Fingal County Council
Comhairle Contae Fhine Gall

Fingal Landfill Project

VOLUME 5
Environmental Impact Statement
Supporting Documents
Factual Ground Investigation Report (No 9716)

Waste Management Plan
Working for the Dublin Region

April 2006

RPS

Factual Ground Investigation Report

(IGSL 2004)

Site B, Dublin Landfill Siting Study

TABLE OF CONTENTS

FOREWORD

The following Conditions and Notes on Site Investigation Procedures should be read in conjunction with this report.

General.

Recommendations made, and opinions expressed in the report are based on the strata observed in the exploratory holes, together with the results of in-situ and laboratory tests. No responsibility can be held for conditions which have not been revealed by exploratory work, or which occur between exploratory hole locations. Whilst the report may suggest the likely configuration of strata, both between exploratory hole locations, or below the maximum depth of the investigation, this is only indicative, and liability cannot be accepted for its accuracy.

Unless specifically stated, no account has been taken of possible subsidence due to mineral extraction below or close to the site.

Boring Procedures.

Unless otherwise stated, the 'Shell and Auger' technique of soft ground boring has been employed. All boring operations sampling and/or logging of soils and in-situ testing complies with the recommendations of the British Standard Code of Practice BS 5930 (1999), 'Site Investigation' and BS 1377:1990, 'Methods of test for soils for civil engineering purposes'.

Whilst the technique allows the maximum data to be obtained in soft ground, some disturbance and variation of soft and layered soils is unavoidable. Attention is drawn to this condition, whenever it is suspected. Where cobbles and boulders are recorded, no conclusion should be drawn concerning the size, presence, lithological nature, or numbers per unit volume of ground.

Where peat has been encountered during siteworks, samples have been logged in accordance with the Von Post Classification (ref. Von Post, L. 1992. Sveriges Gologiska Undersoknings torvinventering och nogra av dess hittils vunna resultat (SGU peat inventory and some preliminary results) Svenska Mosskulturforeningens Tidskrift, Jonkoping, Swedden, 36, 1-37 & Hobbs N. B. Mire morphology and the properties of some British and foreign peats. QJEG, Vol. 19, 1986).

Routine Sampling.

Undisturbed samples of soils, predominantly cohesive in nature are obtained unless otherwise stated by a 104mm diameter open-drive tube sampler. In granular soils, and where undisturbed sampling is inappropriate, disturbed samples are collected. Smaller disturbed samples are also recovered at intervals to allow a visual examination of the full strata section.

In-Situ Testing.

Standard penetration tests, utilising either the standard split spoon sampler or solid cone and automatic trip-hammer are conducted unless otherwise where required by instruction. Subsequent to a seating drive of 150mm, a summation for the number of blows for 300mm penetration is recorded on the boring records together with the blow count for each 75mm penetration. In cases where incomplete penetration is obtained, the number of blows for the recorded value of penetration are noted. In coarse granular soils, a cone end is fitted to the sampler and a similar procedure adopted.

Groundwater.

The depth of entry of any influx of groundwater is recorded during the course of boring operations. However, the normal rate of boring does not usually permit the recording of an equilibrium level for any one water strike. Where possible drilling is suspended for a period of twenty minutes to monitor the subsequent rise in water
level.

Groundwater conditions observed in the borings or pits are those appertaining to the period of investigation. It should be noted however, that groundwater levels are subject to diurnal, seasonal and climatic variations and can also be affected by drainage condition, tidal variation or other causes.

Retention of Samples.

After satisfactory completion of all the scheduled laboratory tests on any sample, the remaining material is discarded. Unless a period of retention of samples is agreed, it is our normal practice to discard all soil samples one month after submission of our final report.

1. INTRODUCTION

At the request of RPS-MCOS Consulting Engineers, IGSL Ltd. has undertaken a ground investigation for the Dublin Landfill Sitting Scheme. The investigation was undertaken on four short listed sites in the North County Dublin Area. The sites are listed as follows:

- Site A – Loughbarn
- Site B – Tooman
- Site C – Annsbrook
- Site D – Loughmain / Brownstown

The investigatory work for the project was carried out in accordance with BS 5930, Code of Practice for Site Investigations (1999). The ground investigation work was undertaken as directed by RPS-MCOS Consulting Engineers for the project. The fieldwork comprised a programme of rotary coreholes, insitu permeability tests and cable percussion boreholes with laboratory testing carried out on selected disturbed samples.

