested, in as received condition unless otherwise noted

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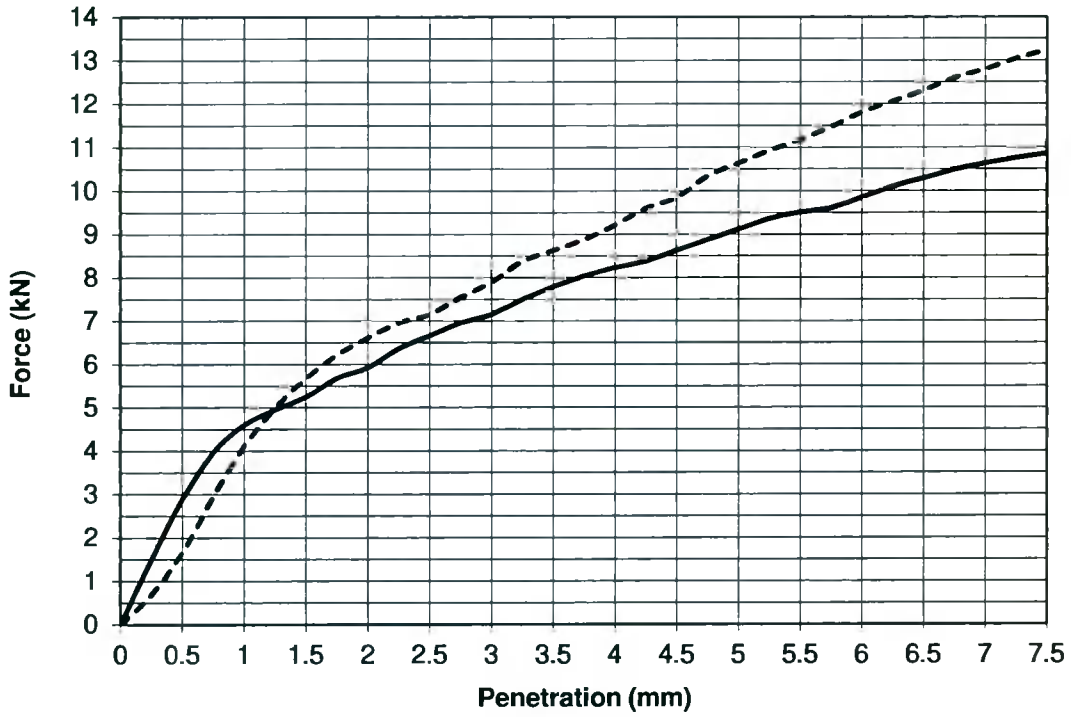
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124174	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	07/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 1% Lime 2% Cement/3 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.19
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.92
% Material >20mm:	50		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**54**	**44**
Moisture Content %	14	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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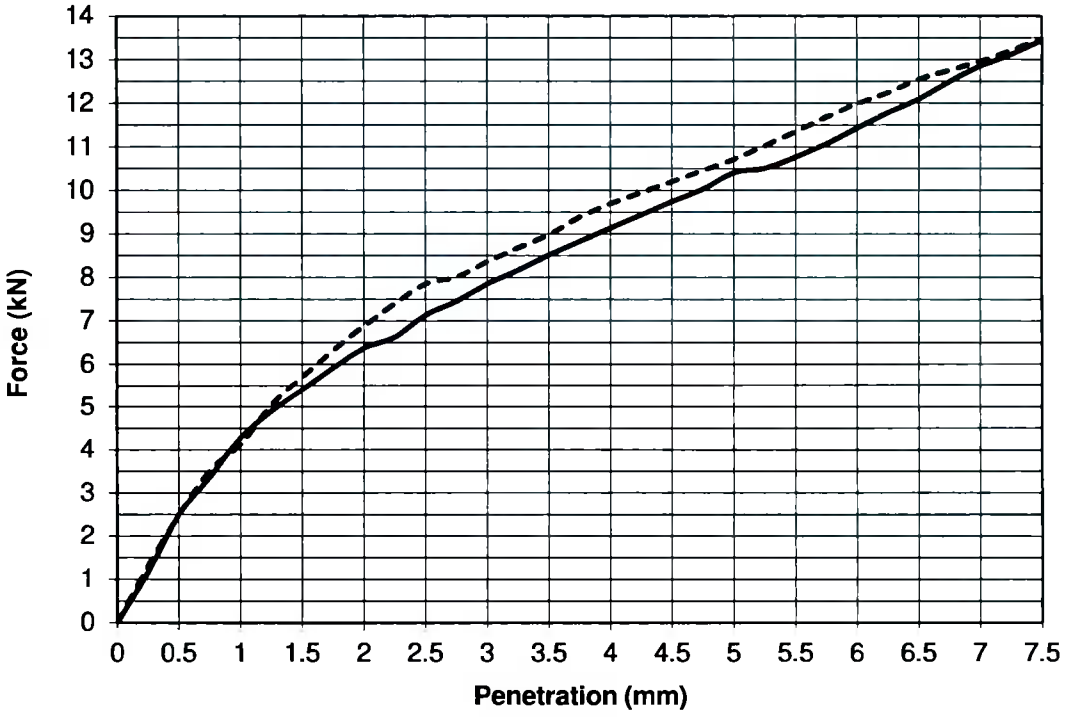
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133

Report No.	R124642	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 1% Lime 2% Cement/7 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.17
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.90
% Material >20mm:	50		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**54**	**59**
Moisture Content %	14	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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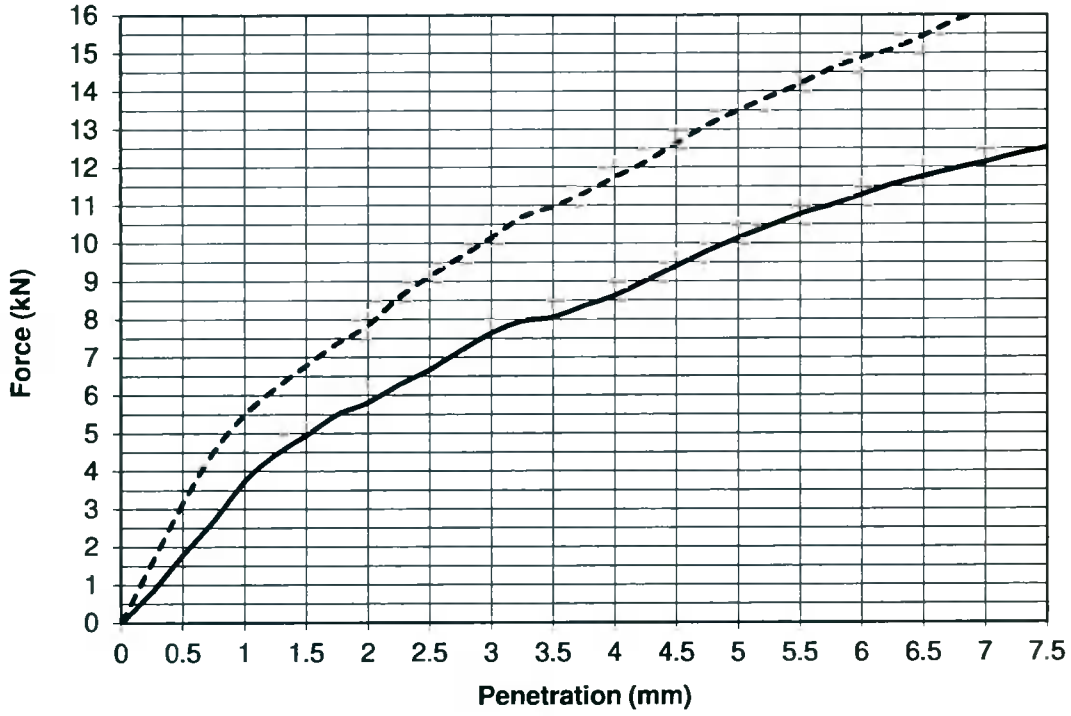
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1317

Report No.	R124646	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP01	Sample No.*	AA143084 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2775



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY - 1% Lime 2% Cement/14 Days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	13	Bulk Density (Mg/m^3):	2.13
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.88
% Material >20mm:	33		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**51**	**69**
Moisture Content %	13	13

Results relate only to the specimen tested, in as received condition unless otherwise noted

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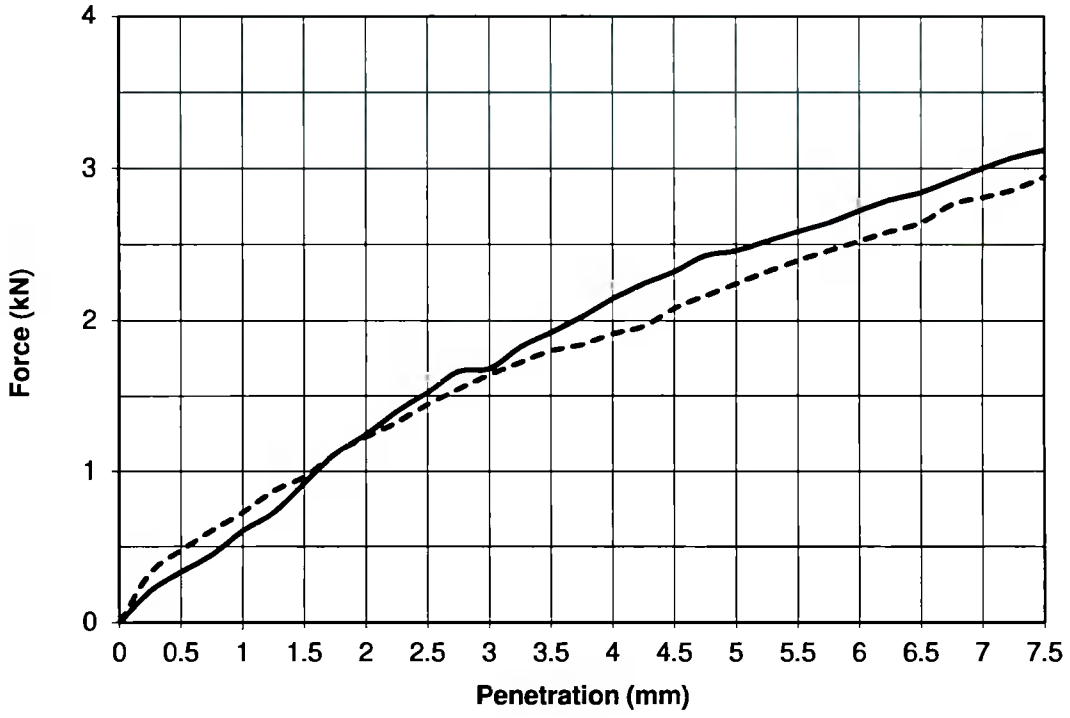
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	R124214	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	06/07/21
BH/TP No.*	TP03	Sample No.*	AA143096 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2778



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	18	Bulk Density (Mg/m^3):	2.09
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.76
% Material >20mm:	60		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**12**	**11**
Moisture Content %	18	18

Results relate only to the specimen tested, in as received condition unless otherwise noted

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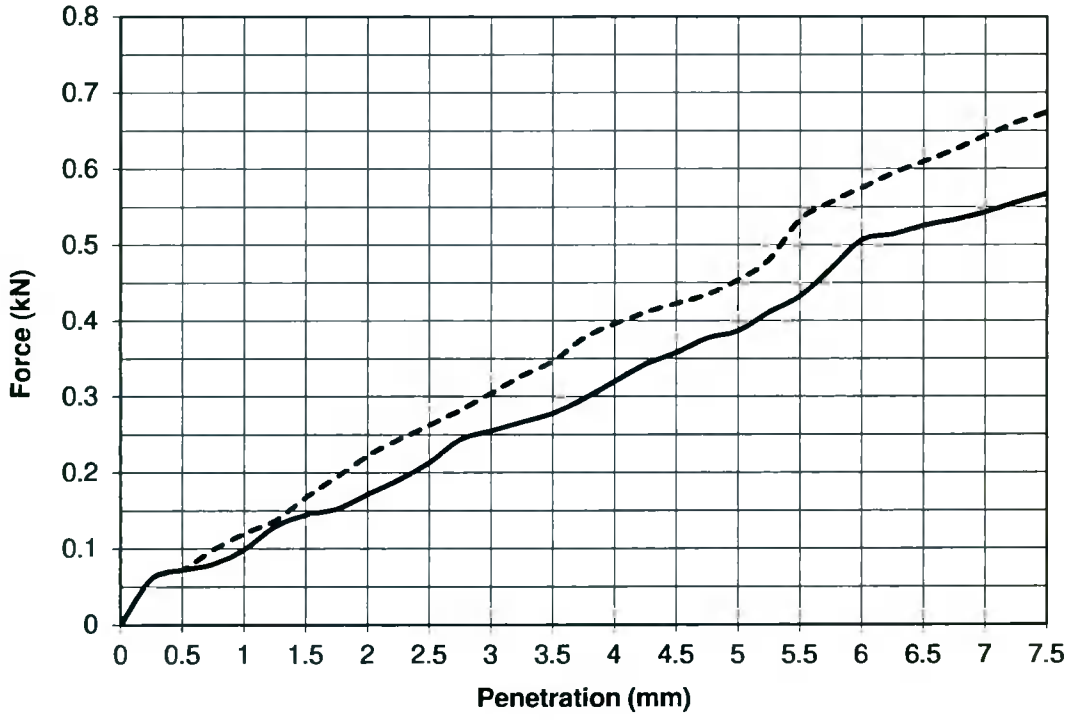
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILS IN SCOPE REG NO. 13

Report No.	R123268	Contract	Project Apollo		
Contract No.	23300	Customer	Ramboll		
Date received	16/06/21	Date Tested	25/06/21		
BH/TP No.*	TP06	Sample No.*	A	Type:	B
Depth* (m)	0.60	Lab sample No.	A21/2783		



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	28	Bulk Density (Mg/m^3):	1.93
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.51
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**1.9**	**2.3**
Moisture Content %	28	28

Results relate only to the specimen tested, in as received condition unless otherwise noted

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J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

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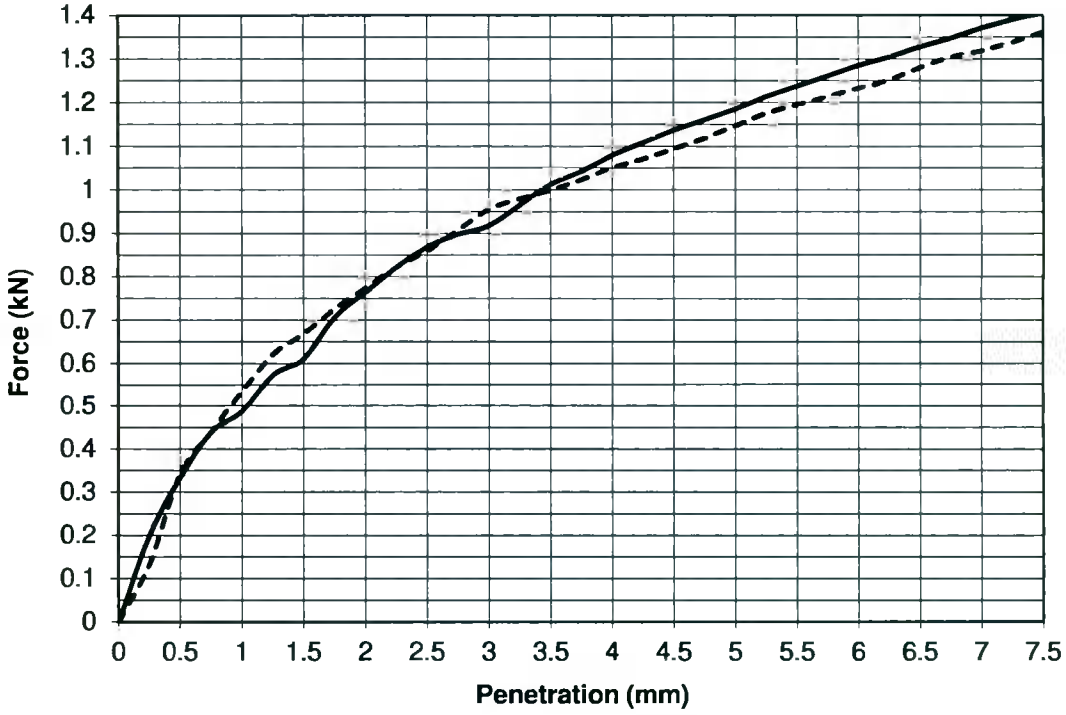
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1137

Report No.	R123794	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	25/06/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 1% Lime/3 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	25	Bulk Density (Mg/m^3):	1.92
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.54
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**7**	**7**
Moisture Content %	24	25

Results relate only to the specimen tested, in as received condition unless otherwise noted

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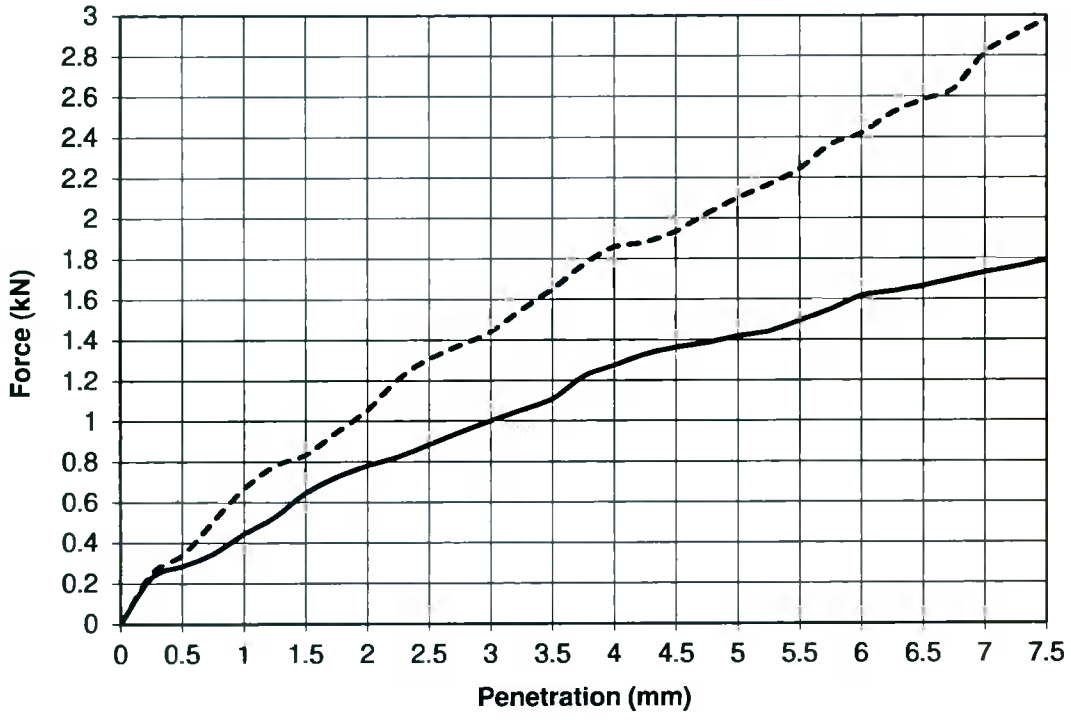
IGSL Ltd
Materials Laboratory
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILS IN SCOPE REG NO. 133T

Report No.	R124649	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 1% Lime/7 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	24	Bulk Density (Mg/m^3):	1.88
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.53
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**8**	**11**
Moisture Content %	23	24

Results relate only to the specimen tested, in as received condition unless otherwise noted

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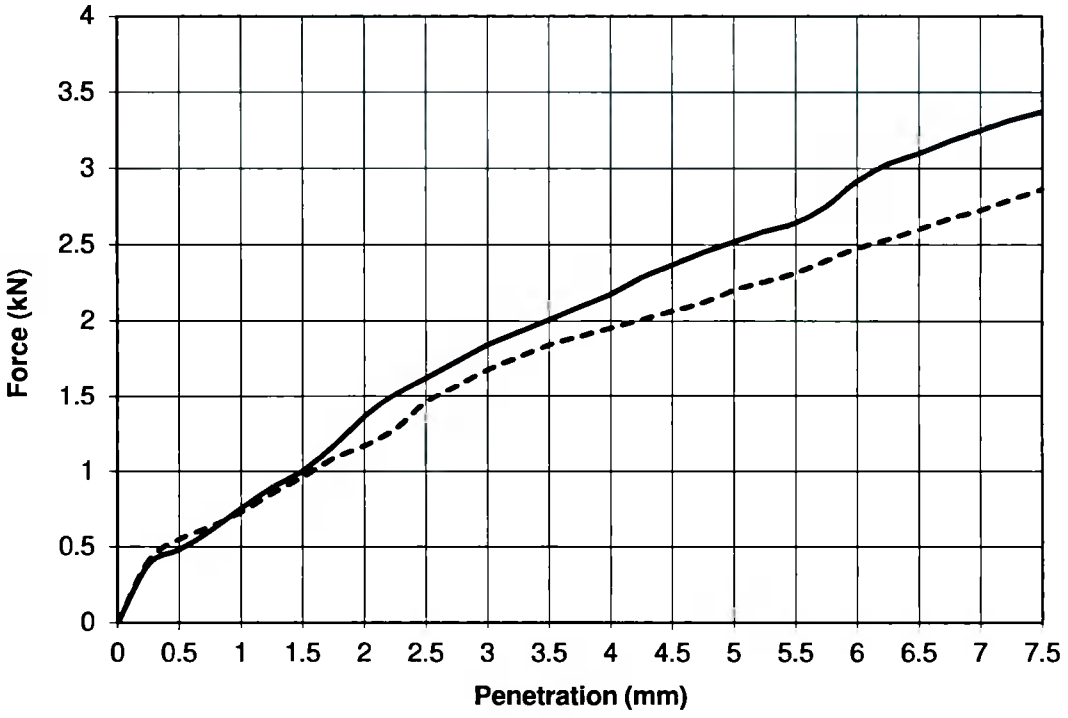
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 13.3T

Report No.	R124650	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 1% Lime/14 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	21	Bulk Density (Mg/m^3):	1.90
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.57
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**13**	**11**
Moisture Content %	21	22

Results relate only to the specimen tested, in as received condition unless otherwise noted

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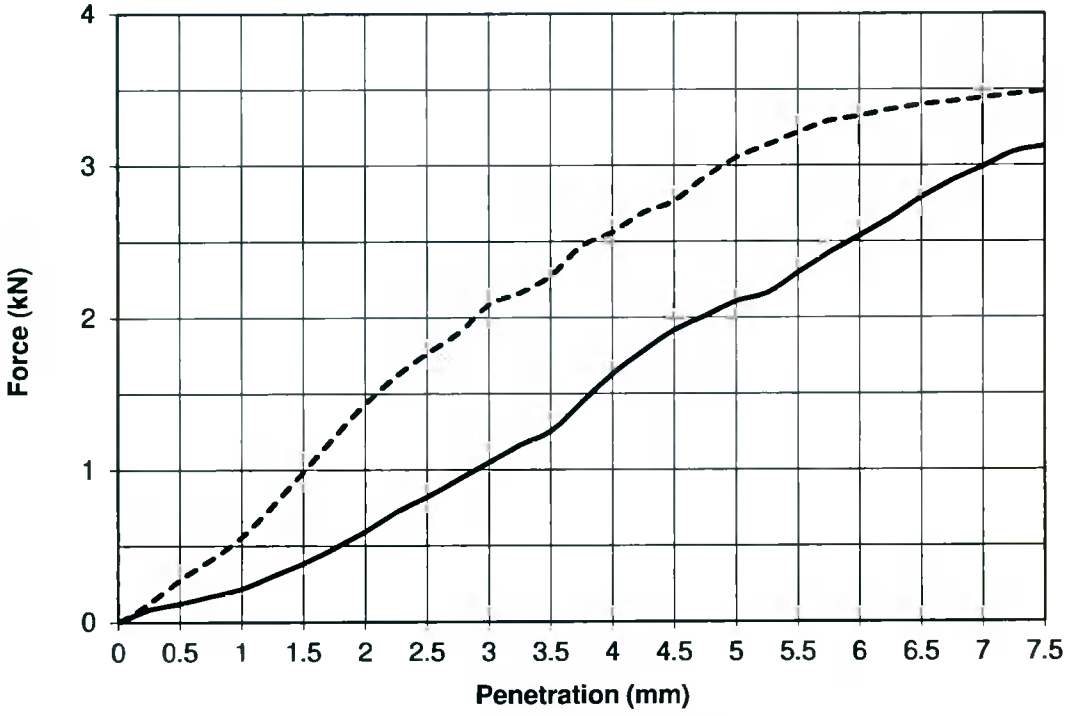
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124186	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 2% Lime/3 days Soaked		
Initial Condition:	Unsoaked		
Moisture Content (%):	23	Bulk Density (Mg/m^3):	1.93
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.57
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**11**	**15**
Moisture Content %	23	22

Results relate only to the specimen tested, in as received condition unless otherwise noted

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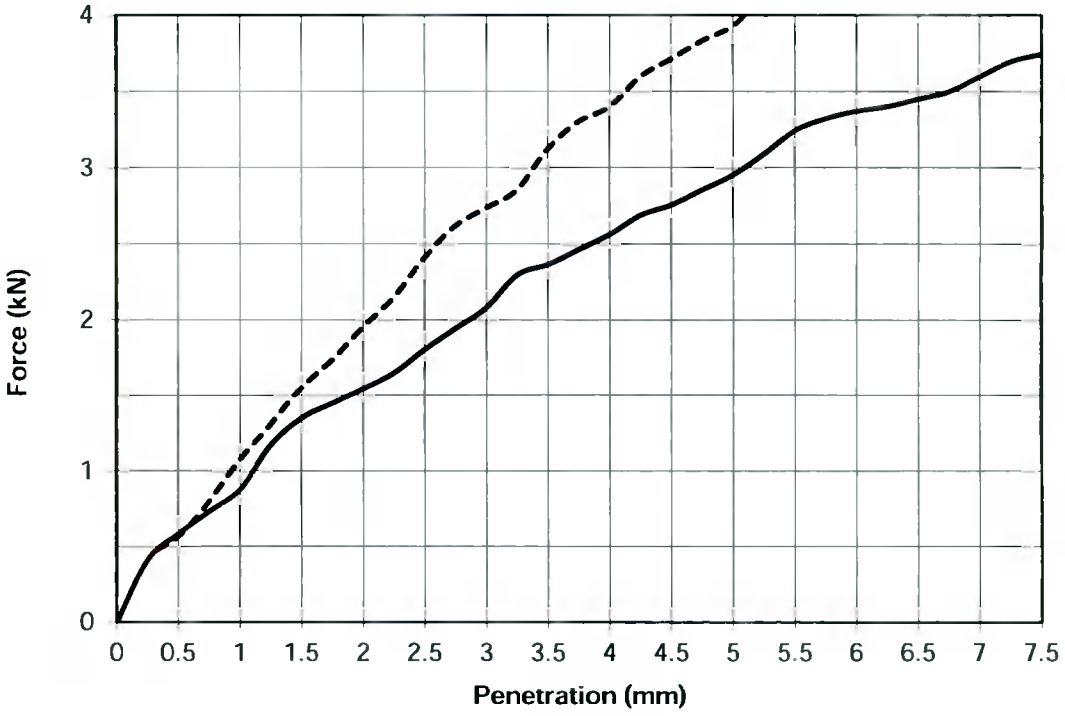
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 137T

Report No.	R124651	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 2% Lime/7 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	21	Bulk Density (Mg/m^3):	1.94
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.60
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**15**	**20**
Moisture Content %	21	21

Results relate only to the specimen tested, in as received condition unless otherwise noted

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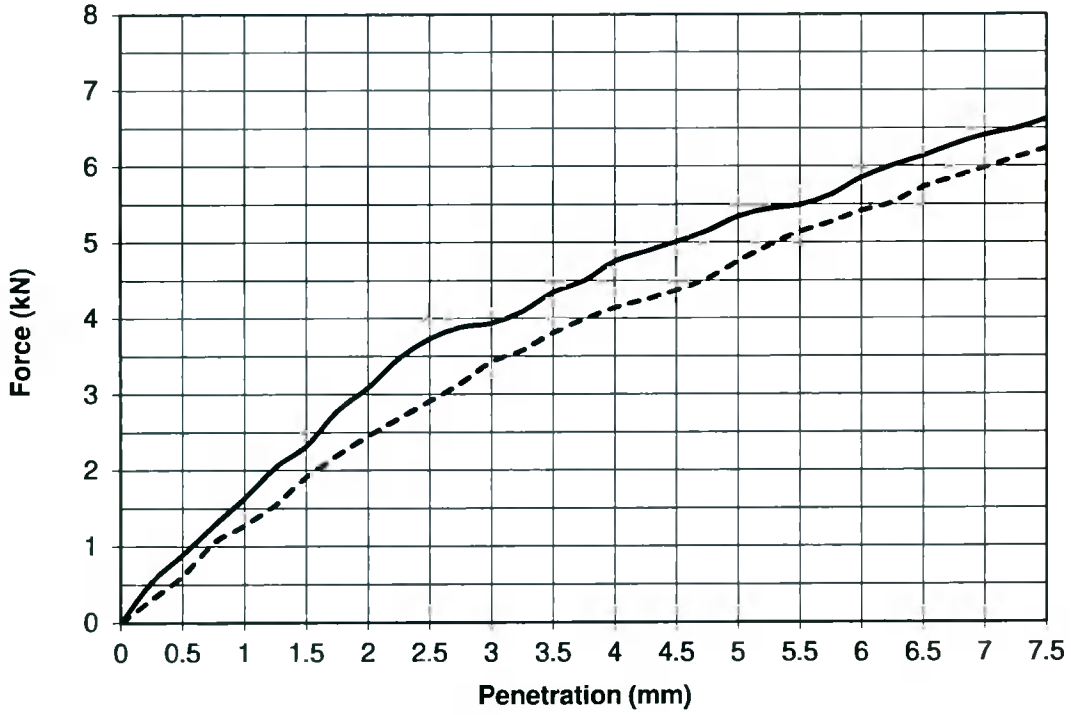
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124652	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 2% Lime/14 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	19	Bulk Density (Mg/m^3):	1.94
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.65
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**28**	**24**
Moisture Content %	19	20

Results relate only to the specimen tested, in as received condition unless otherwise noted

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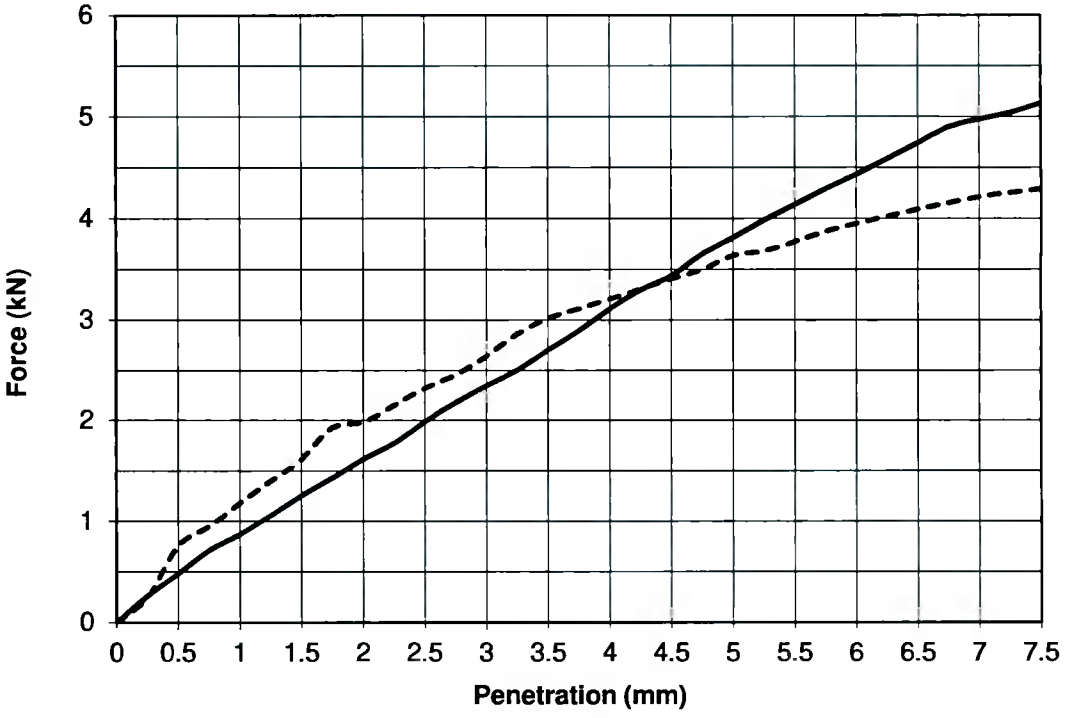
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1.1

Report No.	R124186	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 3% Lime/3 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	22	Bulk Density (Mg/m^3):	1.96
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.61
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**19**	**18**
Moisture Content %	22	22

Results relate only to the specimen tested, in as received condition unless otherwise noted

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IGSL Ltd
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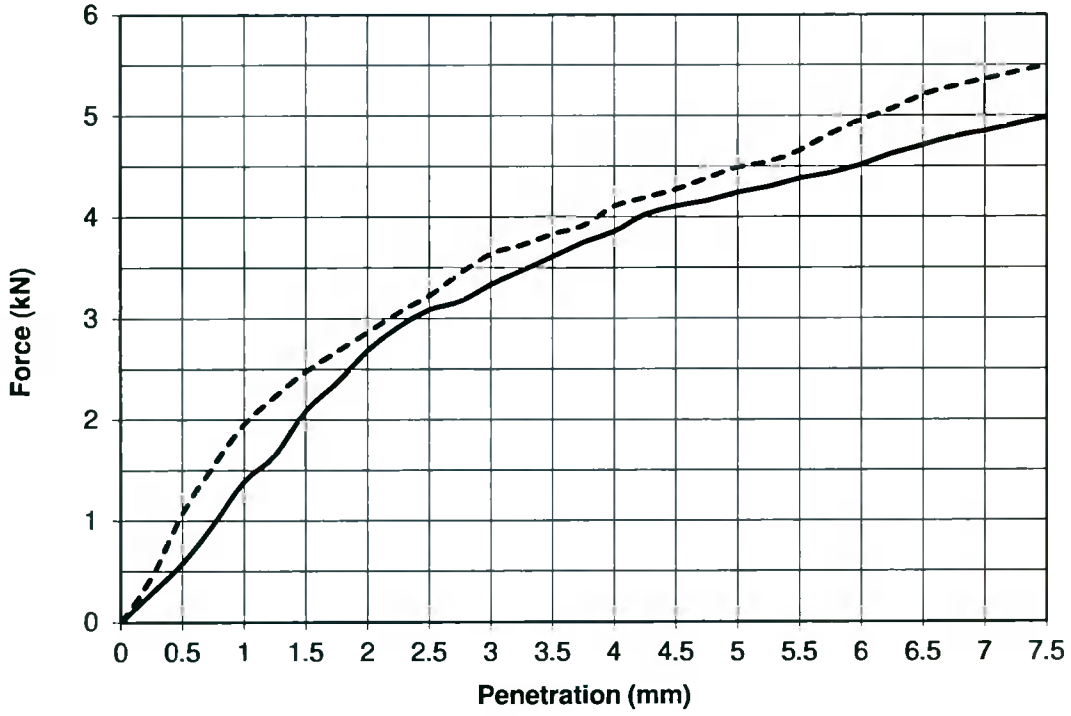
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILS IN SCOPE REG NO. 1337

Report No.	R124653	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 3% Lime/7 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	20	Bulk Density (Mg/m^3):	1.96
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.66
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**23**	**24**
Moisture Content %	20	20

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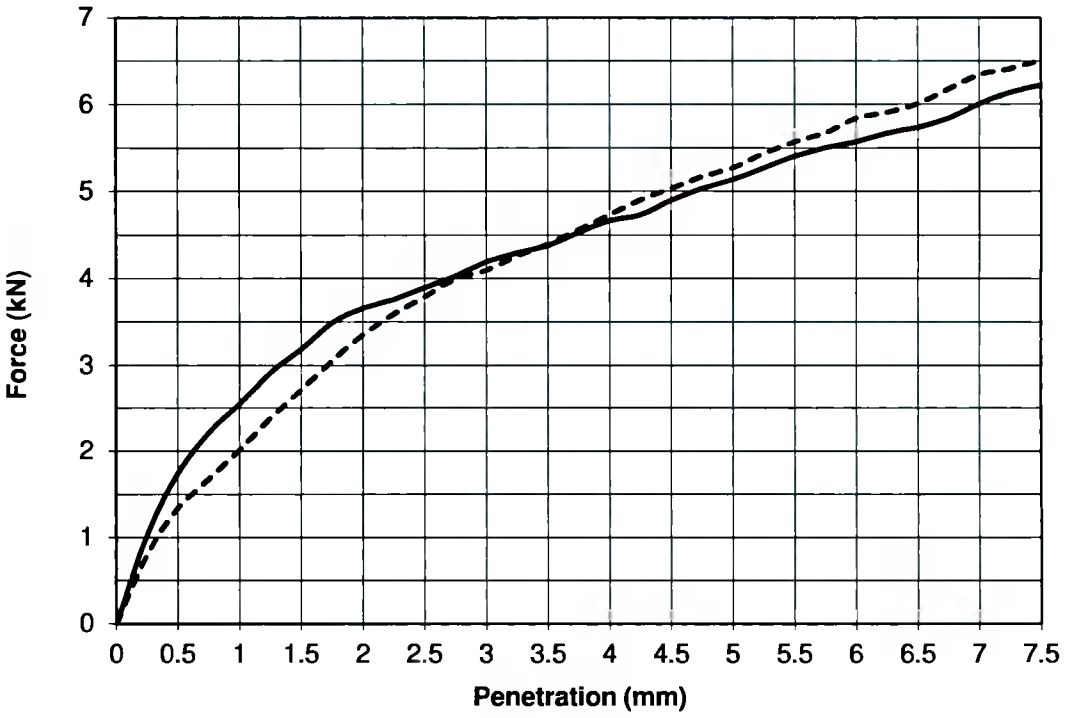
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133

Report No.	R124654	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 3% Lime/14 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	19	Bulk Density (Mg/m^3):	1.98
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.66
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**29**	**29**
Moisture Content %	19	19

Results relate only to the specimen tested, in as received condition unless otherwise noted