The primary objectives of this investigation were as follows:

- Assess the composition, permeability and strength of the sub-soils present at the site

- Establish the elevation of rockhead, lithological sequence, weathering profile, discontinuity characteristics and strength of the rock

- Install groundwater monitoring instruments (standpipes) to determine equilibrium groundwater levels

- Obtain soil samples for geotechnical analysis

This report presents the geotechnical data and laboratory test results obtained from the exploratory positions. It is noted that the soil samples were logged in accordance with BS 5930 (1999). The locations of the exploratory positions are shown on the site plan in Appendix 7.

2. FIELDWORK

The fieldwork was carried out between May and June 2004 and comprised the following:

- Thirty six 200mm diameter cable percussion boreholes
- Twenty four rotary coreholes
- Twenty One packer permeability tests
- Eighteen falling/rising permeability tests
- Associated sampling & in-situ testing

2.1 Cable Percussion Boreholes

Thirty-six cable percussion boreholes were undertaken using a Dando 150 rig and the depths varied between 2.0 and 17.5m. Representative bulk disturbed samples of the sub-soils were taken at 1.0m intervals or change of strata.

Standard Penetration Tests (SPT's) were also carried out during boring, again at 1.0m intervals. Given the mainly coarse composition of the sub-soils, a solid cone was used in each of the SPT tests. Undisturbed sampling (U100's) was also attempted in the boulder clay soils as directed by the Engineer.

Descriptions of the sub-soils encountered and in-situ tests undertaken are presented on the borehole records in Appendix1. Details of groundwater strikes and hard strata boring (chiselling) are also presented on the aforementioned records.

2.2 Rotary Core Drillholes

Rotary drilling was carried out using a combination of track mounted Knebel and Boart Longyear rigs. Both drilling units employed triple tube techniques. The Knebel rig produced H (72mm) size cores using water and air mist flush. While the Boart Longyear produced Geobore-S (102mm) size cores using polymer gel drilling fluid. The rock and soil cores were placed in 3m capacity timber core boxes. An IGSL engineering geologist carried out engineering geological core logging at the IGSL yard in Naas. This included photography of the cores with a digital camera.

The core log records are presented in Appendix 2 and include engineering geological descriptions of the rock cores, details of the bedding / discontinuities and mechanical indices (TCR, SCR and RQD's) for each core run. A graphic

fracture log is also presented alongside the mechanical indices - this illustrates the fracture state of the rock cores and allows easy identification of highly fractured / non-intact zones and discontinuity spacings. It should be noted that that no correction for dip of the joints has been made and that the spacings shown are successive joint / core axis intersections within the core.

Groundwater monitoring standpipes were installed in selected core drillholes, again as directed by the Engineer. These incorporated 50mm diameter pipe with a pea gravel response pack. Cement bentonite grout seals were installed between the various response zones and headwork covers were concreted in place

2.3 Permeability Testing

2.3.1 Falling head test

Twenty-one falling head tests were carried out in selected boreholes. In the field test, a hydraulic head was applied to the standpipe or borehole and then the change in water level with time was recorded. The calculations are based on the assumption that the sub-soils are fully saturated. It was outside the scope of this report to extrapolate the coefficient of permeability when Ht/Ho has not reached 0.37. The results are presented in Appendix 3.

2.3.2 Packer Tests

Packer tests were performed in the majority of the rotary coreholes. Packer permeability tests (single) were carried out in the core drillholes to give a measure of acceptance by the bedrock of water under pressure. The packers were inflated within the hole to form a seal and water injection pressures were calculated using a maximum pressure based on 0.75 σ_v

The results of both types of permeability tests are presented in Appendix 3. Both these tests comply with the requirements of BS 5930 (1999).

2.4 Groundwater Monitoring

A programme of groundwater monitoring was undertaken by IGSL at the end of the investigation programme. This data has been tabulated and is presented in Appendix 6.

2.5 'As Built' Survey

An ‘as built’ survey of the exploratory positions using GPS equipment and was conducted as the geotechnical fieldwork programme reached completion. The results are presented in Appendix 7.

3. LABORATORY TESTING

Soil laboratory testing was carried out on representative soil samples in accordance with BS 1377 (1990). The testing included the following:

- Moisture contents
- Atterberg Limits (Liquid & Plastic Limits)
- Particle size distributions (PSD's)
- Triaxial Permeability Tests