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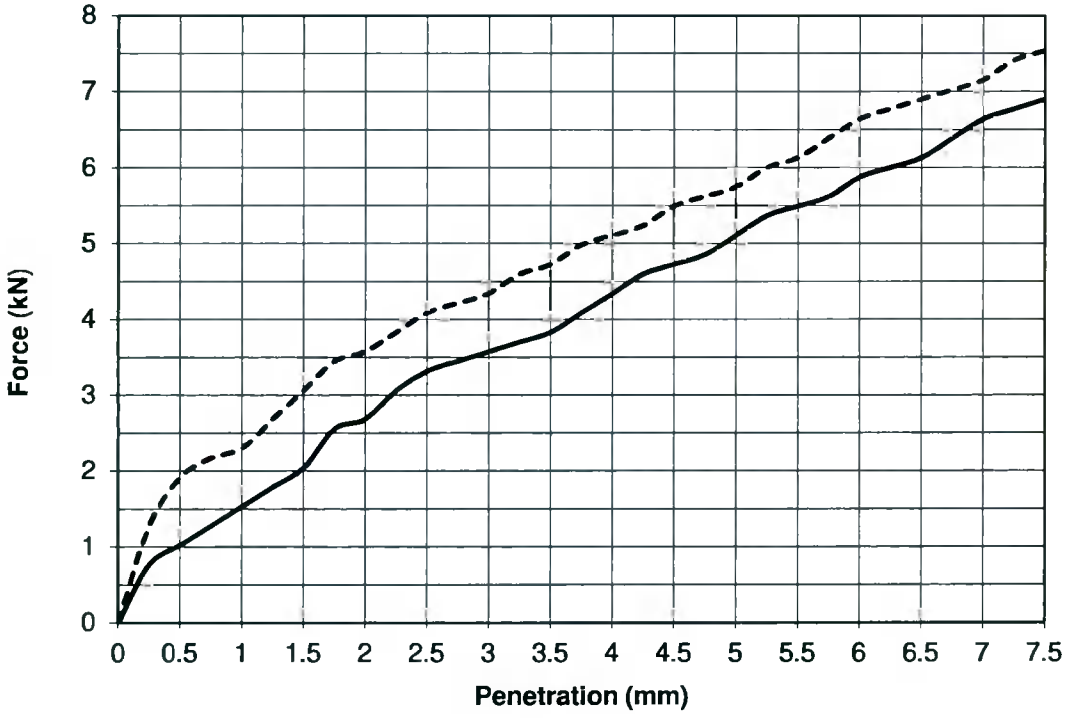
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1321

Report No.	R124189	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 1% Lime 2 % cement/3 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	21	Bulk Density (Mg/m^3):	1.98
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.64
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**25**	**31**
Moisture Content %	21	20

Results relate only to the specimen tested, in as received condition unless otherwise noted

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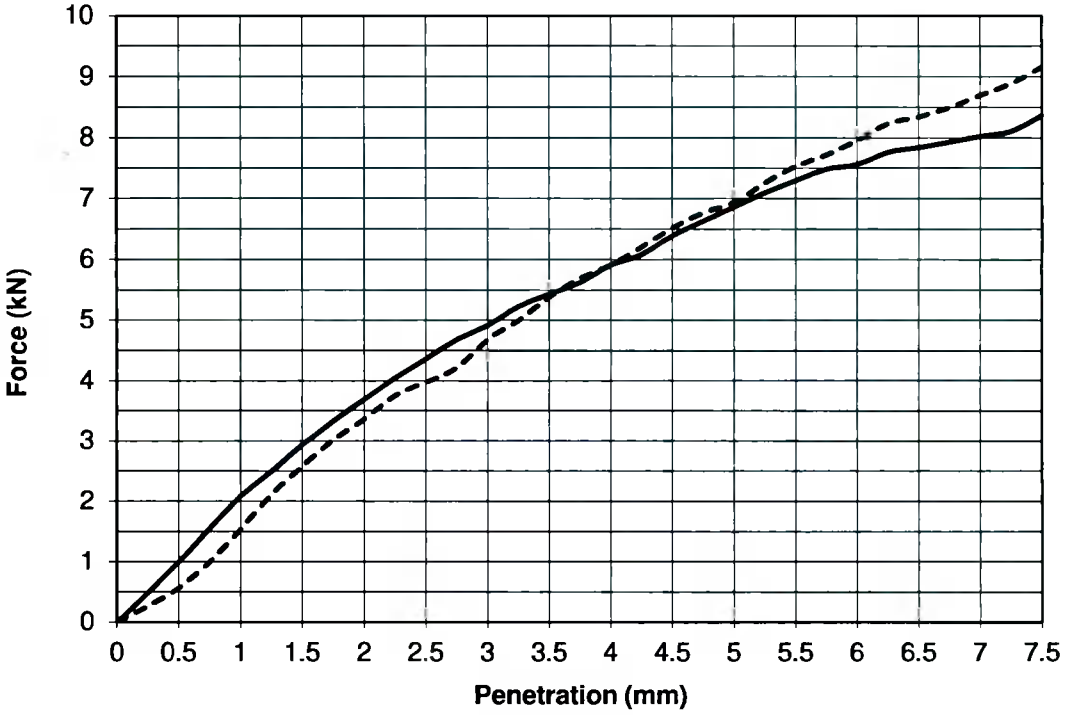
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133

Report No.	R124647	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 1% Lime 2 % cement/7 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	19	Bulk Density (Mg/m^3):	1.96
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.66
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**34**	**34**
Moisture Content %	19	20

Results relate only to the specimen tested, in as received condition unless otherwise noted

Opinions and interpretations are outside the scope of accreditation.

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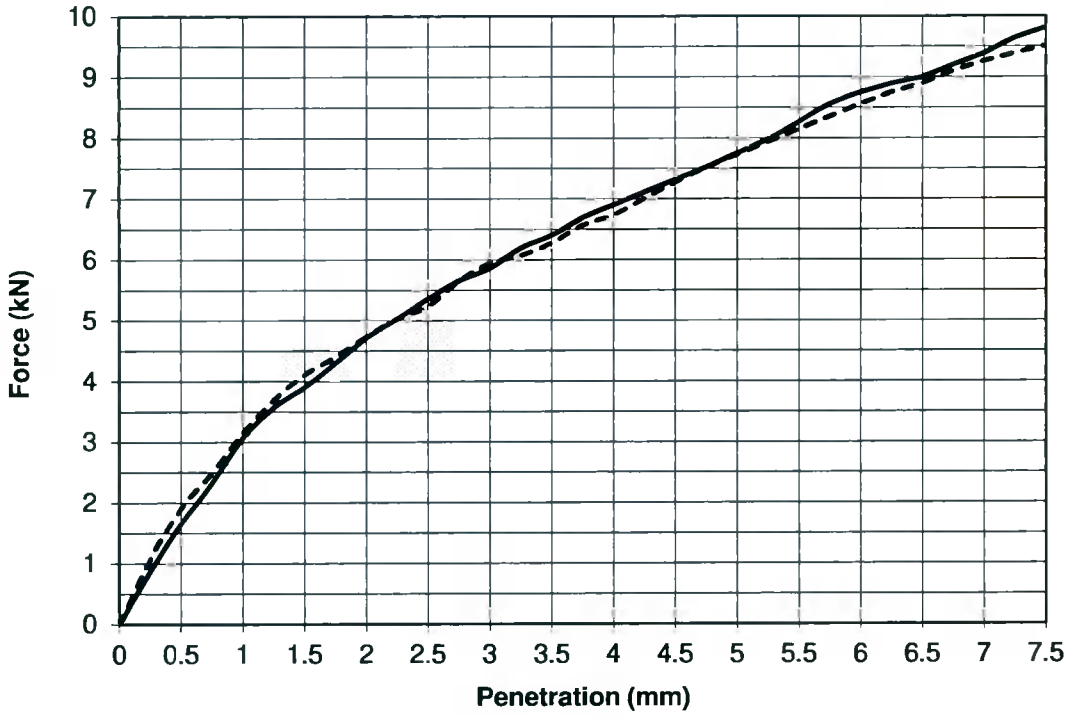
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124648	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP06	Sample No.*	AA148066 Type: B
Depth* (m)	0.60	Lab sample No.	A21/2783



Key: ———— Top ---------- Base

Description:	Brown sandy gravelly CLAY - 1% Lime 2 % cement/14 days Soaked		
Initial Condition:	soaked		
Moisture Content (%):	19	Bulk Density (Mg/m^3):	2.00
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.69
% Material >20mm:	26		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**40**	**40**
Moisture Content %	19	20

Results relate only to the specimen tested, in as received condition unless otherwise noted

Opinions and interpretations are outside the scope of accreditation.

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H Byrne (Laboratory Manager)

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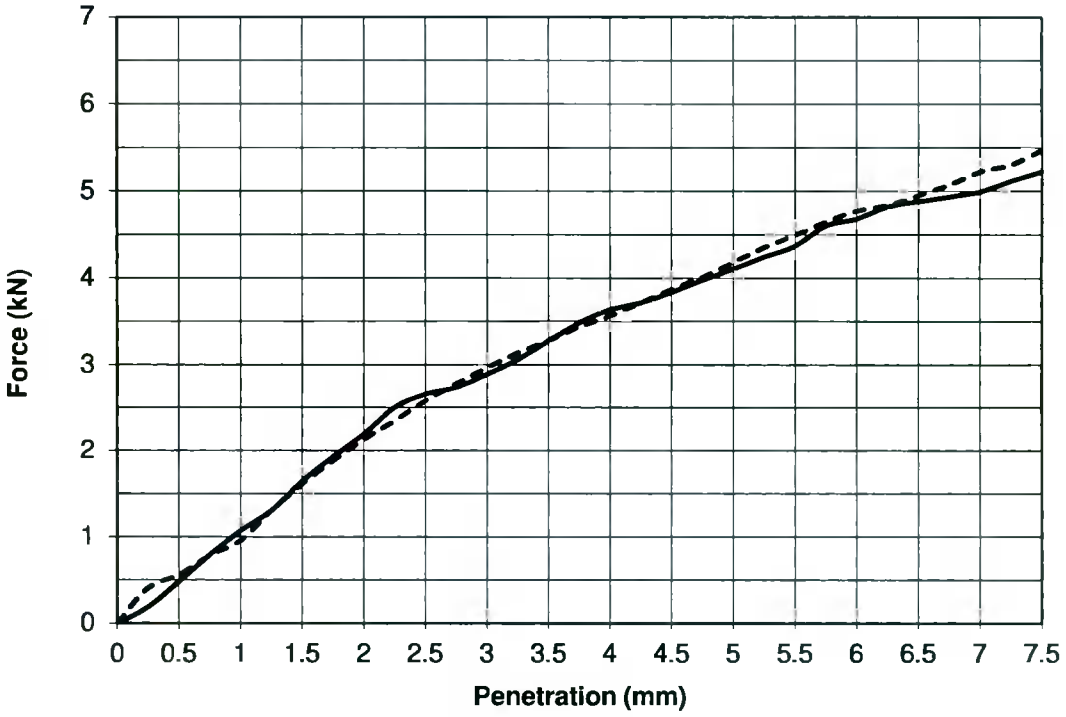
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	IVNAB ISO 17025 ACCREDITED TESTING

Report No.	R124215	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	06/07/21
BH/TP No.*	TP07	Sample No.*	AA148072 Type: B
Depth* (m)	1.00	Lab sample No.	A21/2784



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.19
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.93
% Material >20mm:	60		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**21**	**21**
Moisture Content %	14	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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H Byrne (Laboratory Manager)

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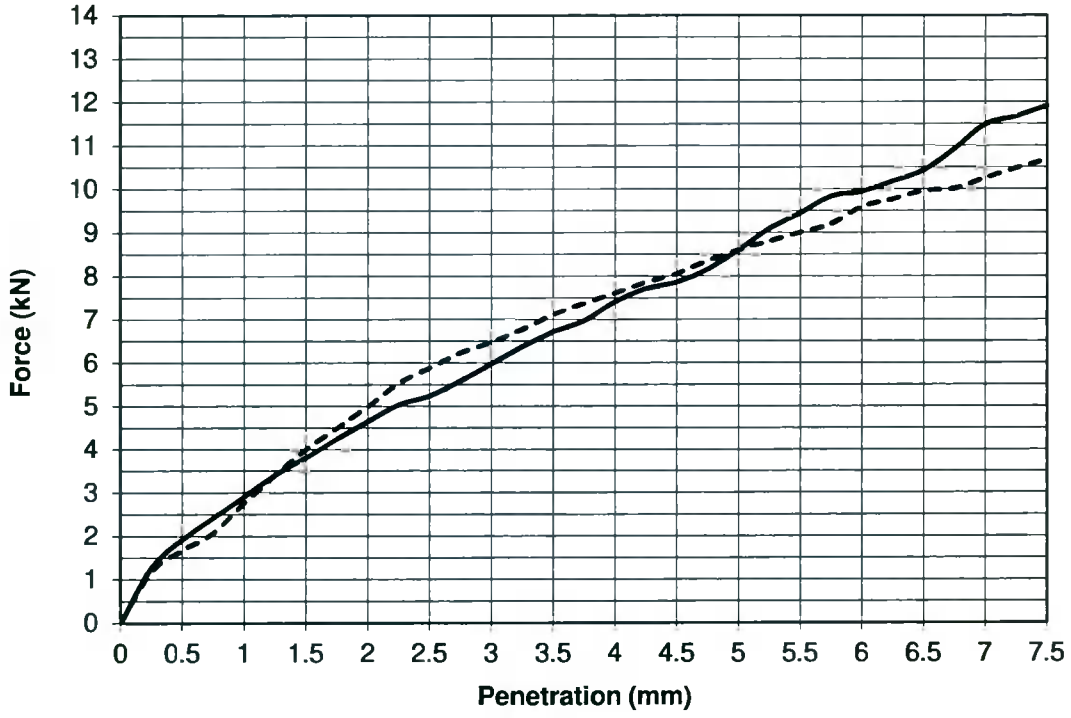
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124216	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	06/07/21
BH/TP No.*	TP10	Sample No.*	AA148081 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2789



Key: ———— Top ---------- Base

Description:	Mottled brown slightly sandy gravelly CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	11	Bulk Density (Mg/m^3):	2.08
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.87
% Material >20mm:	72		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**43**	**44**
Moisture Content %	11	11

Results relate only to the specimen tested, in as received condition unless otherwise noted

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H Byrne (Laboratory Manager)

IGSL Ltd Materials Laboratory

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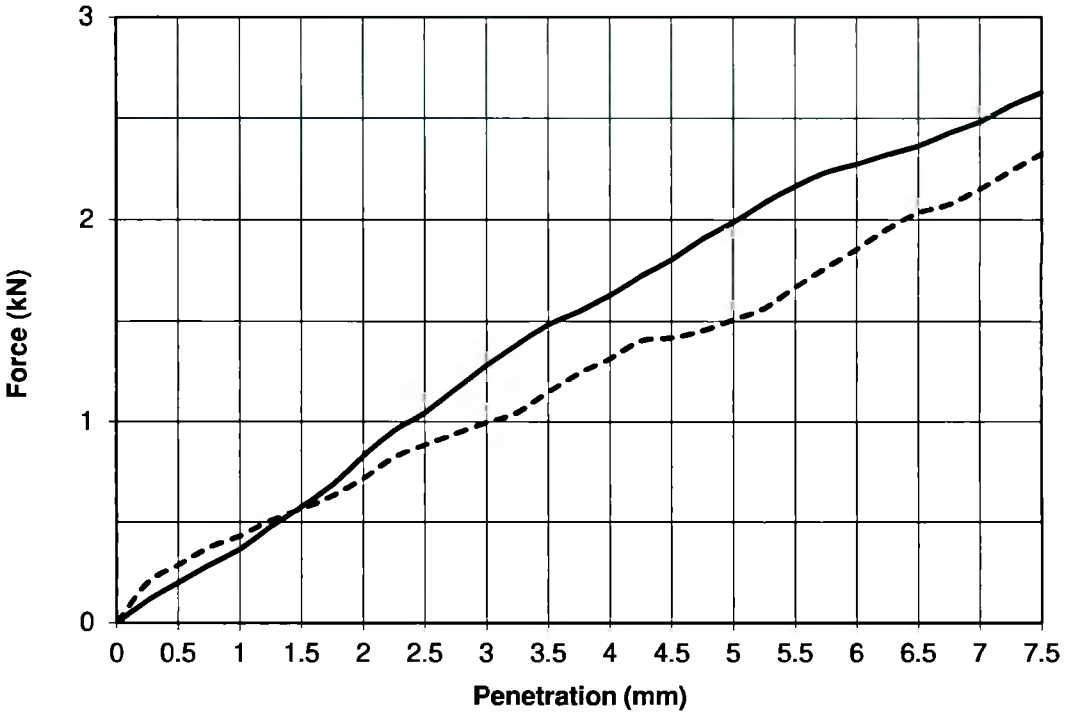
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	R123795	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	29/06/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY		
Initial Condition:	Unsoaked		
Moisture Content (%):	18	Bulk Density (Mg/m^3):	2.14
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.82
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**10**	**8**
Moisture Content %	18	18

Results relate only to the specimen tested, in as received condition unless otherwise noted

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IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
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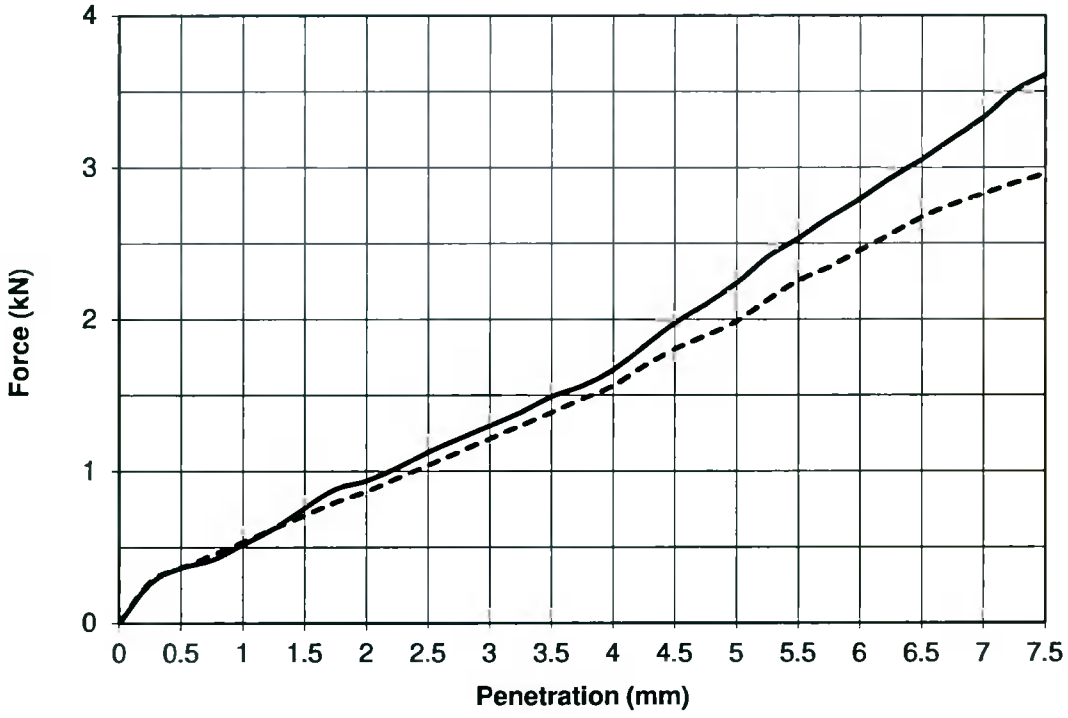
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 13...

Report No.	R124179	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	07/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 1% Lime Added soaked 3 Days		
Initial Condition:	soaked		
Moisture Content (%):	17	Bulk Density (Mg/m^3):	2.11
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.81
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**11**	**10**
Moisture Content %	16	17

Results relate only to the specimen tested, in as received condition unless otherwise noted

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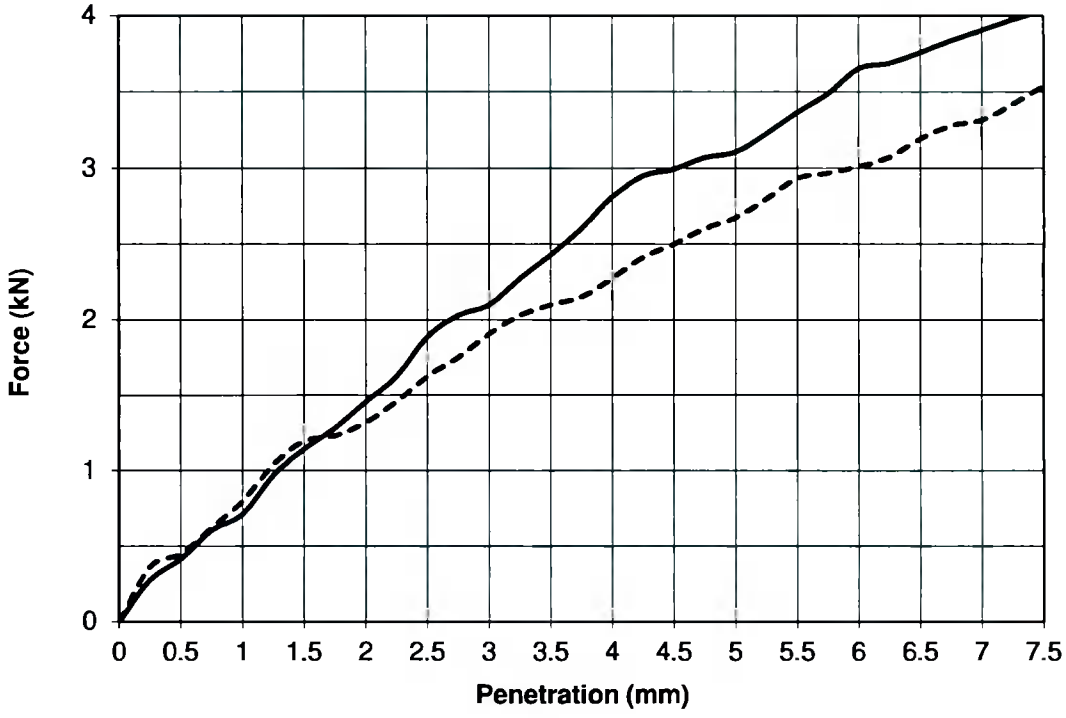
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	R124655	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 1% Lime Added soaked 7 Days		
Initial Condition:	soaked		
Moisture Content (%):	16	Bulk Density (Mg/m^3):	2.11
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.78
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**16**	**13**
Moisture Content %	16	16

Results relate only to the specimen tested, in as received condition unless otherwise noted

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IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
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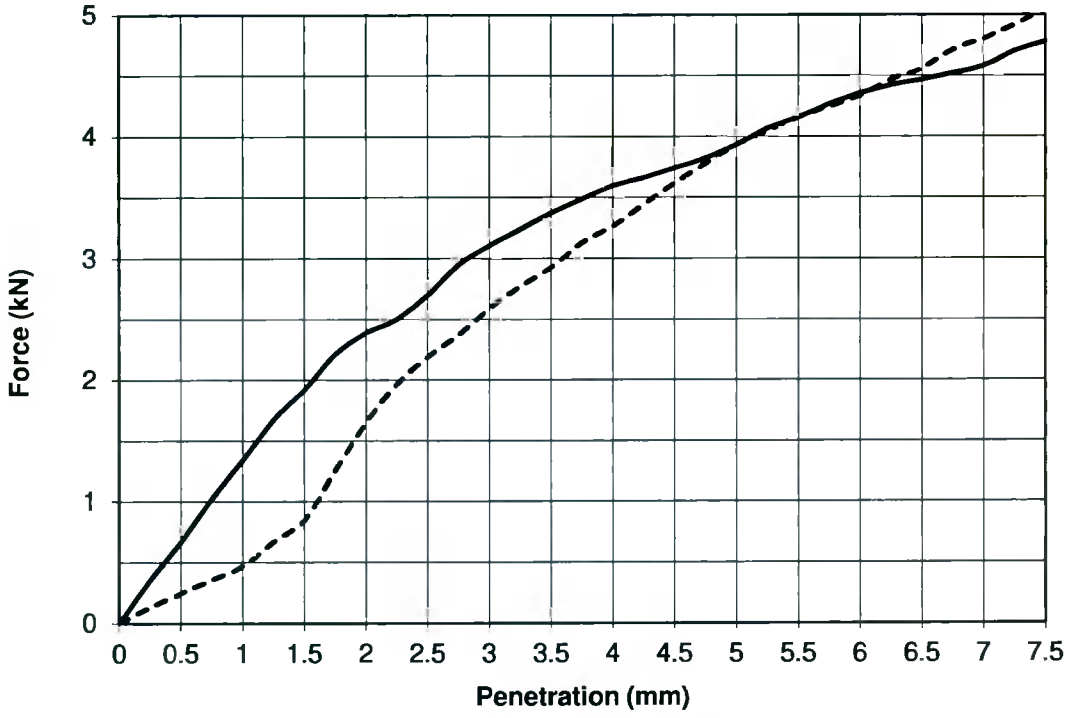
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING

Report No.	R124657	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 1% Lime Added soaked 14 Days		
Initial Condition:	soaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.09
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.82
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**20**	**20**
Moisture Content %	16	15

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IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
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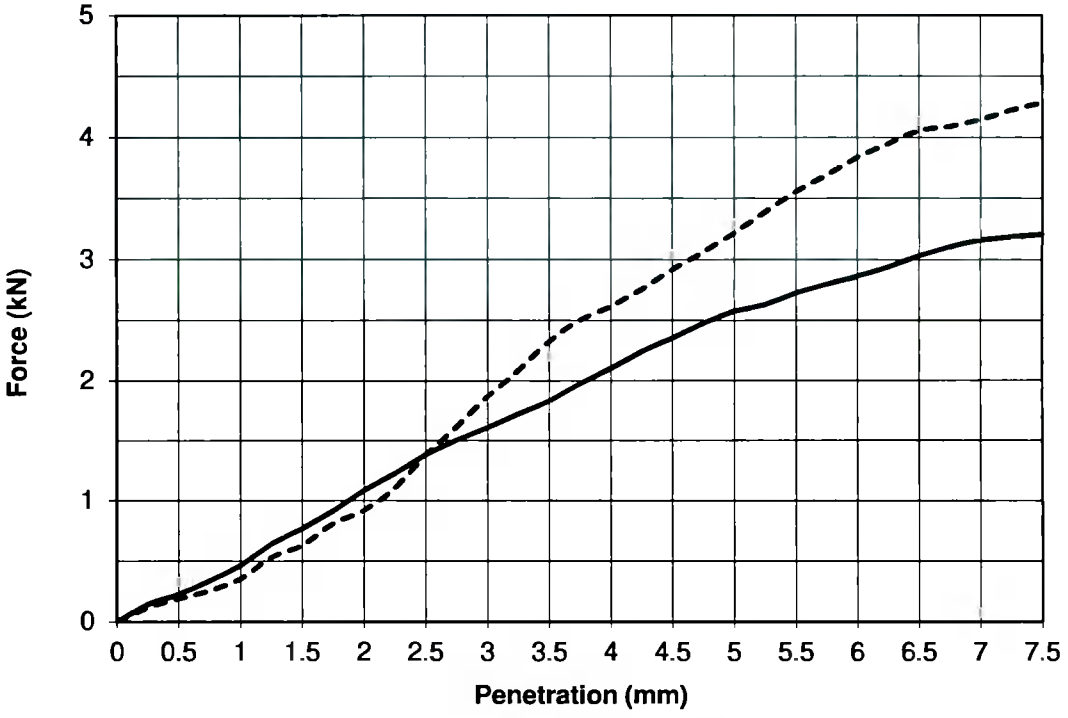
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	R124182	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	07/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 2% Lime Added soaked 3 Days		
Initial Condition:	soaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.17
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.89
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**13**	**16**
Moisture Content %	15	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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IGSL Ltd Materials Laboratory	Approved by	Date	Page No.
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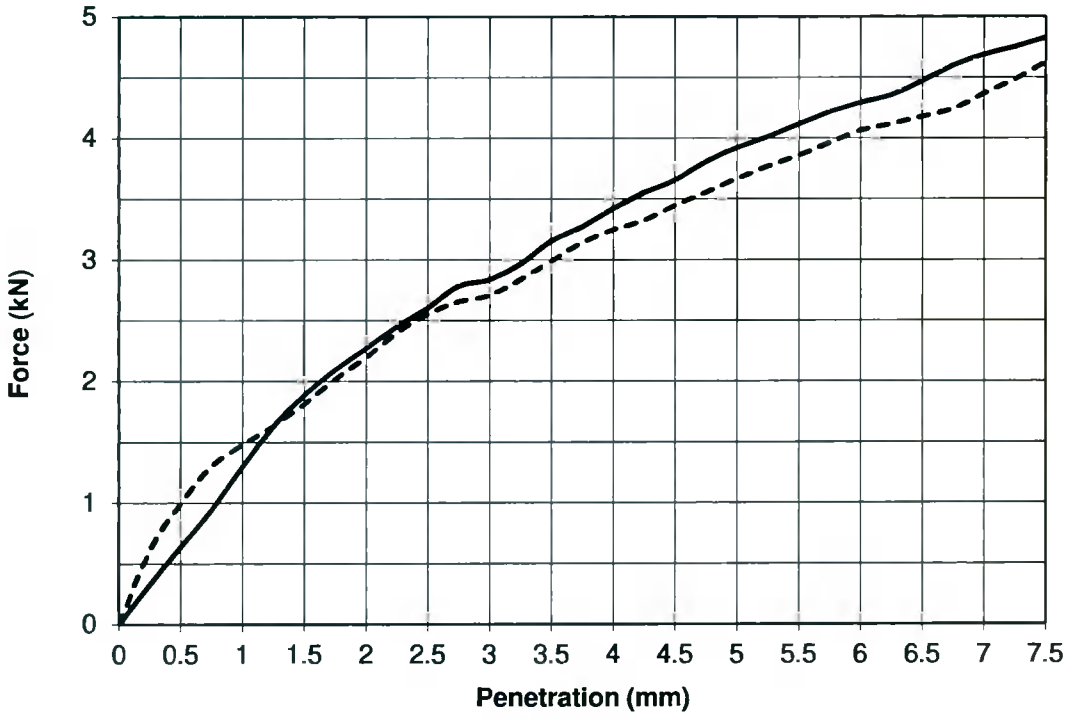
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING

Report No.	R124658	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 2% Lime Added soaked 7 Days		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.15
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.88
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**20**	**19**
Moisture Content %	14	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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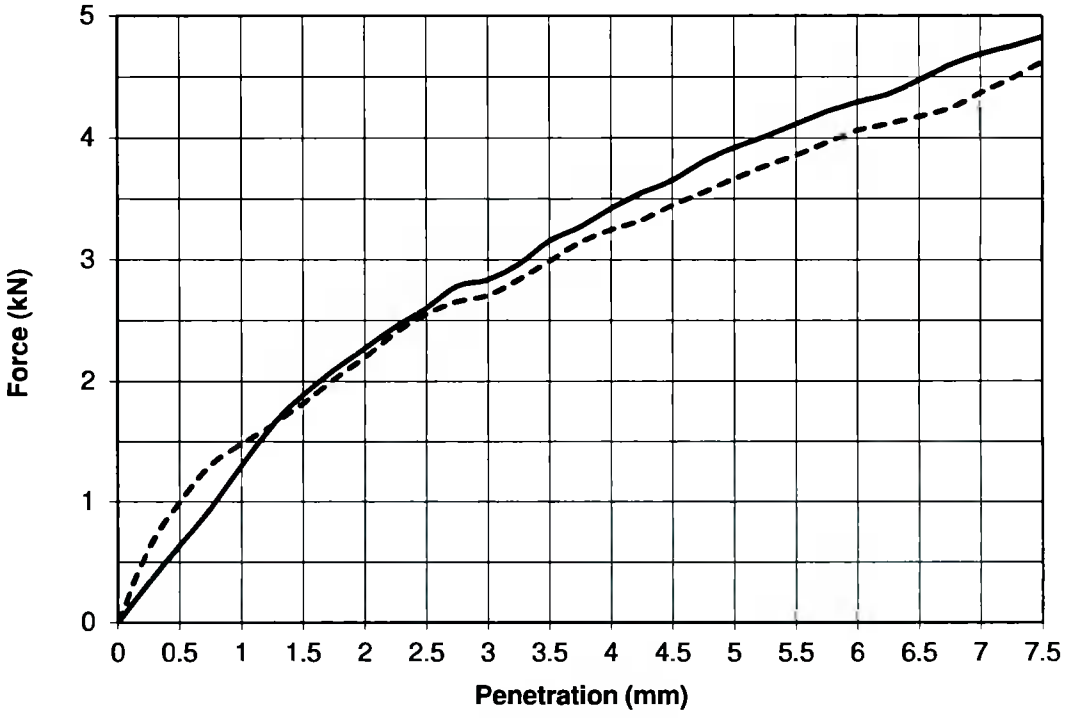
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 133T

Report No.	R124659	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 2% Lime Added soaked 14 Days		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.15
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.88
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**20**	**19**
Moisture Content %	14	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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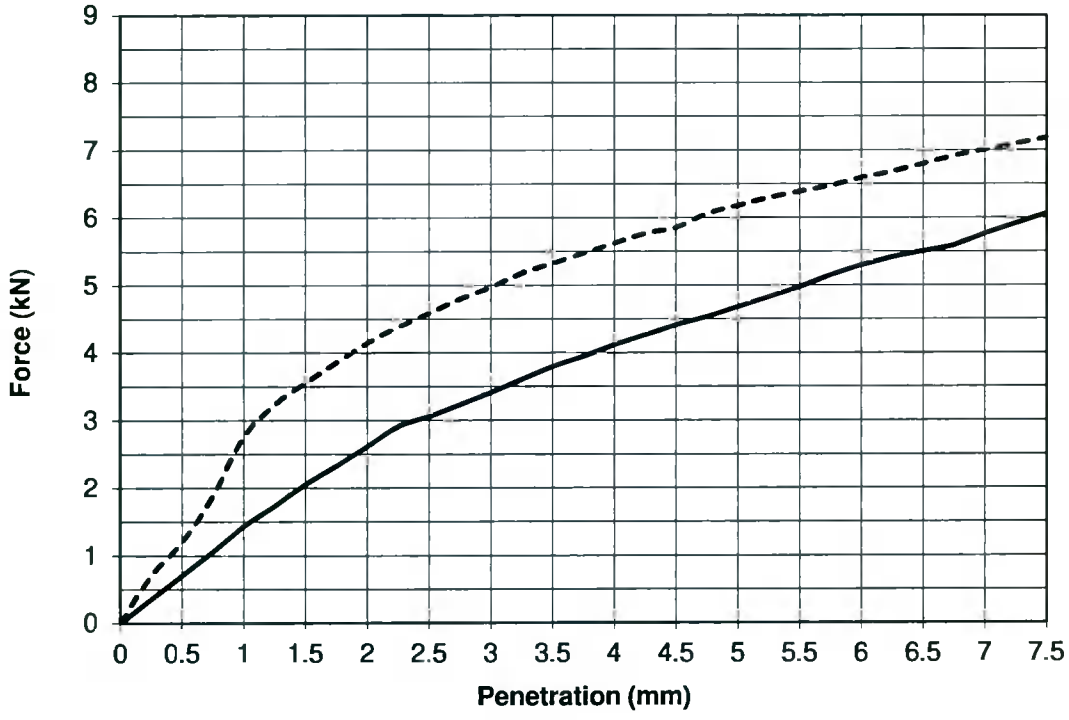
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124180	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	07/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 3% Lime Added soaked 3 Days		
Initial Condition:	soaked		
Moisture Content (%):	15	Bulk Density (Mg/m^3):	2.16
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.88
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**23**	**35**
Moisture Content %	15	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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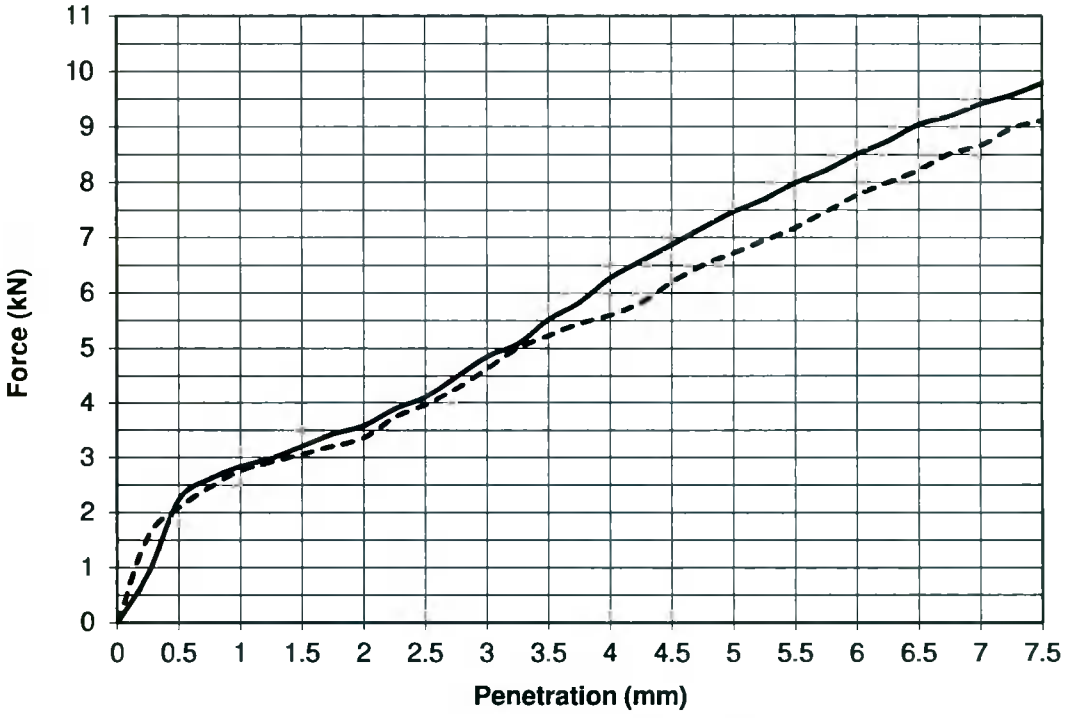
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING