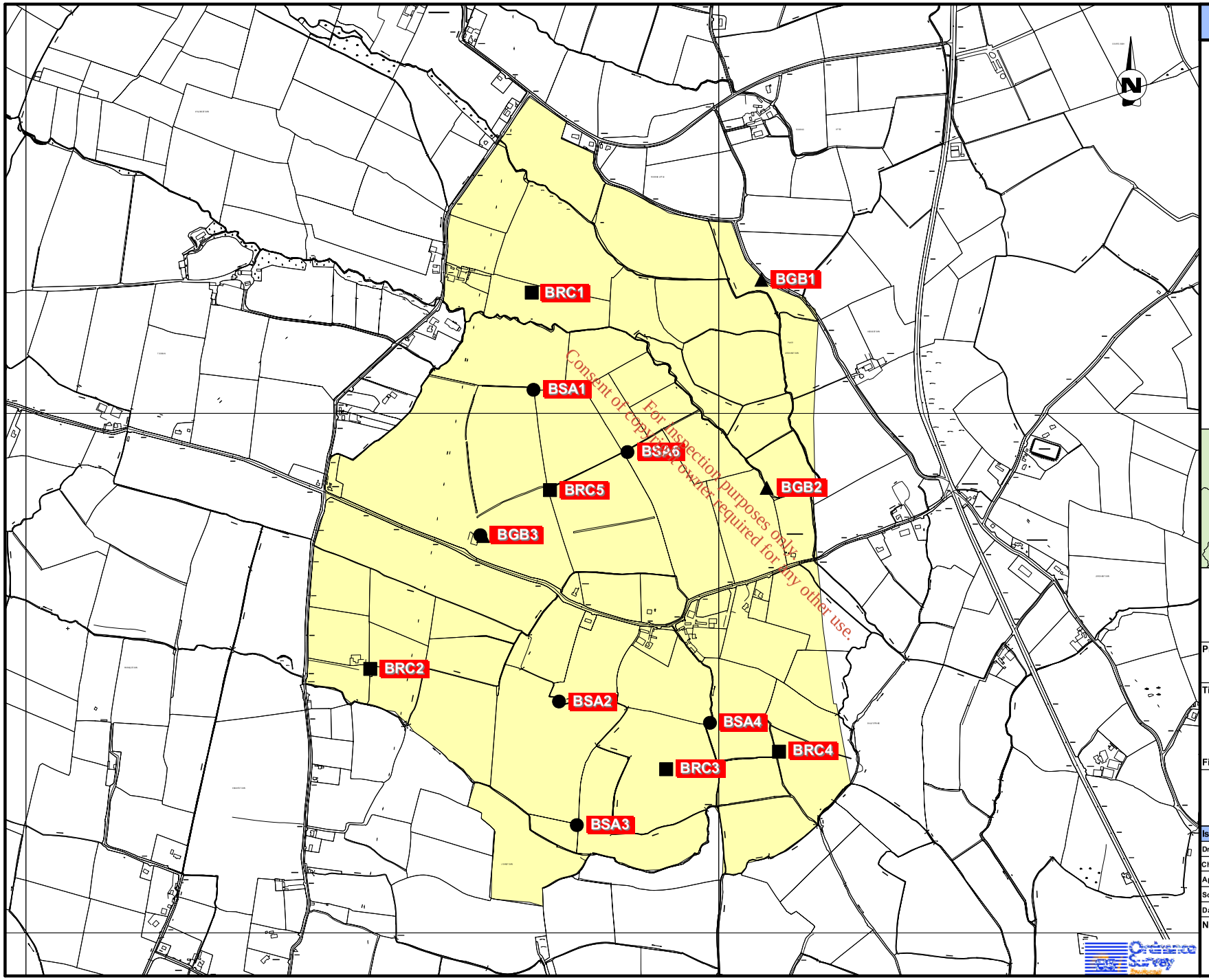
The results of the soil testing are presented in Appendix 4.

References

- BS 5930 (1999) Code of Practice for Site Investigation, British Standards Institution (BSI).

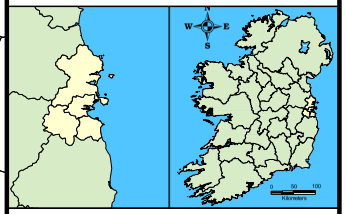
- BS 1377 (1990) Methods of Testing of Soils for Civil Engineering Purposes, BSI.

- Site Investigation Practice: Assessing BS 5930 (1986), Geological Society Special Publication, No. 2.



Legend

- Rotary Core (RC)
- Shell & Auger (SA)
- Geo-Bore (GB)
- Site



WASTE MANAGEMENT
A Strategy for Dublin

Project
Dublin Landfill Siting Study

Title
Borehole Locations
Site B

Figure H

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Issue Details

Drawn:	SK	Project No.	074508001
Checked:	CW	File Ref.	
Approved:	LO'T	074508001MI0131F01	
Scale:	NTS	Drawing No.	Rev.
Date:	30/09/2004	MI0131	F01

Notes

1. This drawing is the property of RPS-MCOS Ltd. It is a confidential document and must not be copied, used, or its contents divulged without prior written consent.
2. All levels are referred to Ordnance Datum, Malin Head.
3. NOT TO SCALE, use figured dimensions only, if in doubt ask.
4. Ordnance Survey Ireland Licence No. EN 0005004 Copyright Government of Ireland.

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA1
Sheet 1 of 2

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 257564.18
N 317457.55

GROUND LEVEL (mOD) 59.19
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 17.50
CASING DEPTH (m) 4.00

DATE STARTED: 17/05/2004
DATE COMPLETED: 19/05/2004

BORED BY: M Collins

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL								
	Stiff brown slightly sandy gravelly CLAY		58.79	0.40					
1					A5823	D	1.00		
						U			
					A5824	B	1.50		
	Stiff brown/grey slightly sandy slightly gravelly CLAY		57.59	1.60					
2					A5825	B	2.00	N=19	
3					A5828	B	3.00		
					A5827	D			
						U			
4					A5829	B	4.00	N=29	
5					A5830	B	5.00		
					A5831	U		N=29	
6					A5832	B	6.00	N=25	
7	Hard black slightly sandy slightly gravelly CLAY with cobbles and boulders		52.19	7.00	A5833	B	7.00	N=67	
8					A5834	B	8.00	N=76	
9					A5835	B	9.00		
10	Continued next sheet				A5836	B	10.00	N=62	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
8.50	9.00	1.00	
11.00	11.40	1.00	
17.30	17.50	1.33	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
17.50	-	-	-	-	Seepage

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
19/05/2004	17.50	16.50	17.50	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
19/05/2004	0.00	-	14.50	Start of day

Remarks:

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA1
Sheet 2 of 2

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 257564.18
N 317457.55

GROUND LEVEL (mOD) 59.19
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 17.50
CASING DEPTH (m) 4.00

DATE STARTED: 17/05/2004
DATE COMPLETED: 19/05/2004

BORED BY: M Collins

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Hard black slightly sandy slightly gravelly CLAY with cobbles and boulders								
11					A5837	B	11.00	N=R	
			47.79	11.40					
	Very stiff dark brown slightly gravelly sandy CLAY with cobbles and boulders								
12					A5801	U	12.00		
13					A5838	B	13.00	N=51	
14					A5839	B	14.00		
					A5802	U			
15								N=83/ 235mm	
16					A5842	B	16.00		
					A5803	U	16.50		
	Obstruction - possible weathered rock		42.59	16.60					
17					A5841	B	17.00		
	End of Borehole at 17.50 m		41.69	17.50	A5804	B	17.50		
18									
19									
20									

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
8.50	9.00	1.00	
11.00	11.40	1.00	
17.30	17.50	1.33	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
17.50	-	-	-	-	Seepage

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
19/05/2004	17.50	16.50	17.50	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
19/05/2004	0.00	-	14.50	Start of day

Remarks:

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA2
Sheet 1 of 1

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 256666.83
N 317542.89

GROUND LEVEL (mOD) 48.76
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 7.40
CASING DEPTH (m) 7.40

DATE STARTED: 20/05/2004
DATE COMPLETED: 20/05/2004

BORED BY: G Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL								
	Grey sandy CLAY		48.46	0.30					
	Brown slightly sandy gravelly CLAY		48.36	0.40	L1405	B	0.40		
1					L1408	B	1.00		
					L1409	U			
					L1406				
					L1407	D	1.45		
					L1407	W	1.80		
2	Stiff dark brown slightly sandy gravelly CLAY with cobbles and boulders		46.76	2.00	L1412	B	2.00		
					L1413	U			
					L1410				
					L1411	D	2.45		
3					L1414	B	3.00	N=24	
					L1415				
4					L1416	B	4.00	N=27	
					L1417				
5					L1418	B	5.00	N=36	
					L1419				
6	Very stiff dark brown slightly sandy gravelly CLAY with cobbles		42.76	6.00	L1420	B	6.00	N=50/ 145mm	
7	Very stiff grey/black slightly sandy gravelly CLAY with cobbles and boulders		41.76	7.00				N=51/ 110mm	
	End of Borehole at 7.40 m		41.36	7.40				N=R	
8									
9									
10									

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
1.70	2.00	0.50	.
6.40	7.00	1.75	.
7.00	7.40	3.00	.