Report No.	R124659	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 3% Lime Added soaked 7 Days		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.20
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.93
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**37**	**34**
Moisture Content %	13	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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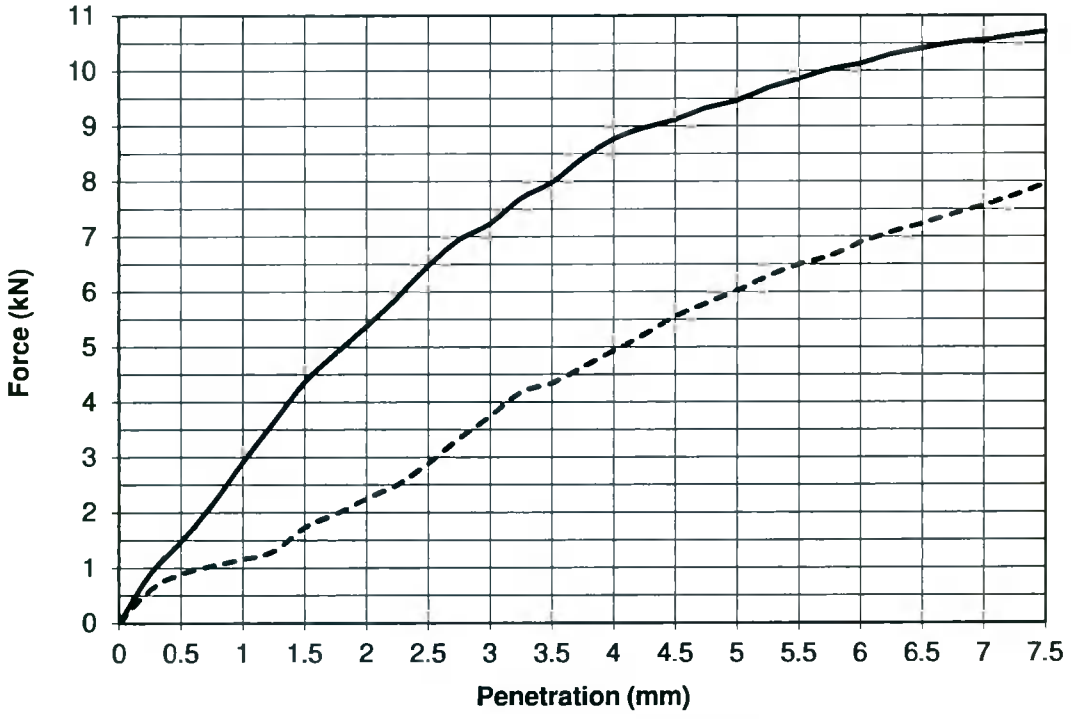
Unit J5,M7 Business Park
Naas Co.Kildare
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124660	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	02/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 3% Lime Added soaked 14 Days		
Initial Condition:	soaked		
Moisture Content (%):	12	Bulk Density (Mg/m^3):	2.18
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.95
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**49**	**30**
Moisture Content %	12	13

Results relate only to the specimen tested, in as received condition unless otherwise noted

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Approved by	Date	Page No.
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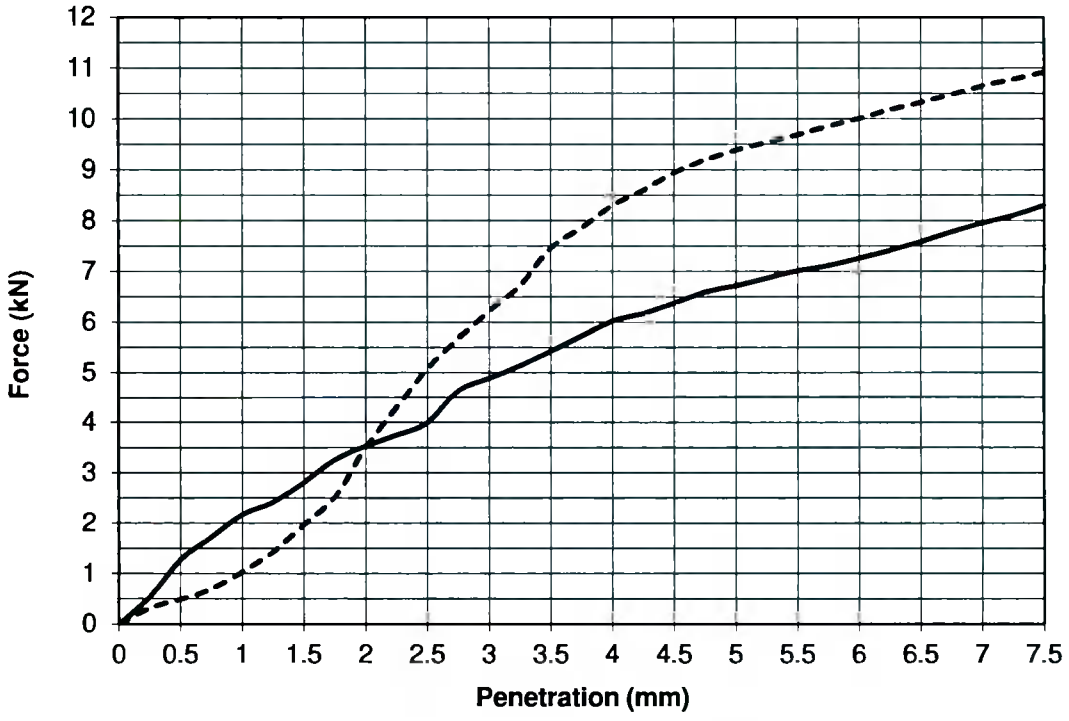
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING

Report No.	R124181	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	07/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 1% Lime 2% Cement Added soaked 3 Days		
Initial Condition:	soaked		
Moisture Content (%):	13	Bulk Density (Mg/m^3):	2.20
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.95
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**34**	**47**
Moisture Content %	14	12

Results relate only to the specimen tested, in as received condition unless otherwise noted

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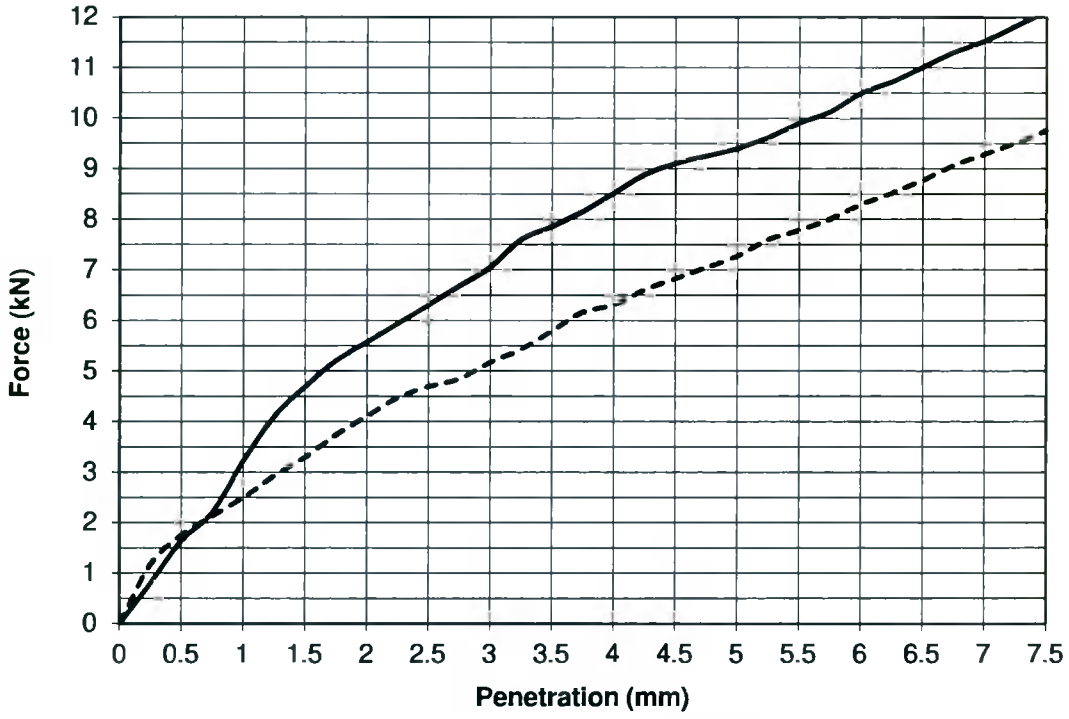
045 899324

TEST REPORT
Determination of California Bearing Ratio (CBR)

Tested in accordance with BS1377:Part 4:1990, clause 7

Report No.	R124661	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	07/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 1% Lime 2% Cement Added soaked 7 Days		
Initial Condition:	soaked		
Moisture Content (%):	13	Bulk Density (Mg/m^3):	2.16
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.91
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**47**	**36**
Moisture Content %	13	13

Results relate only to the specimen tested, in as received condition unless otherwise noted

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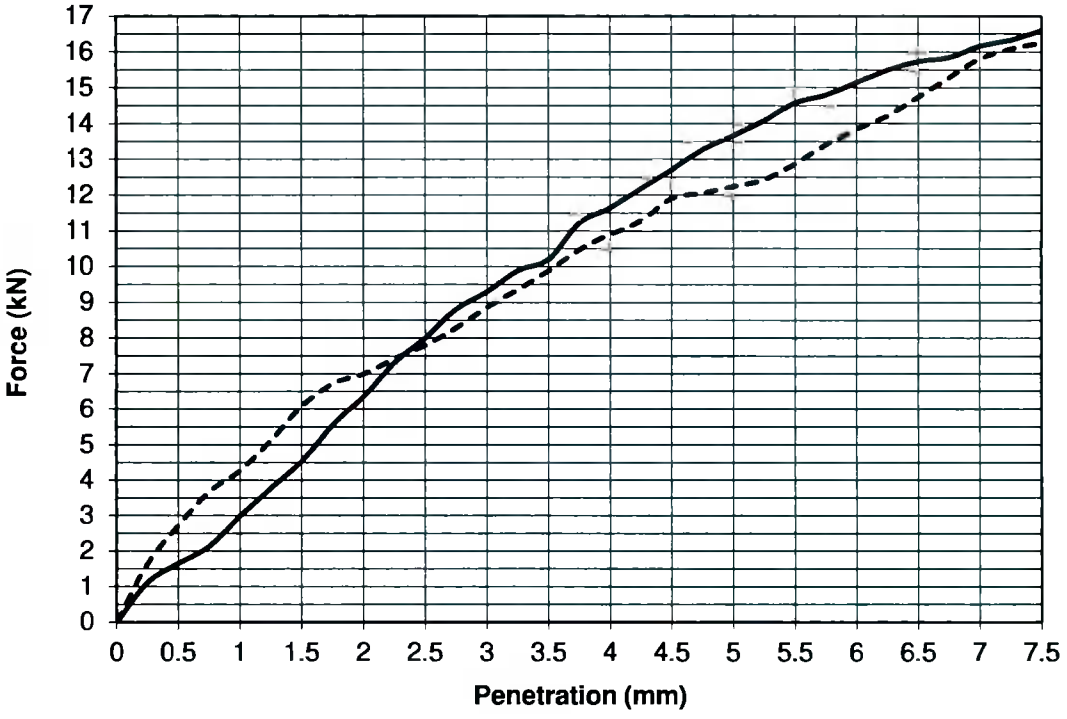
IGSL Ltd Materials Laboratory Unit J5,M7 Business Park Naas Co.Kildare 045 899324	TEST REPORT Determination of California Bearing Ratio (CBR) Tested in accordance with BS1377:Part 4:1990, clause 7	ISO 17025 IVNAB ACCREDITED TESTING DETAILED IN SCOPE REG NO. 1231

Report No.	R124662	Contract	Project Apollo
Contract No.	23300	Customer	Ramboll
Date received	16/06/21	Date Tested	07/07/21
BH/TP No.*	TP12	Sample No.*	AA148088 Type: B
Depth* (m)	0.50	Lab sample No.	A21/2792



Key: ———— Top ---------- Base

Description:	Brown slightly sandy, slightly gravelly, CLAY 1% Lime 2% Cement Added soaked 14 Days		
Initial Condition:	soaked		
Moisture Content (%):	14	Bulk Density (Mg/m^3):	2.21
Surcharge (kg):	4	Dry Density (Mg/m^3):	1.94
% Material >20mm:	7.4		
Method of compaction:	Static Compaction Method 2		

Test Result	Top	Base
CBR %	**68**	**61**
Moisture Content %	14	14

Results relate only to the specimen tested, in as received condition unless otherwise noted

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IGSL Ltd Materials Laboratory M7 Business Park Naas Co. Kildare	Test Report	
	Determination of Thermal Conductivity of Soil by Thermal Needle Probe	

Report No. **R121281**

Contract No. 23300

Contract Name: Project Apollo Grangecastle

Client: Ramboll

Sample No. -

Location RC01 3.8m

Soil description Grey argillaceous LIMESTONE

Preparation Tested as received. 5 determinations in one location

Date Tested: 29/06/2021

Test No.	Thermal Conductivity K (W/m.k)	Thermal Resistivity R (m K/W)
1	3.2560	0.3071
2	2.8908	0.3459
3	3.1036	0.3222
4	3.2092	0.3116
5	2.9816	0.3354
Average	3.0882	0.3244

Bulk density (Mg/m3)	2.77
Dry density (Mg/m3)	2.77
Water Content (%)	0.1
Porosity	0.00
Particle density (assumed)	2.75

Notes: Water content measured in accordance with ISO 17892-1:2014. Bulk density measured by linear measurement. Porosity calculated (voids ratio/1+voids ratio). Thermal measurements undertake using a TEMPOS and RK-3 probe (manufactured by METER Group).

The result relates to the specimen tested as received
Opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve report
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H Byrne (Laboratory Manager)

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IGSL Ltd
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M7 Business Park
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Co. Kildare

Test Report

Determination of Thermal Conductivity of Soil by Thermal Needle Probe

Report No.	**R121282**
Contract No.	23300
Contract Name:	Project Apollo Grangecastle
Client:	Ramboll
Sample No.	-
Location	RC02 5.5m
Soil description	Grey argillaceous LIMESTONE
Preparation	Tested as received. 5 determinations in one location
Date Tested:	29/06/2021

Test No.	Thermal Conductivity K (W/m.k)	Thermal Resistivity R (m K/W)
1	2.2089	0.4527
2	2.0573	0.4861
3	1.9656	0.5087
4	2.1439	0.4664
5	2.1379	0.4678
Average	2.1027	0.4763

Bulk density (Mg/m3)	2.69
Dry density (Mg/m3)	2.68
Water Content (%)	0.3
Porosity	0.03
Particle density (assumed)	2.75

Notes: Water content measured in accordance with ISO 17892-1:2014. Bulk density measured by linear measurement. Porosity calculated (voids ratio/1+voids ratio). Thermal measurements undertake using a TEMPOS and RK-3 probe (manufactured by METER Group).

The result relates to the specimen tested as received
Opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve report
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
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IGSL Ltd Materials Laboratory M7 Business Park Naas Co. Kildare	Test Report	
	Determination of Thermal Conductivity of Soil by Thermal Needle Probe	

Report No. **R121283**

Contract No. 23300

Contract Name: Project Apollo Grangecastle

Client: Ramboll

Sample No. -

Location RC03 5.6m

Soil description Grey argillaceous LIMESTONE

Preparation Tested as received. 5 determinations in one location

Date Tested: 29/06/2021

Test No.	Thermal Conductivity K (W/m.k)	Thermal Resistivity R (m K/W)
1	2.2689	0.4407
2	2.2945	0.4358
3	2.4378	0.4102
4	2.5967	0.3851
5	2.5004	0.3979
Average	2.4197	0.4139

Bulk density (Mg/m3)	2.74
Dry density (Mg/m3)	2.73
Water Content (%)	0.1
Porosity	0.01
Particle density (assumed)	2.75

Notes: Water content measured in accordance with ISO 17892-1:2014. Bulk density measured by linear measurement. Porosity calculated (voids ratio/1+voids ratio). Thermal measurements undertake using a TEMPOS and RK-3 probe (manufactured by METER Group).

The result relates to the specimen tested as received
Opinions and interpretations are outside the scope of accreditation.

Persons authorised to approve report
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
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IGSL Ltd Materials Laboratory M7 Business Park Naas Co. Kildare	Test Report	
	Determination of Thermal Conductivity of Soil by Thermal Needle Probe	

Report No. **R121284**

Contract No. 23300

Contract Name: Project Apollo Grangecastle

Client: Ramboll

Sample No. -

Location TP1 1.5m

Soil description Brown slightly sandy slightly gravelly SILT/CLAY

Preparation Tested at as received moisture content of <8mm material. Tamped into container.

Date Tested: 21/06/2021

Test No.	Thermal Conductivity K (W/m.k)	Thermal Resistivity R (m K/W)
1	1.3431	0.7445
2	1.2467	0.8021
3	1.2331	0.8110
4	1.2855	0.7779
5	1.2966	0.7712
Average	1.2810	0.7813

Bulk density (Mg/m3)	1.86
Dry density (Mg/m3)	1.57
Water Content (%)	18.4
Porosity	0.41
Particle density (assumed)	2.65

Notes: Water content measured in accordance with ISO 17892-1:2014. Bulk density measured by linear measurement. Porosity calculated (voids ratio/1+voids ratio). Thermal measurements undertake using a TEMPOS and TR-3 probe (manufactured by METER Group).

The result relates to the specimen tested.

Persons authorised to approve report
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
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IGSL Ltd Materials Laboratory M7 Business Park Naas Co. Kildare	Test Report Determination of Thermal Conductivity of Soil by Thermal Needle Probe	

Report No.	**R121285**
Contract No.	23300
Contract Name:	Project Apollo Grangecastle
Client:	Ramboll
Sample No.	-
Location	TP4 1.0m
Soil description	Brown slightly sandy slightly gravelly SILT/CLAY
Preparation	Tested at as received moisture content of <8mm material. Tamped into container.
Date Tested:	22/06/2021

Test No.	Thermal Conductivity K (W/m.k)	Thermal Resistivity R (m K/W)
1	1.5099	0.6623
2	1.3214	0.7568
3	1.2515	0.7990
4	1.3714	0.7293
5	1.4756	0.6777
Average	1.3860	0.7250

Bulk density (Mg/m3)	1.83
Dry density (Mg/m3)	1.57
Water Content (%)	16.2
Porosity	0.41
Particle density (assumed)	2.65

Notes: Water content measured in accordance with ISO 17892-1:2014. Bulk density measured by linear measurement. Porosity calculated (voids ratio/1+voids ratio). Thermal measurements undertake using a TEMPOS and TR-3 probe (manufactured by METER Group).

The result relates to the specimen tested.

Persons authorised to approve report
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
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IGSL Ltd Materials Laboratory M7 Business Park Naas Co. Kildare	Test Report Determination of Thermal Conductivity of Soil by Thermal Needle Probe	

Report No. **R121286**

Contract No. 23300

Contract Name: Project Apollo Grangecastle

Client: Ramboll

Sample No. -

Location TP9 0.6m

Soil description Brown slightly sandy slightly gravelly SILT/CLAY

Preparation Tested at as received moisture content of <8mm material. Tamped into container.

Date Tested: 23/06/2021

Test No.	Thermal Conductivity K (W/m.k)	Thermal Resistivity R (m K/W)
1	1.3414	0.7455
2	1.4751	0.6779
3	1.5908	0.6286
4	1.4935	0.6696
5	1.4217	0.7034
Average	1.4645	0.6850

Bulk density (Mg/m3)	1.97
Dry density (Mg/m3)	1.69
Water Content (%)	16.5
Porosity	0.36
Particle density (assumed)	2.65

Notes: Water content measured in accordance with ISO 17892-1:2014. Bulk density measured by linear measurement. Porosity calculated (voids ratio/1+voids ratio). Thermal measurements undertake using a TEMPOS and TR-3 probe (manufactured by METER Group).

The result relates to the specimen tested.

Persons authorised to approve report
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
		30/06/21	1 of 1

IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Determination of Thermal Conductivity of Soil by Thermal Needle Probe

Report No.	**R121287**
Contract No.	23300
Contract Name:	Project Apollo Grangecastle
Client:	Ramboll
Sample No.	-
Location	TP11 1.5m
Soil description	Grey slightly sandy slightly gravelly SILT/CLAY
Preparation	Tested at as received moisture content of <8mm material. Tamped into container.
Date Tested:	24/06/2021

Test No.	Thermal Conductivity K (W/m.k)	Thermal Resistivity R (m K/W)
1	1.7169	0.5824
2	1.4577	0.6860
3	1.5429	0.6481
4	1.6813	0.5948
5	1.6092	0.6214
Average	1.6016	0.6265

Bulk density (Mg/m3)	2.08
Dry density (Mg/m3)	1.77
Water Content (%)	17.5
Porosity	0.33
Particle density (assumed)	2.65

Notes: Water content measured in accordance with ISO 17892-1:2014. Bulk density measured by linear measurement. Porosity calculated (voids ratio/1+voids ratio). Thermal measurements undertake using a TEMPOS and TR-3 probe (manufactured by METER Group).