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
24/05/2004	7.40	5.40	7.40	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
21/05/2004	0.00	-	7.20	End of Day
24/05/2004	0.00	-	1.80	Start of day

Remarks: Ihr awaiting instruction from Client

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA3
Sheet 1 of 1

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 256309.52
N 317589.26

GROUND LEVEL (mOD) 41.70
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 2.00
CASING DEPTH (m) 2.00

DATE STARTED: 24/05/2004
DATE COMPLETED: 24/05/2004

BORED BY: M Collins

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES: REF. NUMBER	SAMPLES: SAMPLE TYPE	SAMPLES: DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL								
	Stiff brown slightly sandy gravelly CLAY with cobbles and boulders		41.30	0.40					
1									
2	OBSTRUCTION - possible boulder		39.70	2.00					
	End of Borehole at 2.00 m								
3									
4									
5									
6									
7									
8									
9									
10									

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
1.99	2.00	1.00	.

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments

Remarks:

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA3A
Sheet 1 of 2

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 256311.23
N 317593.36

GROUND LEVEL (mOD) 41.16
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 17.00
CASING DEPTH (m) 11.20

DATE STARTED: 24/05/2004
DATE COMPLETED: 27/05/2004

BORED BY: M Collins

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL								
			40.76	0.40					
	Brown slightly sandy gravelly CLAY								
1					A5850	B	1.00		
					A5851	U	1.10		
					A5824				
2					A5852	B	2.00	N=21	
					A5853				
			38.76	2.40					
	very stiff black slightly sandy slightly gravelly CLAY with cobbles and boulders								
3					A5854	B	3.00		
					A5855				
4					A5836	B	4.00	N=67	
					A5837				
5					A5858	B	5.00		
					A5859	U			
					A5827				
6					A5860	B	6.00	N=61	
					A5861				
7					A5862	B	7.00		
					A5863	U			
					A5846				
8					A5864	B	8.00	N=47	
					A5865				
9					A5866	B	9.00		
					A5867	U			
					A5847				
10	Continued next sheet							N=56/ 160mm	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
9.50	11.00	3.00	.
17.00	17.00	0.50	.

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
27/05/2004	17.00	16.00	17.00	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments

Remarks:

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA3A
Sheet 2 of 2

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 256311.23
N 317593.36

GROUND LEVEL (mOD) 41.16
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 17.00
CASING DEPTH (m) 11.20

DATE STARTED: 24/05/2004
DATE COMPLETED: 27/05/2004

BORED BY: M Collins

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
10	very stiff black slightly sandy slightly gravelly CLAY with cobbles and boulders								
			30.66	10.50					
	Very stiff brown slightly sandy slightly gravelly CLAY with cobbles and boulders								
11					A5870 A5871	B U	11.00		
12					A5872 A5873 A5848	B U	12.00		
13					A5874 A5875	B	13.00	N=69	
14					A5876 A5877 A5849 A5850	B U	14.00		
15					A5878 A5879	B	15.00	N=66	
16					A5880 A5881 A5851	B U	16.00		
17	OBSTRUCTION		24.16	17.00	A5882 A5883	B	17.00		
	End of Borehole at 17.00 m								
18									
19									
20									

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
9.50	11.00	3.00	.
17.00	17.00	0.50	.

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
27/05/2004	17.00	16.00	17.00	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments

Remarks:

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA4
Sheet 1 of 2

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 256616.66
N 317972.02

GROUND LEVEL (mOD) 34.17
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 12.30
CASING DEPTH (m) 4.50

DATE STARTED: 24/05/2004
DATE COMPLETED: 26/05/2004

BORED BY: G Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL								
	Brown/grey slightly sandy slightly gravelly CLAY		33.92	0.25	L1421 L1422	B	0.25		
1					L1423 L1424 L1425	B U	1.00		
					L1426	D	1.55		
2	Stiff black slightly sandy slightly gravelly CLAY with occasionial cobbles and boulders		32.17	2.00	L1427 L1428 L1426	B U	2.00	N=28	
3					L1429 L1430	B	3.00	N=34	
4					L1431 L1432	B	4.00	N=28	
5					L1433 L1434	B	5.00		
6					L1435 L1436	B	6.00	N=21	
7					L1437 L1438	B	7.00	N=27	
8					L1439 L1440	B	8.00	N=51	
9					L1441 L1442	B	9.00	N=31	
10	Continued next sheet				L1443	B	10.00	N=31	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
2.60	3.00	0.75	.
7.80	8.00	0.50	.
8.40	8.90	1.50	.
9.40	9.80	0.75	.
12.00	12.30	0.75	

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
26/05/2004	12.30	2.00	12.30	SP

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
25/05/2004	6.00	4.50	-	Dry at start of day
26/05/2004	6.00	4.50	-	Dry at start of day

Remarks:

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA4
Sheet 2 of 2

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 256616.66
N 317972.02

GROUND LEVEL (mOD) 34.17
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 12.30
CASING DEPTH (m) 4.50

DATE STARTED: 24/05/2004
DATE COMPLETED: 26/05/2004

BORED BY: G Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Stiff black slightly sandy slightly gravelly CLAY with occasionial cobbles and boulders				L1444				
11					L1445 L1446	B	11.00	N=37	
12	OBSTRUCTION - possible boulder		22.17	12.00				N=51/ 110mm	
	End of Borehole at 12.30 m		21.87	12.30					
13									
14									
15									
16									
17									
18									
19									
20									

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
2.60	3.00	0.75	.
7.80	8.00	0.50	.
8.40	8.90	1.50	.
9.40	9.80	0.75	.
12.00	12.30	0.75	

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
26/05/2004	12.30	2.00	12.30	SP

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
25/05/2004	6.00	4.50	-	Dry at start of day
26/05/2004	6.00	4.50	-	Dry at start of day

Remarks:

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA5
Sheet 1 of 1

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 257143.29
N 317309.72

GROUND LEVEL (mOD) 62.25
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 6.90
CASING DEPTH (m) 6.90

DATE STARTED: 20/05/2004
DATE COMPLETED: 21/05/2004

BORED BY: M Collins

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL								
			61.85	0.40					
	Stiff dark brown slightly sandy slightly gravelly CLAY with cobbles								
1					A5805	U	1.00		
2					A5844	B	2.00	N=24	
3					A5845 A5806	B U	3.00		
4					A5846 A5847	B	4.00	N=67	
			57.25	5.00					
5	Boulder								
			56.45	5.80					
6	Stiff black slightly sandy gravelly CLAY with cobbles and boulders				A5807	U	6.00		
			55.75	6.50					
	Dark brown slightly clayey slightly sandy coarse GRAVEL with cobbles and boulders				A5823	LB	6.80		
			55.35	6.90					
7	End of Borehole at 6.90 m								
8									
9									
10									

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
5.00	5.30	2.00	
5.30	5.80	2.00	
6.50	6.90	1.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
21/05/2004	6.90	6.40	6.90	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments

Remarks:

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA6
Sheet 1 of 2

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 257391.25
N 317736.97

GROUND LEVEL (mOD) 49.93
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 14.00
CASING DEPTH (m) 7.50

DATE STARTED: 18/05/2004
DATE COMPLETED: 20/05/2004

BORED BY: G Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
0	TOPSOIL								
	Brown slightly sandy gravelly CLAY		49.53	0.40	L1676	B	0.40		
1	Stiff to very stiff black slightly sandy gravelly CLAY with cobbles and boulders		48.93	1.00	L1677 L1678 L1676	B U	1.00	N=18	
2					L1679 L1680	B	2.00	N=17	
3					L1681 L1682	B	3.00	N=22	
4					L1683 L1684	B	4.00	N=21	
5					L1685 L1686	B	5.00	N=17	
6					L1687 L1688	B	6.00	N=23	
7					L1689 L1690	B	7.00	N=40	
8	Very stiff black slightly sandy slightly gravelly CLAY with cobbles and boulders		41.93	8.00	L1691 L1692	B	8.00	N=30	
9					L1693 L1694	B	9.00	N=44	
10	Continued next sheet				L1695	B	10.00	N=32	

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
6.80	7.20	2.50	.
8.60	9.00	0.75	.
11.40	11.80	0.75	.
12.50	14.00	3.00	

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
12.50	-	-	12.30	20	

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
20/04/2004	14.00	12.00	14.00	SP

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
20/05/2004	0.00	-	13.20	Start of day

Remarks: Water added to assist boring

REPORT NO: 9716	GEOTECHNICAL BORING RECORD	IGSL Ltd.

CONTRACT : Dublin Landfill Siting Study

BOREHOLE NO: BSA6
Sheet 2 of 2

CLIENT : Fingal County Council
ENGINEER : RPS-MCOS

CO-ORDINATES : E 257391.25
N 317736.97

GROUND LEVEL (mOD) 49.93
BOREHOLE DIAMETER (mm) 200
BOREHOLE DEPTH (m) 14.00
CASING DEPTH (m) 7.50

DATE STARTED: 18/05/2004
DATE COMPLETED: 20/05/2004

BORED BY: G Roberts

DEPTH (M)	DESCRIPTION	LEGEND	ELEVATION (mOD)	DEPTH (m)	SAMPLES REF. NUMBER	SAMPLES SAMPLE TYPE	SAMPLES DEPTH (m)	FIELD TEST RESULTS	STAND PIPE DETAILS
10	Very stiff black slightly sandy slightly gravelly CLAY with cobbles and boulders				L1696				
11					L1697 L1698	B	11.00	N=31	
12					L1401 L1402	B	12.00	N=52/ 270mm	
					L1699	U	12.50		
13					L1670 L1403 L1404	D B	12.95 13.00	N=32/ 210mm	
14	End of Borehole at 14.00 m		35.93	14.00					
15									
16									
17									
18									
19									
20									