The result relates to the specimen tested.

Persons authorised to approve report
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

IGSL Materials Laboratory	Approved by	Date	Page
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IGSL Ltd
Materials Laboratory
M7 Business Park
Naas
Co. Kildare

Test Report

Determination of Thermal Conductivity of Soil by Thermal Needle Probe

Report No.	**R121288**
Contract No.	23300
Contract Name:	Project Apollo Grangecastle
Client:	Ramboll
Sample No.	-
Location	TP13 1.0m
Soil description	Grey slightly sandy slightly gravelly SILT/CLAY
Preparation	Tested at as received moisture content of <8mm material. Tamped into container.
Date Tested:	25/06/2021

Test No.	Thermal Conductivity K (W/m.k)	Thermal Resistivity R (m K/W)
1	1.6073	0.6222
2	1.4867	0.6726
3	1.5365	0.6508
4	1.6143	0.6195
5	1.5947	0.6271
Average	1.5679	0.6384

Bulk density (Mg/m3)	2.12
Dry density (Mg/m3)	1.77
Water Content (%)	19.7
Porosity	0.33
Particle density (assumed)	2.65

Notes: Water content measured in accordance with ISO 17892-1:2014. Bulk density measured by linear measurement. Porosity calculated (voids ratio/1+voids ratio). Thermal measurements undertake using a TEMPOS and TR-3 probe (manufactured by METER Group).

The result relates to the specimen tested.

Persons authorised to approve report
J Barrett (Quality Manager)
H Byrne (Laboratory Manager)

Appendix 9

Geotechnical Rock Laboratory Test Records

(Diametrial) POINT LOAD STRENGTH INDEX TEST DATA

Contract: Project Apollo
Contract no. 23300
Date of test: 21/06/2021

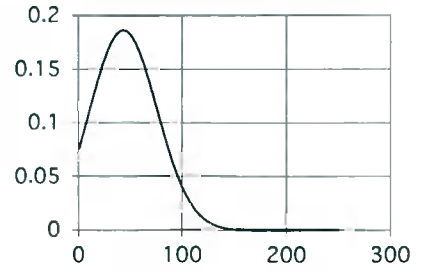
Sample Type: Core

RC No.	Depth m	D (Diameter) mm	P (failure load) kN	F	Is (index strength) Mpa	Is(50) (index strength) Mpa	*UCS MPa	Type	Orienation
RC01	3.1	78	18.0	1.222	2.96	3.61	72	d	//
	3.2	78	26.0	1.222	4.27	5.22	104	d	//
	4.5	78	11.0	1.222	1.81	2.21	44	d	//
	4.6	78	19.0	1.222	3.12	3.81	76	d	//
	6.7	78	22.0	1.222	3.62	4.42	88	d	//
RC02	3.1	78	8.0	1.222	1.31	1.61	32	d	//
	3.2	78	5.0	1.222	0.82	1.00	20	d	//
	6.7	78	4.0	1.222	0.66	0.80	16	d	//
	7.7	78	2.0	1.222	0.33	0.40	8	d	//
	8.6	78	12.0	1.222	1.97	2.41	48	d	//
RC03	3.3	78	2.0	1.222	0.33	0.40	8	d	//
	4.5	78	6.0	1.222	0.99	1.20	24	d	//
	7.5	78	2.0	1.222	0.33	0.40	8	d	//
	7.7	78	19.0	1.222	3.12	3.81	76	d	//
	8.8	78	8.0	1.222	1.31	1.61	32	d	//

Statistical Summary Data	Is(50)	UCS*
Number of Samples Tested	15	15
Minimum	0.40	8
Average	2.20	44
Maximum	5.22	104
Standard Dev.	1.61	32
Upper 95% Confidence Limit	5.34	106.83
Lower 95% Confidence Limit	-0.95	-19.02

Comments:
*UCS taken as k x Point Load Is(50): k= 20

*UCS Normal Distribution Curve



Abbreviations	
i	irregular
a	axial
b	block
d	diametral

approx. orientation to planes of weakness/bedding	
U	unknown
P	perpendicular
//	parallel

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	Project Apollo
Job Number:	23300
Hole No:	RC01
Depth (m):	6.30m

Sample Description

Colour:	Grey/dark grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

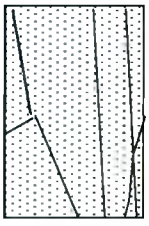
Sample Measurements

Length	206	
Diameter (Ø)	78.1	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	206	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength $= \dfrac{206000}{4788.19385}$

$= \dfrac{1000 \times P}{\prod \times (Ø/2)^2}$

$=$ 43.00 (Mpa)

Bulk Density $=$ 2.64 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	Project Apollo
Job Number:	23300
Hole No:	RC02
Depth (m):	5.50m

Sample Description

Colour:	Grey/dark grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

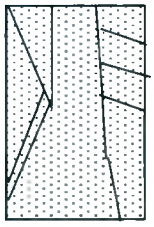
Sample Measurements

Length	205	
Diameter (Ø)	78	mm

Testing

Load Rate	4.3	kN/min
Load at Failure (P)	232	kN

Sketch of Failure Surfaces



Strength Calculations

Uniaxial Compressive Strength $= \dfrac{232000}{4775.94}$

$= \dfrac{1000 \times P}{\prod \times (Ø/2)^2}$

$=$ 48.55 (Mpa)

Bulk Density $=$ 2.67 (Mg/m^3)

Notes:

Uniaxial Compression Test Report Sheet

I.G.S.L.

Sample Identification

Contract Name:	Project Apollo
Job Number:	23300
Hole No:	RC03
Depth (m):	5.90m

Sample Description

Colour:	Grey/dark grey
Grain size:	Fine-grained
Weathering Grade:	Fresh
Rock Type:	LIMESTONE

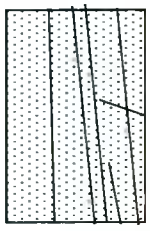
Weathering Grade Criteria

I. Fresh:	Unchanged from original state
II. Slightly weathered:	Slight discolouration, slight weakening
III. Moderately weathered:	Considerable weakening, penetrative discolouration
IV. Highly weathered:	Considerable weakening, penetrative discolouration, breaks in hand

Sample Measurements

Length	201	
Diameter (Ø)	78	mm

Sketch of Failure Surfaces



Testing

Load Rate	4.3	kN/min
Load at Failure (P)	434	kN

Strength Calculations

Uniaxial Compressive Strength $= \dfrac{434000}{4775.94}$

$= \dfrac{1000 \times P}{\Pi \times (Ø/2)^2}$

$=$ 90.83 (Mpa)

Bulk Density $=$ 2.61 (Mg/m^3)

Notes:

Appendix 10

Environmental Soil Laboratory Test Records

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

UKAS TESTING
2183

Final Report

Report No.:	21-19137-1		
Initial Date of Issue:	16-Jun-2021		
Client	IGSL		
Client Address:	M7 Business Park Naas County Kildare Ireland		
Contact(s):	Darren Keogh		
Project	23300 Project Appollo Grangecastle Dublin (Ramboll)		
Quotation No.:	Q20-21693	**Date Received:**	07-Jun-2021
Order No.:		**Date Instructed:**	07-Jun-2021
No. of Samples:	21		
Turnaround (Wkdays):	7	**Results Due:**	15-Jun-2021
Date Approved:	16-Jun-2021		
Approved By:			
Details:	Glynn Harvey, Technical Manager		

Results - Leachate

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL				Chemtest Job No.:		21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137
Quotation No.: Q20-21693				Chemtest Sample ID.:		1215872	1215874	1215876	1215878	1215880	1215881	1215883	1215884	1215885	1215886	1215887
Order No.:				Client Sample Ref.:		AA143083	AA143089	AA143094	AA143099	AA148062	AA148065	AA148070	AA148073	AA148077	AA148080	AA148083
				Sample Location:		TP1	TP2	TP3	TP4	TP5	TP6	TP7	TP8	TP9	TP10	TP11
				Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):		0.30	0.50	0.50	0.50	1.00	0.50	0.50	0.50	0.60	0.50	0.40
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**											
pH	U	1010	10:1		N/A	8.5	8.4	8.5	8.5	8.7	8.4	8.5	8.6	8.6	8.7	8.1
Ammonium	U	1220	10:1	mg/l	0.050	0.10	0.067	0.057	< 0.050	< 0.050	0.11	0.063	< 0.050	0.077	0.056	0.17
Ammonium	N	1220	10:1	mg/kg	0.10	1.2	0.76	0.68	0.40	0.64	1.2	0.75	0.51	0.95	0.72	1.8
Boron (Dissolved)	U	1455	10:1	mg/kg	0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01
Benzo[j]fluoranthene	N	1800	10:1	µg/l	0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010	< 0.010

Results - Leachate

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL				Chemtest Job No.:		21-19137	21-19137
Quotation No.: Q20-21693				Chemtest Sample ID.:		1215889	1215891
Order No.:				Client Sample Ref.:		AA158663	AA148092
				Sample Location:		TP12	TP13
				Sample Type:		SOIL	SOIL
				Top Depth (m):		0.10	0.50
Determinand	**Accred.**	**SOP**	**Type**	**Units**	**LOD**		
pH	U	1010	10:1		N/A	8.4	8.5
Ammonium	U	1220	10:1	mg/l	0.050	0.088	0.062
Ammonium	N	1220	10:1	mg/kg	0.10	1.0	0.72
Boron (Dissolved)	U	1455	10:1	mg/kg	0.01	< 0.01	< 0.01
Benzo[j]fluoranthene	N	1800	10:1	µg/l	0.010	< 0.010	< 0.010

Results - Soil

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL				Chemtest Job No.:	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137
Quotation No.: Q20-21693				Chemtest Sample ID.:	1215872	1215873	1215874	1215875	1215876	1215877	1215878	1215879	1215880
Order No.:				Client Sample Ref.:	AA143083	AA143085	AA143089	AA143090	AA143094	AA143096	AA143099	AA148061	AA148062
				Sample Location:	TP1	TP1	TP2	TP2	TP3	TP3	TP4	TP5	TP5
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.30	0.50	0.50	1.00	0.50	1.00	0.50	1.00	1.00
				Asbestos Lab:	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
Moisture	N	2030	%	0.020	23	10	23	11	20	12	32	15	16
pH (2.5:1)	N	2010		4.0		[A] 8.9		[A] 8.7		[A] 8.8		[A] 8.5	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] < 0.40		[A] < 0.40		[A] < 0.40		[A] 0.65		[A] < 0.40
Magnesium (Water Soluble)	N	2120	g/l	0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Total Sulphur	U	2175	%	0.010		[A] 0.044		[A] 0.038		[A] 0.088		[A] 0.17	
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 4.1		[A] 3.4		[A] 3.4		[A] 3.2		[A] 2.9
Chloride (Water Soluble)	U	2220	g/l	0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Nitrate (Water Soluble)	N	2220	g/l	0.010		< 0.010		< 0.010		< 0.010		< 0.010	
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50		[A] < 0.50		[A] < 0.50		[A] < 0.50		[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 1.2		[A] 2.7		[A] 3.1		[A] 1.0		[A] 2.4
Ammonium (Water Soluble)	U	2220	g/l	0.01		< 0.01		< 0.01		< 0.01		< 0.01	
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.076	[A] 0.040	[A] 0.073	[A] 0.031	[A] 0.065	[A] 0.020	[A] 0.076	[A] < 0.010	[A] < 0.010
Arsenic	U	2450	mg/kg	1.0	18		38		24		11		8.0
Barium	U	2450	mg/kg	10	100		600		290		86		13
Cadmium	U	2450	mg/kg	0.10	3.4		4.0		3.1		2.3		0.85
Chromium	U	2450	mg/kg	1.0	25		31		17		28		5.9
Molybdenum	U	2450	mg/kg	2.0	5.7		8.9		7.0		< 2.0		3.5
Antimony	N	2450	mg/kg	2.0	2.9		2.2		2.1		< 2.0		< 2.0
Copper	U	2450	mg/kg	0.50	53		28		27		24		13
Mercury	U	2450	mg/kg	0.10	0.15		0.14		0.11		0.12		< 0.10
Nickel	U	2450	mg/kg	0.50	78		67		61		31		31
Lead	U	2450	mg/kg	0.50	39		44		41		24		8.9
Selenium	U	2450	mg/kg	0.20	1.4		1.3		0.43		0.70		0.41
Zinc	U	2450	mg/kg	0.50	140		120		93		68		26
Chromium (Trivalent)	N	2490	mg/kg	1.0	25		31		17		28		5.9
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50		< 0.50		< 0.50		< 0.50		< 0.50
Mineral Oil (TPH Calculation)	N	2670	mg/kg	10	< 10		< 10		< 10		< 10		< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0

Results - Soil

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL					Chemtest Job No.:	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137
Quotation No.: Q20-21693					Chemtest Sample ID.:	1215872	1215873	1215874	1215875	1215876	1215877	1215878	1215879	1215880
Order No.:					Client Sample Ref.:	AA143083	AA143085	AA143089	AA143090	AA143094	AA143096	AA143099	AA148061	AA148062
					Sample Location:	TP1	TP1	TP2	TP2	TP3	TP3	TP4	TP5	TP5
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.30	0.50	0.50	1.00	0.50	1.00	0.50	1.00	1.00
					Asbestos Lab:	COVENTRY		COVENTRY		COVENTRY		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0		[A] < 5.0		[A] < 5.0		[A] < 5.0		[A] < 5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0		[A] < 5.0		[A] < 5.0		[A] < 5.0		[A] < 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10		[A] < 10		[A] < 10		[A] < 10		[A] < 10	
Benzene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Toluene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0		[A] < 1.0	
Naphthalene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Acenaphthylene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Acenaphthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Fluorene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Phenanthrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Anthracene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Pyrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Benzo[a]anthracene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Chrysene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Benzo[a]pyrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Coronene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010		[A] < 0.010	
Total Of 17 PAH's	N	2800	mg/kg	0.20	[A] < 0.20		[A] < 0.20		[A] < 0.20		[A] < 0.20		[A] < 0.20	
PCB 28	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010	
PCB 52	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010	

Results - Soil

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL			Chemtest Job No.:		21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137
Quotation No.: Q20-21693			Chemtest Sample ID.:		1215872	1215873	1215874	1215875	1215876	1215877	1215878	1215879	1215880
Order No.:			Client Sample Ref.:		AA143083	AA143085	AA143089	AA143090	AA143094	AA143096	AA143099	AA148061	AA148062
			Sample Location:		TP1	TP1	TP2	TP2	TP3	TP3	TP4	TP5	TP5
			Sample Type:		SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
			Top Depth (m):		0.30	0.50	0.50	1.00	0.50	1.00	0.50	1.00	1.00
			Asbestos Lab:		COVENTRY		COVENTRY		COVENTRY		COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**									
PCB 90+101	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010
PCB 118	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010
PCB 153	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010
PCB 138	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010
PCB 180	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010		[A] < 0.0010
Total Phenols	U	2920	mg/kg	0.10	< 0.10		< 0.10		< 0.10		< 0.10		< 0.10

Results - Soil

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL				Chemtest Job No.:	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137
Quotation No.: Q20-21693				Chemtest Sample ID.:	1215881	1215882	1215883	1215884	1215885	1215886	1215887	1215888	1215889
Order No.:				Client Sample Ref.:	AA148065	AA148066	AA148070	AA148073	AA148077	AA148080	AA148083	AA148085	AA158663
				Sample Location:	TP6	TP6	TP7	TP8	TP9	TP10	TP11	TP11	TP12
				Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.60	0.50	0.50	0.60	0.50	0.40	1.00	0.10
				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
Moisture	N	2030	%	0.020	21	15	17	15	15	14	15	18	14
pH (2.5:1)	N	2010		4.0		[A] 8.5						[A] 9.4	
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40	[A] < 0.40		[A] < 0.40	[A] < 0.40	[A] < 0.40	[A] < 0.40	[A] < 0.40		[A] < 0.40
Magnesium (Water Soluble)	N	2120	g/l	0.010		[A] < 0.010						[A] < 0.010	
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010		[A] < 0.010						[A] < 0.010	
Total Sulphur	U	2175	%	0.010		[A] 0.021						[A] 0.024	
Sulphur (Elemental)	U	2180	mg/kg	1.0	[A] 3.3		[A] 3.2	[A] < 1.0	[A] 1.1	[A] 5.9	[A] 2.6		[A] 3.4
Chloride (Water Soluble)	U	2220	g/l	0.010		[A] < 0.010						[A] < 0.010	
Nitrate (Water Soluble)	N	2220	g/l	0.010		< 0.010						< 0.010	
Cyanide (Total)	U	2300	mg/kg	0.50	[A] < 0.50		[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50	[A] < 0.50		[A] < 0.50
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50	[A] 0.96		[A] 12	[A] 3.2	[A] 2.1	[A] 1.1	[A] < 0.50		[A] 1.7
Ammonium (Water Soluble)	U	2220	g/l	0.01		< 0.01						< 0.01	
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.036	[A] 0.029	[A] 0.022	[A] 0.035	[A] < 0.010	[A] 0.068	[A] 0.042	[A] < 0.010	[A] 0.024
Arsenic	U	2450	mg/kg	1.0	10		15	16	13	16	25		18
Barium	U	2450	mg/kg	10	89		85	180	30	14	140		50
Cadmium	U	2450	mg/kg	0.10	1.8		3.0	1.5	0.83	0.57	1.5		1.4
Chromium	U	2450	mg/kg	1.0	14		17	15	11	7.3	25		11
Molybdenum	U	2450	mg/kg	2.0	3.0		4.9	4.7	4.1	3.4	5.0		3.4
Antimony	N	2450	mg/kg	2.0	< 2.0		2.2	< 2.0	< 2.0	3.3	2.2		< 2.0
Copper	U	2450	mg/kg	0.50	20		34	20	24	13	16		22
Mercury	U	2450	mg/kg	0.10	< 0.10		0.13	< 0.10	< 0.10	< 0.10	0.11		< 0.10
Nickel	U	2450	mg/kg	0.50	35		62	49	52	25	31		44
Lead	U	2450	mg/kg	0.50	21		23	15	16	10	25		19
Selenium	U	2450	mg/kg	0.20	0.49		0.42	< 0.20	< 0.20	1.2	1.2		0.24
Zinc	U	2450	mg/kg	0.50	75		82	39	31	16	73		38
Chromium (Trivalent)	N	2490	mg/kg	1.0	14		17	15	11	7.3	25		11
Chromium (Hexavalent)	N	2490	mg/kg	0.50	< 0.50		< 0.50	< 0.50	< 0.50	< 0.50	< 0.50		< 0.50
Mineral Oil (TPH Calculation)	N	2670	mg/kg	10	< 10		< 10	< 10	< 10	< 10	< 10		< 10
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0