Hard Strata Boring / Chiselling

From (m)	To (m)	Hours	Comments
6.80	7.20	2.50	.
8.60	9.00	0.75	.
11.40	11.80	0.75	.
12.50	14.00	3.00	

Standpipe Installation Details

Date	Tip Depth	RZ Top	RZ Base	Type
20/04/2004	14.00	12.00	14.00	SP

Water Strike Details

Water Strike	Casing Depth	Sealed At	Rise To	Time	Comments
12.50	-	-	12.30	20	

Groundwater Observations

Date	Hole Depth	Casing Depth	Depth to Water	Comments
20/05/2004	0.00	-	13.20	Start of day

Remarks: Water added to assist boring

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BGB1 SHEET: Sheet 1 of 3
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 102 GROUND LEVEL (mOD): 43.92	DATE STARTED: 12/06/2004 DATE COMPLETED: 14/06/2004
CO-ORDINATES: 257899.74 318109.86		INCLINATION (Degrees): 90 FLUSH: Polymer Gel	DRILLED BY: MILLENIUM LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0		0	0	0									OPEN HOLE DRILLING: No recovery, observed by driller as returns of clay.
1	1.00								42.92	1.00			
		40	0	0									Soft, brown, sandy, slightly gravelly CLAY with occasional cobbles.
2													
	2.50								41.42	2.50			
3		30	0	0									Firm to stiff, brown/black, sandy, very gravelly CLAY with occasional cobbles.
4													
	4.50												
5		100	0	0									
6	6.00												
		83	0	0									
	6.60												
7		100	0	0									
	7.50												
		100	0	0									
	8.50												
		100	0	0									Continued next sheet

REMARKS: Second standpipe installed at 24.0m : Gravel 24.0-22.0m, seal 22.0-17.0m.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 2.00
Depth to Response Zone bottom (m) : 17.00
Comments : Gravel 17.0-2.0m, seal 2.0-0.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BGB1 SHEET: Sheet 2 of 3
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 102 GROUND LEVEL (mOD): 43.92	DATE STARTED: 12/06/2004 DATE COMPLETED: 14/06/2004
CO-ORDINATES: 257899.74 318109.86		INCLINATION (Degrees): 90 FLUSH: Polymer Gel	DRILLED BY: MILLENIUM LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10	9.00	100	0	0									Firm to stiff, brown/black, sandy, very gravelly CLAY with occasional cobbles.
11	10.50	100	0	0									
12	12.00	100	0	0									
13	12.50	100	0	0									
14	13.50	100	0	0									
15	14.50	100	0	0									
16	15.00	100	0	0									
	16.50	100	0	0									

Continued next sheet

REMARKS: Second standpipe installed at 24.0m : Gravel 24.0-22.0m, seal 22.0-17.0m.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 2.00
Depth to Response Zone bottom (m) : 17.00
Comments : Gravel 17.0-2.0m, seal 2.0-0.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study

DRILLHOLE NO : BGB1
SHEET: Sheet 3 of 3

CLIENT: Fingal County Council
ENGINEER: RPS-MCOS

CORE DIAMETER (mm): 102
GROUND LEVEL (mOD): 43.92

DATE STARTED: 12/06/2004
DATE COMPLETED: 14/06/2004

CO-ORDINATES: 257899.74
318109.86

INCLINATION (Degrees): 90
FLUSH: Polymer Gel

DRILLED BY: MILLENIUM
LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
19	18.00	56	0	0									Firm to stiff, brown/black, sandy, very gravelly CLAY with occasional cobbles.
	18.90	100	0	0									
	19.50	100	0	0									
20													
	20.50	100	0	0									
21	21.00	40	0	0									
22													
	22.50	33	0	0					21.42	22.50			Brown clayey sandy GRAVEL with cobble size fragments of limestone
23													
24	24.00								19.92	24.00			End of Borehole at 24.00 m
25													

REMARKS: Second standpipe installed at 24.0m : Gravel 24.0-22.0m, seal 22.0-17.0m.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 2.00
Depth to Response Zone bottom (m) : 17.00
Comments : Gravel 17.0-2.0m, seal 2.0-0.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study