Results - Soil

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL					Chemtest Job No.:	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137
Quotation No.: Q20-21693					Chemtest Sample ID.:	1215881	1215882	1215883	1215884	1215885	1215886	1215887	1215888	1215889
Order No.:					Client Sample Ref.:	AA148065	AA148066	AA148070	AA148073	AA148077	AA148080	AA148083	AA148085	AA158663
					Sample Location:	TP6	TP6	TP7	TP8	TP9	TP10	TP11	TP11	TP12
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	0.60	0.50	0.50	0.60	0.50	0.40	1.00	0.10
					Asbestos Lab:	COVENTRY		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0		[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0		[AC] < 5.0
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0	[A] < 5.0		[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0	[A] < 5.0		[AC] < 5.0
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0	[A] < 10		[A] < 10	[A] < 10	[A] < 10	[A] < 10	[A] < 10		[AC] < 10
Benzene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Toluene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Ethylbenzene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
m & p-Xylene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
o-Xylene	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0	[A] < 1.0		[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0	[A] < 1.0		[AC] < 1.0
Naphthalene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Acenaphthylene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Acenaphthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Fluorene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Phenanthrene	N	2800	mg/kg	0.010	[A] 0.044		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Anthracene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Fluoranthene	N	2800	mg/kg	0.010	[A] 0.059		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] 0.060
Pyrene	N	2800	mg/kg	0.010	[A] 0.061		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] 0.031
Benzo[a]anthracene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Chrysene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Benzo[b]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Benzo[k]fluoranthene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Benzo[a]pyrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Coronene	N	2800	mg/kg	0.010	[A] < 0.010		[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010	[A] < 0.010		[A] < 0.010
Total Of 17 PAH's	N	2800	mg/kg	0.20	[A] < 0.20		[A] < 0.20	[A] < 0.20	[A] < 0.20	[A] < 0.20	[A] < 0.20		[A] < 0.20
PCB 28	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010		[AC] < 0.0010
PCB 52	N	2815	mg/kg	0.0010	[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010		[AC] < 0.0010

Results - Soil

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL					Chemtest Job No.:	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137	21-19137
Quotation No.: Q20-21693					Chemtest Sample ID.:	1215881	1215882	1215883	1215884	1215885	1215886	1215887	1215888	1215889
Order No.:					Client Sample Ref.:	AA148065	AA148066	AA148070	AA148073	AA148077	AA148080	AA148083	AA148085	AA158663
					Sample Location:	TP6	TP6	TP7	TP8	TP9	TP10	TP11	TP11	TP12
					Sample Type:	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	0.60	0.50	0.50	0.60	0.50	0.40	1.00	0.10
					Asbestos Lab:	COVENTRY		COVENTRY	COVENTRY	COVENTRY	COVENTRY	COVENTRY		COVENTRY
Determinand	**Accred.**	**SOP**	**Units**	**LOD**										
PCB 90+101	N	2815	mg/kg	0.0010		[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010		[AC] < 0.0010
PCB 118	N	2815	mg/kg	0.0010		[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010		[AC] < 0.0010
PCB 153	N	2815	mg/kg	0.0010		[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010		[AC] < 0.0010
PCB 138	N	2815	mg/kg	0.0010		[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010		[AC] < 0.0010
PCB 180	N	2815	mg/kg	0.0010		[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010		[AC] < 0.0010
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010		[A] < 0.0010		[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010	[A] < 0.0010		[AC] < 0.0010
Total Phenols	U	2920	mg/kg	0.10		< 0.10		< 0.10	< 0.10	< 0.10	< 0.10	< 0.10		< 0.10

Results - Soil

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL				Chemtest Job No.:	21-19137	21-19137	21-19137
Quotation No.: Q20-21693				Chemtest Sample ID.:	1215890	1215891	1215892
Order No.:				Client Sample Ref.:	AA148088	AA148092	AA148093
				Sample Location:	TP12	TP13	TP13
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.50	1.00
				Asbestos Lab:		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
ACM Type	U	2192		N/A		-	
Asbestos Identification	U	2192		N/A		No Asbestos Detected	
Moisture	N	2030	%	0.020	15	22	17
pH (2.5:1)	N	2010		4.0	[A] 9.6		[A] 9.5
Boron (Hot Water Soluble)	U	2120	mg/kg	0.40		[A] < 0.40	
Magnesium (Water Soluble)	N	2120	g/l	0.010	[A] < 0.010		[A] < 0.010
Sulphate (2:1 Water Soluble) as SO4	U	2120	g/l	0.010	[A] < 0.010		[A] < 0.010
Total Sulphur	U	2175	%	0.010	[A] 0.020		[A] 0.033
Sulphur (Elemental)	U	2180	mg/kg	1.0		[A] 4.0	
Chloride (Water Soluble)	U	2220	g/l	0.010	[A] < 0.010		[A] < 0.010
Nitrate (Water Soluble)	N	2220	g/l	0.010	0.015		< 0.010
Cyanide (Total)	U	2300	mg/kg	0.50		[A] < 0.50	
Sulphide (Easily Liberatable)	N	2325	mg/kg	0.50		[A] 1.1	
Ammonium (Water Soluble)	U	2220	g/l	0.01	< 0.01		< 0.01
Sulphate (Acid Soluble)	U	2430	%	0.010	[A] 0.011	[A] 0.016	[A] < 0.010
Arsenic	U	2450	mg/kg	1.0		17	
Barium	U	2450	mg/kg	10		61	
Cadmium	U	2450	mg/kg	0.10		0.98	
Chromium	U	2450	mg/kg	1.0		19	
Molybdenum	U	2450	mg/kg	2.0		2.6	
Antimony	N	2450	mg/kg	2.0		< 2.0	
Copper	U	2450	mg/kg	0.50		15	
Mercury	U	2450	mg/kg	0.10		< 0.10	
Nickel	U	2450	mg/kg	0.50		26	
Lead	U	2450	mg/kg	0.50		21	
Selenium	U	2450	mg/kg	0.20		0.56	
Zinc	U	2450	mg/kg	0.50		59	
Chromium (Trivalent)	N	2490	mg/kg	1.0		19	
Chromium (Hexavalent)	N	2490	mg/kg	0.50		< 0.50	
Mineral Oil (TPH Calculation)	N	2670	mg/kg	10		< 10	
Aliphatic TPH >C5-C6	N	2680	mg/kg	1.0		[A] < 1.0	
Aliphatic TPH >C6-C8	N	2680	mg/kg	1.0		[A] < 1.0	
Aliphatic TPH >C8-C10	U	2680	mg/kg	1.0		[A] < 1.0	
Aliphatic TPH >C10-C12	U	2680	mg/kg	1.0		[A] < 1.0	
Aliphatic TPH >C12-C16	U	2680	mg/kg	1.0		[A] < 1.0	
Aliphatic TPH >C16-C21	U	2680	mg/kg	1.0		[A] < 1.0	
Aliphatic TPH >C21-C35	U	2680	mg/kg	1.0		[A] < 1.0	

Results - Soil

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL					Chemtest Job No.:	21-19137	21-19137	21-19137
Quotation No.: Q20-21693					Chemtest Sample ID.:	1215890	1215891	1215892
Order No.:					Client Sample Ref.:	AA148088	AA148092	AA148093
					Sample Location:	TP12	TP13	TP13
					Sample Type:	SOIL	SOIL	SOIL
					Top Depth (m):	0.50	0.50	1.00
					Asbestos Lab:		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**				
Aliphatic TPH >C35-C44	N	2680	mg/kg	1.0			[A] < 1.0	
Total Aliphatic Hydrocarbons	N	2680	mg/kg	5.0			[A] < 5.0	
Aromatic TPH >C5-C7	N	2680	mg/kg	1.0			[A] < 1.0	
Aromatic TPH >C7-C8	N	2680	mg/kg	1.0			[A] < 1.0	
Aromatic TPH >C8-C10	U	2680	mg/kg	1.0			[A] < 1.0	
Aromatic TPH >C10-C12	U	2680	mg/kg	1.0			[A] < 1.0	
Aromatic TPH >C12-C16	U	2680	mg/kg	1.0			[A] < 1.0	
Aromatic TPH >C16-C21	U	2680	mg/kg	1.0			[A] < 1.0	
Aromatic TPH >C21-C35	U	2680	mg/kg	1.0			[A] < 1.0	
Aromatic TPH >C35-C44	N	2680	mg/kg	1.0			[A] < 1.0	
Total Aromatic Hydrocarbons	N	2680	mg/kg	5.0			[A] < 5.0	
Total Petroleum Hydrocarbons	N	2680	mg/kg	10.0			[A] < 10	
Benzene	U	2760	µg/kg	1.0			[A] < 1.0	
Toluene	U	2760	µg/kg	1.0			[A] < 1.0	
Ethylbenzene	U	2760	µg/kg	1.0			[A] < 1.0	
m & p-Xylene	U	2760	µg/kg	1.0			[A] < 1.0	
o-Xylene	U	2760	µg/kg	1.0			[A] < 1.0	
Methyl Tert-Butyl Ether	U	2760	µg/kg	1.0			[A] < 1.0	
Naphthalene	N	2800	mg/kg	0.010			[A] < 0.010	
Acenaphthylene	N	2800	mg/kg	0.010			[A] < 0.010	
Acenaphthene	N	2800	mg/kg	0.010			[A] < 0.010	
Fluorene	N	2800	mg/kg	0.010			[A] < 0.010	
Phenanthrene	N	2800	mg/kg	0.010			[A] < 0.010	
Anthracene	N	2800	mg/kg	0.010			[A] < 0.010	
Fluoranthene	N	2800	mg/kg	0.010			[A] < 0.010	
Pyrene	N	2800	mg/kg	0.010			[A] < 0.010	
Benzo[a]anthracene	N	2800	mg/kg	0.010			[A] < 0.010	
Chrysene	N	2800	mg/kg	0.010			[A] < 0.010	
Benzo[b]fluoranthene	N	2800	mg/kg	0.010			[A] < 0.010	
Benzo[k]fluoranthene	N	2800	mg/kg	0.010			[A] < 0.010	
Benzo[a]pyrene	N	2800	mg/kg	0.010			[A] < 0.010	
Indeno(1,2,3-c,d)Pyrene	N	2800	mg/kg	0.010			[A] < 0.010	
Dibenz(a,h)Anthracene	N	2800	mg/kg	0.010			[A] < 0.010	
Benzo[g,h,i]perylene	N	2800	mg/kg	0.010			[A] < 0.010	
Coronene	N	2800	mg/kg	0.010			[A] < 0.010	
Total Of 17 PAH's	N	2800	mg/kg	0.20			[A] < 0.20	
PCB 28	N	2815	mg/kg	0.0010			[A] < 0.0010	
PCB 52	N	2815	mg/kg	0.0010			[A] < 0.0010	

Results - Soil

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Client: IGSL				Chemtest Job No.:	21-19137	21-19137	21-19137
Quotation No.: Q20-21693				Chemtest Sample ID.:	1215890	1215891	1215892
Order No.:				Client Sample Ref.:	AA148088	AA148092	AA148093
				Sample Location:	TP12	TP13	TP13
				Sample Type:	SOIL	SOIL	SOIL
				Top Depth (m):	0.50	0.50	1.00
				Asbestos Lab:		COVENTRY	
Determinand	**Accred.**	**SOP**	**Units**	**LOD**			
PCB 90+101	N	2815	mg/kg	0.0010		[A] < 0.0010	
PCB 118	N	2815	mg/kg	0.0010		[A] < 0.0010	
PCB 153	N	2815	mg/kg	0.0010		[A] < 0.0010	
PCB 138	N	2815	mg/kg	0.0010		[A] < 0.0010	
PCB 180	N	2815	mg/kg	0.0010		[A] < 0.0010	
Total PCBs (7 congeners)	N	2815	mg/kg	0.0010		[A] < 0.0010	
Total Phenols	U	2920	mg/kg	0.10		< 0.10	

Project: 23300 Project Appollo Grangecastle D[illegible]n (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215872						
Sample Ref:	AA143083						
Sample ID:							
Sample Location:	TP1						
Top Depth(m):	0.30						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 1.6	3	5	6
Loss On Ignition	2610	U	%	6.3	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0020	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0005	0.0049	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0005	0.0050	0.5	10	70
Copper	1455	U	0.0027	0.027	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0012	0.012	0.5	10	30
Nickel	1455	U	0.0013	0.013	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.36	3.6	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	91	900	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.7	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	23

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215874						
Sample Ref:	AA143089						
Sample ID:							
Sample Location:	TP2						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	U	%	[A] 0.84	3	5	6
Loss On Ignition	2610	U	%	5.5	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.013	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0003	0.0033	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0021	0.021	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0010	0.0099	0.5	10	30
Nickel	1455	U	0.0009	0.0086	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.32	3.2	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	91	900	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	6.9	69	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	23

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle D[illegible]n (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215876						
Sample Ref:	AA143094						
Sample ID:							
Sample Location:	TP3						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 1.2	3	5	6
Loss On Ignition	2610	U	%	3.8	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.039	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0002	0.0023	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0005	0.0054	0.5	10	70
Copper	1455	U	0.0009	0.0092	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0069	0.069	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.53	5.3	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	72	710	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	4.8	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	20

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215878						
Sample Ref:	AA143099						
Sample ID:							
Sample Location:	TP4						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	U	%	[A] 1.6	3	5	6
Loss On Ignition	2610	U	%	6.9	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.4	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.0090	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0008	0.0078	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0007	0.0072	0.5	10	70
Copper	1455	U	0.0021	0.021	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0011	0.011	0.5	10	30
Nickel	1455	U	0.0006	0.0063	0.4	10	40
Lead	1455	U	0.0007	0.0073	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0011	0.011	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	1.2	12	800	15000	25000
Fluoride	1220	U	0.33	3.3	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	65	640	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	14	140	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	32

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle D[illegible]n (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215880						
Sample Ref:	AA148062						
Sample ID:							
Sample Location:	TP5						
Top Depth(m):	1.00						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.29	3	5	6
Loss On Ignition	2610	U	%	2.7	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.074	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0042	0.042	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.51	5.1	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	55	540	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	8.8	88	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	16

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215881						
Sample Ref:	AA148065						
Sample ID:							
Sample Location:	TP6						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	U	%	[A] 1.1	3	5	6
Loss On Ignition	2610	U	%	4.6	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.0	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.010	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0004	0.0035	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0006	0.0057	0.5	10	70
Copper	1455	U	0.0028	0.028	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0018	0.018	0.5	10	30
Nickel	1455	U	0.0011	0.011	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.28	2.8	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	120	1200	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	7.1	71	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	21

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle D[illegible]n (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215883						
Sample Ref:	AA148070						
Sample ID:							
Sample Location:	TP7						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.42	3	5	6
Loss On Ignition	2610	U	%	3.4	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.016	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0041	0.041	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.33	3.3	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	65	650	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.5	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	17

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Chemtest Job No:	21-19137				Landfill Waste Acceptance Criteria Limits		
Chemtest Sample ID:	1215884						
Sample Ref:	AA148073						
Sample ID:							
Sample Location:	TP8						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.68	3	5	6
Loss On Ignition	2610	U	%	13	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		9.3	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.042	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0007	0.0073	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0065	0.065	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.47	4.7	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	72	710	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	5.8	58	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle D[illegible]n (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215885						
Sample Ref:	AA148077						
Sample ID:							
Sample Location:	TP9						
Top Depth(m):	0.60						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] < 0.20	3	5	6
Loss On Ignition	2610	U	%	2.4	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		9.5	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.055	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0007	0.0065	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0057	0.057	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.34	3.4	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	59	580	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	2.9	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215886						
Sample Ref:	AA148080						
Sample ID:							
Sample Location:	TP10						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 0.57	3	5	6
Loss On Ignition	2610	U	%	2.2	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		9.1	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.10	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	< 0.0005	< 0.0005	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0028	0.028	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0095	0.096	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	2.3	23	800	15000	25000
Fluoride	1220	U	0.16	1.6	10	150	500
Sulphate	1220	U	23	230	1000	20000	50000
Total Dissolved Solids	1020	N	85	840	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	2.9	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle D[illegible]n (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215887						
Sample Ref:	AA148083						
Sample ID:							
Sample Location:	TP11						
Top Depth(m):	0.40						
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**		**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Total Organic Carbon	2625	U	%	[A] 2.9	3	5	6
Loss On Ignition	2610	U	%	5.8	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.2	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.069	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0037	0.037	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0020	0.020	0.5	10	70
Copper	1455	U	0.0028	0.028	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0009	0.0091	0.5	10	30
Nickel	1455	U	0.0037	0.037	0.4	10	40
Lead	1455	U	0.0014	0.014	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	< 0.0005	< 0.0005	0.1	0.5	7
Zinc	1455	U	0.007	0.068	4	50	200
Chloride	1220	U	2.0	20	800	15000	25000
Fluoride	1220	U	0.12	1.2	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	35	350	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	15	150	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	15

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle Dublin (Ramboll)

Chemtest Job No:	21-19137				Landfill Waste Acceptance Criteria Limits		
Chemtest Sample ID:	1215889						
Sample Ref:	AA158663						
Sample ID:							
Sample Location:	TP12						
Top Depth(m):	0.10				Inert Waste Landfill	Stable, Non-reactive hazardous waste in non-hazardous Landfill	Hazardous Waste Landfill
Bottom Depth(m):							
Sampling Date:							
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	U	%	[A] 0.52	3	5	6
Loss On Ignition	2610	U	%	2.9	--	--	10
Total BTEX	2760	U	mg/kg	[AC] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[AC] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[AC] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.6	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.13	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	< 0.0002	< 0.0002	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	< 0.0005	< 0.0005	0.5	10	70
Copper	1455	U	0.0005	0.0051	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0058	0.058	0.5	10	30
Nickel	1455	U	< 0.0005	< 0.0005	0.4	10	40
Lead	1455	U	< 0.0005	< 0.0005	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0005	0.0054	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.44	4.4	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	62	620	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	3.9	< 50	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	14

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Project: 23300 Project Appollo Grangecastle D[illegible]n (Ramboll)

					Landfill Waste Acceptance Criteria Limits		
Chemtest Job No:	21-19137						
Chemtest Sample ID:	1215891						
Sample Ref:	AA148092						
Sample ID:							
Sample Location:	TP13						
Top Depth(m):	0.50						
Bottom Depth(m):							
Sampling Date:					**Inert Waste Landfill**	**Stable, Non-reactive hazardous waste in non-hazardous Landfill**	**Hazardous Waste Landfill**
Determinand	**SOP**	**Accred.**	**Units**				
Total Organic Carbon	2625	U	%	[A] 0.58	3	5	6
Loss On Ignition	2610	U	%	4.0	--	--	10
Total BTEX	2760	U	mg/kg	[A] < 0.010	6	--	--
Total PCBs (7 congeners)	2815	N	mg/kg	[A] < 0.0010	1	--	--
TPH Total WAC	2670	U	mg/kg	[A] < 10	500	--	--
Total Of 17 PAH's	2800	N	mg/kg	[A] < 0.20	100	--	--
pH	2010	U		8.7	--	>6	--
Acid Neutralisation Capacity	2015	N	mol/kg	0.012	--	To evaluate	To evaluate
Eluate Analysis			**10:1 Eluate mg/l**	**10:1 Eluate mg/kg**	**Limit values for compliance leaching test using BS EN 12457 at L/S 10 l/kg**		
Arsenic	1455	U	0.0013	0.013	0.5	2	25
Barium	1455	U	< 0.005	< 0.0005	20	100	300
Cadmium	1455	U	< 0.00011	< 0.00011	0.04	1	5
Chromium	1455	U	0.0007	0.0067	0.5	10	70
Copper	1455	U	0.0016	0.016	2	50	100
Mercury	1455	U	< 0.00005	< 0.00005	0.01	0.2	2
Molybdenum	1455	U	0.0015	0.015	0.5	10	30
Nickel	1455	U	0.0012	0.012	0.4	10	40
Lead	1455	U	0.0006	0.0062	0.5	10	50
Antimony	1455	U	< 0.0005	< 0.0005	0.06	0.7	5
Selenium	1455	U	0.0005	0.0051	0.1	0.5	7
Zinc	1455	U	< 0.003	< 0.003	4	50	200
Chloride	1220	U	< 1.0	< 10	800	15000	25000
Fluoride	1220	U	0.54	5.4	10	150	500
Sulphate	1220	U	< 1.0	< 10	1000	20000	50000
Total Dissolved Solids	1020	N	64	640	4000	60000	100000
Phenol Index	1920	U	< 0.030	< 0.30	1	-	-
Dissolved Organic Carbon	1610	U	7.9	79	500	800	1000

Solid Information	
Dry mass of test portion/kg	0.090
Moisture (%)	22

Waste Acceptance Criteria

Landfill WAC analysis (specifically leaching test results) must not be used for hazardous waste classification purposes. This analysis is only applicable for hazardous waste landfill acceptance and does not give any indication as to whether a waste may be hazardous or non-hazardous.

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory will assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1215872	AA143083		TP1		A	Amber Glass 250ml
1215872	AA143083		TP1		A	Plastic Tub 500g
1215873	AA143085		TP1		A	Amber Glass 250ml
1215873	AA143085		TP1		A	Plastic Tub 500g
1215874	AA143089		TP2		A	Amber Glass 250m
1215874	AA143089		TP2		A	Plastic Tub 500g
1215875	AA143090		TP2		A	Amber Glass 250ml
1215875	AA143090		TP2		A	Plastic Tub 500g
1215876	AA143094		TP3		A	Amber Glass 250ml
1215876	AA143094		TP3		A	Plastic Tub 500g
1215877	AA143096		TP3		A	Amber Glass 250ml
1215877	AA143096		TP3		A	Plastic Tub 500g
1215878	AA143099		TP4		A	Amber Glass 250m
1215878	AA143099		TP4		A	Plastic Tub 500g
1215879	AA148061		TP5		A	Amber Glass 250ml
1215879	AA148061		TP5		A	Plastic Tub 500g
1215880	AA148062		TP5		A	Amber Glass 250ml
1215880	AA148062		TP5		A	Plastic Tub 500g
1215881	AA148065		TP6		A	Amber Glass 250ml
1215881	AA148065		TP6		A	Plastic Tub 500g
1215882	AA148066		TP6		A	Amber G 250m
1215882	AA148066		TP6		A	Plastic Tub 500g

Deviations

In accordance with UKAS Policy on Deviating Samples TPS 63. Chemtest have a procedure to ensure 'upon receipt of each sample a competent laboratory shall assess whether the sample is suitable with regard to the requested test(s)'. This policy and the respective holding times applied, can be supplied upon request.The reason a sample is declared as deviating is detailed below. Where applicable the analysis remains UKAS/MCERTs accredited but the results may be compromised.

Sample:	Sample Ref:	Sample ID:	Sample Location:	Sampled Date:	Deviation Code(s):	Containers Received:
1215883	AA148070		TP7		A	Amber Glass 250ml
1215883	AA148070		TP7		A	Plastic Tub 500g
1215884	AA148073		TP8		A	Amber Glass 250ml
1215884	AA148073		TP8		A	Plastic Tub 500g
1215885	AA148077		TP9		A	Amber Glass 250ml
1215885	AA148077		TP9		A	Plastic Tub 500g
1215886	AA148080		TP10		A	Amber Glass 250ml
1215886	AA148080		TP10		A	Plastic Tub 500g
1215887	AA148083		TP11		A	Amber Glass 250ml
1215887	AA148083		TP11		A	Plastic Tub 500g
1215888	AA148085		TP11		A	Amber Glass 250ml
1215888	AA148085		TP11		A	Plastic Tub 500g
1215889	AA158663		TP12		AC	Plastic Tub 500g
1215890	AA148088		TP12		A	Amber Glass 250ml
1215890	AA148088		TP12		A	Plastic Tub 500g
1215891	AA148092		TP13		A	Amber Glass 250ml
1215891	AA148092		TP13		A	Plastic Tub 500g
1215892	AA148093		TP13		A	Amber Glass 250ml
1215892	AA148093		TP13		A	Plastic Tub 500g

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1020	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Electrical Conductivity and Total Dissolved Solids (TDS) in Waters	Conductivity Meter
1220	Anions, Alkalinity & Ammonium in Waters	Fluoride; Chloride; Nitrite; Nitrate; Total; Oxidisable Nitrogen (TON); Sulfate; Phosphate; Alkalinity; Ammonium	Automated colorimetric analysis using 'Aquakem 600' Discrete Analyser.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese: Mercury: Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1610	Total/Dissolved Organic Carbon in Waters	Organic Carbon	TOC Analyser using Catalytic Oxidation
1800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters by GC-MS	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	Pentane extraction / GCMS detection
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.
2010	pH Value of Soils	pH	pH Meter
2015	Acid Neutralisation Capacity	Acid Reserve	Titration
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
2175	Total Sulphur in Soils	Total Sulphur	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2180	Sulphur (Elemental) in Soils by HPLC	Sulphur	Dichloromethane extraction / HPLC with UV detection
2192	Asbestos	Asbestos	Polarised light microscopy / Gravimetry
2220	Water soluble Chloride in Soils	Chloride	Aqueous extraction and measuremernt by 'Aquakem 600' Discrete Analyser using ferric nitrate / mercuric thiocyanate.
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.
2325	Sulphide in Soils	Sulphide	Steam distillation with sulphuric acid / analysis by 'Aquakem 600' Discrete Analyser, using N,N–dimethyl-p-phenylenediamine.
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.

Test Methods

SOP	Title	Parameters included	Method summary
2610	Loss on Ignition	loss on ignition (LOI)	Determination of the proportion by mass that is lost from a soil by ignition at 550°C.
2625	Total Organic Carbon in Soils	Total organic Carbon (TOC)	Determined by high temperature combustion under oxygen, using an Eltra elemental analyser.
2670	Total Petroleum Hydrocarbons (TPH) in Soils by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO*TPH C8–C40	Dichloromethane extraction / GC-FID
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
2760	Volatile Organic Compounds (VOCs) in Soils by Headspace GC-MS	Volatile organic compounds, including BTEX and halogenated Aliphatic/Aromatics.(cf. USEPA Method 8260)*please refer to UKAS schedule	Automated headspace gas chromatographic (GC) analysis of a soil sample, as received, with mass spectrometric (MS) detection of volatile organic compounds.
2800	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Soil by GC-MS	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-MS
2815	Polychlorinated Biphenyls (PCB) ICES7Congeners in Soils by GC-MS	ICES7 PCB congeners	Acetone/Hexane extraction / GC-MS
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.
640	Characterisation of Waste (Leaching C10)	Waste material including soil, sludges and granular waste	ComplianceTest for Leaching of Granular Waste Material and Sludge

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"
SOP	Standard operating procedure
LOD	Limit of detection

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

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

Appendix 11

Environmental Groundwater & Surface Water Laboratory Test Records

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

UKAS TESTING
2183

Final Report

Report No.:	21-21918-1
Initial Date of Issue:	05-Jul-2021
Client	IGSL
Client Address:	M7 Business Park Naas County Kildare Ireland
Contact(s):	John Clancy
Project	Water Analysis
Quotation No.:	Q21-24299
Date Received:	
Order No.:	
Date Instructed:	28-Jun-2021
No. of Samples:	5
Turnaround (Wkdays):	5
Results Due:	02-Jul-2021
Date Approved:	05-Jul-2021
Approved By:	

Details: Glynn Harvey, Technical Manager

Results - Water

Project: Water Analysis

Client: IGSL		Chemtest Job No.:			21-21918	21-21918	21-21918	21-21918	21-21918
Quotation No.: Q21-24299		Chemtest Sample ID.:			1229332	1229333	1229334	1229335	1229336
		Sample Location:			WS1	WS2	RC 1	RC 2	RC 3
		Sample Type:			WATER	WATER	WATER	WATER	WATER
		Date Sampled:			21-Jun-2021	21-Jun-2021	21-Jun-2021	21-Jun-2021	21-Jun-2021
Determinand	**Accred.**	**SOP**	**Units**	**LOD**					
pH	U	1010		N/A	7.5	8.1	8.0	7.9	8.1
Cyanide (Total)	U	1300	mg/l	0.050	0.11	0.11	0.11	0.10	0.12
Arsenic (Dissolved)	U	1455	µg/l	0.20	1.5	0.87	0.63	0.50	1.7
Cadmium (Dissolved)	U	1455	µg/l	0.11	< 0.11	< 0.11	< 0.11	< 0.11	< 0.11
Chromium (Dissolved)	U	1455	µg/l	0.50	3.4	6.1	7.2	8.3	6.8
Copper (Dissolved)	U	1455	µg/l	0.50	4.1	4.6	2.5	1.8	0.97
Mercury (Dissolved)	U	1455	µg/l	0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Nickel (Dissolved)	U	1455	µg/l	0.50	5.9	3.8	4.8	4.2	3.2
Lead (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	< 0.50	< 0.50	< 0.50
Selenium (Dissolved)	U	1455	µg/l	0.50	< 0.50	< 0.50	17	22	4.3
Zinc (Dissolved)	U	1455	µg/l	2.5	6.2	3.8	6.7	< 2.5	< 2.5
Total TPH >C6-C40	U	1670	µg/l	10	< 10	< 10	< 10	< 10	< 10
Naphthalene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Acenaphthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluorene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Phenanthrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Chrysene	N	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[b]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[k]fluoranthene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[a]pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Indeno(1,2,3-c,d)Pyrene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Dibenz(a,h)Anthracene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Benzo[g,h,i]perylene	U	1700	µg/l	0.10	< 0.10	< 0.10	< 0.10	< 0.10	< 0.10
Total Of 16 PAH's	N	1700	µg/l	2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0
Total Phenols	U	1920	mg/l	0.030	< 0.030	< 0.030	< 0.030	< 0.030	< 0.030

Test Methods

SOP	Title	Parameters included	Method summary
1010	pH Value of Waters	pH	pH Meter
1300	Cyanides & Thiocyanate in Waters	Free (or easy liberatable) Cyanide; total Cyanide; complex Cyanide; Thiocyanate	Continuous Flow Analysis.
1455	Metals in Waters by ICP-MS	Metals, including: Antimony; Arsenic; Barium; Beryllium; Boron; Cadmium; Chromium; Cobalt; Copper; Lead; Manganese; Mercury; Molybdenum; Nickel; Selenium; Tin; Vanadium; Zinc	Filtration of samples followed by direct determination by inductively coupled plasma mass spectrometry (ICP-MS).
1670	Total Petroleum Hydrocarbons (TPH) in Waters by GC-FID	TPH (C6–C40); optional carbon banding, e.g. 3-band – GRO, DRO & LRO	Pentane extraction / GC FID detection
1700	Speciated Polynuclear Aromatic Hydrocarbons (PAH) in Waters 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)
1920	Phenols in Waters by HPLC	Phenolic compounds including: Phenol, Cresols, Xylenols, Trimethylphenols Note: Chlorophenols are excluded.	Determination by High Performance Liquid Chromatography (HPLC) using electrochemical detection.

Report Information

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

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

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

Appendix 12

Chemical Laboratory Test Records

Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

IGSL
Unit F
M7 Business Park
Naas

Analytical Test Report: L21/02130/IGS/21-19339

Your Project Reference:	**23300 Project Apollo**	Samples Received on:	30/06/2021
Your Order Number:	19263	Testing Instruction Received:	30/06/2021
Report Issue Number:	1	Sample Tested:	30/06 to 13/07/2021
Samples Analysed:	3 soil samples	Report issued:	14/07/2021

Signed

Peter Swanston
Environmental Laboratory Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies tab for details pertaining to the analytical methods undertaken

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Samples were supplied by customer, results apply to the samples as received.

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Accreditation Key

UKAS = UKAS Accreditation, u = Unaccredited

Date of Issue 10/12/2020
Owned by Emily Blissett - Customer Services Supervisor
Authorised by James Gane - Commercial Manager
J:\Public\Projects\2021\L21\IGS - IGSL\L21-2130-IGS\[L21-02130-IGS - 21-19339 XLSX]EN 1744 Combined

Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L21/02130/IGS/21-19339

Project Reference - 23300 Project Apollo

Analytical Test Results - Soil/Aggregate Testing

NC Reference			176203	176204	176205
Client Sample Reference			A21/2791	A21/2782	A21/2788
Material			Soil	Soil	Soil
Source/Cliet Reference			TP11 @ 1.5m	TP05 @ 2m	TP09 @ 1.2m
Sample Description			Dark grey crushed rock	Dark grey crushed rock	Dark grey crushed rock
	Units	**Accreditation**			
EN 1744 Determinations					
Total Sulphur content (as S)	(%)	UKAS	0.40	0.66	0.56
Acid soluble sulphate content (as SO_3)	(%)	UKAS	0.11	0.14	0.13
Acid soluble sulphate content (as SO_4)	(%)	u	0.13	0.17	0.16

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Leicester
LE1 4DH

L21/02130/IGS/21-19339

Project Reference - 23300 Project Apollo

Analysis Methodologies and Notes

Determinant	Test method and notes
EN 1744 Total Sulphur	Testing was in accordance with BS EN 1744-1:2009 + A1:2012 clause 11.
EN 1744 Acid Soluble Sulphate	Testing was in accordance with BS EN 1744-1:2009 + A1:2012 clause 12.

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7 - 11 Harding Street
Leicester
LE1 4DH

IGSL
Unit F
M7 Business Park
Naas

Analytical Test Report: L21/02240/IGS - 21-19468

Your Project Reference:	**23300 Project Apollo**		
Your Order Number:	19294	Samples Received / Instructed:	07/07/2021 / 07/07/2021
Report Issue Number:	1	Sample Tested:	07/07 to 15/07/2021
Samples Analysed:	3 soil samples	Report issued:	15/07/2021

Signed

Peter Swanston
Environmental Labs Manager
Nicholls Colton Group

Notes:

General

Please refer to Methodologies page for details pertaining to the analytical methods undertaken.

Samples will be retained for 14 days after issue of this report unless otherwise requested.

Moisture Content was determined in accordance with NC method statement MS - CL - Sample Prep, oven dried at <30°C.

Moisture Content is reported as a percentage of the dry mass of soil, this calculation is in accordance with BS1377, Part 2, 1990, Clause 3.2

Where specification limits are included these are for guidance only. Where a measured value has been highlighted this is not implying acceptance or failure and certainty of measurement values have not been taken into account.

Uncertainty of measurement values are available on request.

Samples were supplied by customer, results apply to the samples as received

Deviating Samples

On receipt samples are compared against our sample holding and handling protocols, where any deviations have been noted these are reported on our deviating sample page (if present)

Accreditation Key

UKAS = UKAS Accreditation, MCERTS = MCERTS Accreditation, u = Unaccredited

MCERTS Accreditation only covers the SAND, CLAY and LOAM matrices

Nicholls Colton Group
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Leicester
LE1 4DH

L21/02240/IGS - 21-19468

Project Reference - 23300 Project Apollo

Analytical Test Results - Soil Analysis

NC Reference			176870	176871	176872
Client Sample ID			A21/2783	A21/2775	A21/2792
Client Sample Location			TP06 @ 0.6m 2% Lime	TP01 @ 0.5m 1% Lime	TP12 @ 0.5m 1% Lime 2% Cement
Client Sample Type			Soil	Soil	Soil
Client Sample Number			-	-	-
Depth - Top (m)			0.60	0.50	0.50
Depth - Bottom (m)			0.60	0.50	0.50
Date of Sampling			-	-	-
Time of Sampling			-	-	-
Sample Matrix			Clay	Clay	Clay
Determinant	**Units**	**Accreditation**			
Water soluble sulphate	(mg/l)	u	< 10	< 10	< 10
Acid Soluble Sulphate	(%)	u	0.08	0.09	0.18
Total Sulphur	(%)	u	0.03	0.04	0.06
pH Value	pH Units	MCERTS	12.5	12.5	12.5

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L21/02240/IGS - 21-19468

Project Reference - 23300 Project Apollo

Sample Descriptions

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Description	Moisture Content (%)	Stone Content (%)	Passing 2mm test sieve (%)
176870	A21/2783	TP06 @ 0.6m 2% Lime	Soil	-	Brownish grey slightly gravelly slightly sandy silty clay	-	-	44
176871	A21/2775	TP01 @ 0.5m 1% Lime	Soil	-	Brownish grey slightly gravelly slightly sandy silty clay	-	-	58
176872	A21/2792	TP12 @ 0.5m 1% Lime 2%	Soil	-	Light brownish grey slightly gravelly slightly sandy silty clay	-	-	64

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LE1 4DH

L21/02240/IGS - 21-19468

Project Reference - 23300 Project Apollo

Analysis Methodologies

Test Code	Test Name / Reference	Sample condition for analysis	Sample Preperation	Test Details
ANIONSS	MS - CL - Anions by Aquakem (2:1Extract)	Oven dried	Passing 2mm test sieve	Determination of Anions (inc Sulphate, chloride etc.) in soils by Aquakem. Analysis is based on a 2:1 water to soil extraction ratio
TSUL	MS - CL - Total Sulphur by ICP	Air dried	Passing 10mm test sieve	Determination of Total sulphur in soils via ICP
PHS	MS - CL - pH in Soils	As received	Passing 10mm test sieve	Determination of pH in soils using a pH probe (using a 1:3 soil to water extraction)
ASSO4S	MS - CL - Acid Soluble Sulphate	Oven Dried	Passing 2mm test sieve	Determination of total sulphate in soils by acid extraction followed by ICP analysis
SAMPLEPREP	MS - CL - Sample Preparation			Preparation of samples (including determination of moisture content) to allow for subsequent analysis

Nicholls Colton Group
7 - 11 Harding Street
Leicester
LE1 4DH

L21/02240/IGS - 21-19468

Project Reference - 23300 Project Apollo

Sample Deviations

Deviations are listed below against each sample and associated test method, where deviation(s) are noted it means data may not be representative of the sample at the time of sampling and it is possible that results provided may be compromised.

KEY: A - No Date of Sampling Provided, C - Samples received in inappropriate containers, H - Samples contain headspace, R - Date of sampling to receipt to exceeds sample holding times, X - Exceeds sampling to extraction or analysis timescales, T - Temperature of samples on receipt exceeds storage temperature.

NC Reference	Client Sample ID	Client Sample Location	Client Sample Type	Client Sample Number	Test	Deviations
176870	A21/2783	Soil	-	TP06 @ 0.6m 2% Lime	MS - CL - Anions by Aquakem (2:1Extract)	AT
176870	A21/2783	Soil	-	TP06 @ 0.6m 2% Lime	MS - CL - pH in Soils	AT
176871	A21/2775	Soil	-	TP01 @ 0.5m 1% Lime	MS - CL - Anions by Aquakem (2:1Extract)	AT
176871	A21/2775	Soil	-	TP01 @ 0.5m 1% Lime	MS - CL - pH in Soils	AT
176872	A21/2792	Soil	-	TP12 @ 0.5m 1% Lime 2% Cement	MS - CL - Anions by Aquakem (2:1Extract)	AT
176872	A21/2792	Soil	-	TP12 @ 0.5m 1% Lime 2% Cement	MS - CL - pH in Soils	AT

Appendix 13

Exploratory Hole Location Plan


Project apollo
Exploratory hole location plan
Legend
Cable percussion borehole
Plate bearing test
Rotary core drillhole
Soakaway test (to BRE 365)
Trail pit and plate load test
TP01
SA03
TP03
TP02
BH01
TP05
TP06
BH02
BH03
TP04
RC01
TP08
TP07
BH05
TP09
BH04
BH08
BH07
BH06
TP10
TP11
RC02
SA02
BH10
BH09
SA01
TP13
BH11
BH12
TP12
RC03
BH13
BH17
BH14
BH16
BH15
N
Google Earth