DRILLHOLE NO : BGB2
SHEET: Sheet 1 of 2

CLIENT: Fingal County Council
ENGINEER: RPS-MCOS

CORE DIAMETER (mm): 102
GROUND LEVEL (mOD): 40.05

DATE STARTED: 11/06/2004
DATE COMPLETED: 12/06/2004

CO-ORDINATES: 257277.01
318138.25

INCLINATION (Degrees): 90
FLUSH: Polymer Gel

DRILLED BY: MILLENIUM
LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
		0	0	0									OPEN HOLE DRILLING: No recovery, observed by driller as returns of gravelly clay.
1	1.00								39.05	1.00			
		100	0	0									Soft to firm, light brown, slightly sandy, slightly gravelly CLAY with occasional cobbles.
2	2.50								37.55	2.50			
		100	0	0									Firm to stiff, dark brown, sandy gravelly CLAY with occasional cobbles.
3													
4	4.00	100	0	0									
5	5.00	100	0	0									
	5.50												
6		100	0	0									
	6.50	100	0	0									
	6.70								33.35	6.70			
7		100	0	0									Angular gravel and cobble-sized returns of limestone with sandy clay - PROBABLE WEATHERED ROCK
	7.60								32.45	7.60			
		100	67	16									Strong to very strong, medium to thinly bedded, grey/blue to lo9cally black, fine-grained, LIMESTONE, fresh to locally moderately weathered (at 10.0-10.3m & 13.8-14.2m) intersected by smooth, planar, tight to open, locally clay-filled (at 8.3-8.39m,

Continued next sheet

REMARKS: Second standpipe installed at 17.6m : Gravel 17.6-8.5m, seal 8.5-6.5m.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 2.00
Depth to Response Zone bottom (m) : 6.00
Comments : Gravel 6.0-2.0m, seal 2.0-0.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study

DRILLHOLE NO : BGB2
SHEET: Sheet 2 of 2

CLIENT: Fingal County Council
ENGINEER: RPS-MCOS

CORE DIAMETER (mm): 102
GROUND LEVEL (mOD): 40.05

DATE STARTED: 11/06/2004
DATE COMPLETED: 12/06/2004

CO-ORDINATES: 257277.01
318138.25

INCLINATION (Degrees): 90
FLUSH: Polymer Gel

DRILLED BY: MILLENIUM
LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
	9.00												
		100	36	0									8.71-8.9m, 9.0-9.4m, 10.64-10.69m, 10.93-11.02m, 12.5-13.0m & 14.2-14.44m), locally slightly iron-oxide stained fractures of 60° & locally sub-horizontal dip.
10	10.00	100	38	0									
	10.50	100	55	36									
11	11.50	100	80	48									
12	12.00	100	50	20									
	12.50	58	45	0									
13	13.70	78	33	0									
14	14.60	100	97	30									
15	15.00	100	80	54									
	15.70	100	86	51									
16	16.40	100	88	23									
	17.30	100	100	0					22.45	17.60			End of Borehole at 17.60 m
	17.60												

REMARKS: Second standpipe installed at 17.6m : Gravel 17.6-8.5m, seal 8.5-6.5m.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 2.00
Depth to Response Zone bottom (m) : 6.00
Comments : Gravel 6.0-2.0m, seal 2.0-0.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study

DRILLHOLE NO : BGB3
SHEET: Sheet 1 of 3

CLIENT: Fingal County Council
ENGINEER: RPS-MCOS

CORE DIAMETER (mm): 102
GROUND LEVEL (mOD): 62.18

DATE STARTED: 15/06/2004
DATE COMPLETED: 16/06/2004

CO-ORDINATES: 257144.70
317314.90

INCLINATION (Degrees): 90
FLUSH: Polymer Gel

DRILLED BY: MILLENIUM
LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
		0	0	0									OPEN HOLE DRILLING: No recovery, observed by driller as returns of clay.
1	1.00								61.18	1.00			
		80	0	0									Soft to firm, light brown,slightly gravelly sandy CLAY
2									59.88	2.30			
	2.50												Firm to stiff, dark brown/black, sandy gravelly CLAY with occasional cobbles.
3		100	0	0									
	3.30												
		100	0	0									
4	4.00												
		100	0	0									
5	5.00												
		100	0	0									
	5.60												
6		100	0	0									
7	7.10												
		100	0	0									
	8.20												
		40	0	0									
	8.70												

Continued next sheet

REMARKS: Second standpipe installed at 24.0m : Gravel 24.0-14.0m, seal 14.0-12.0m.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 2.00
Depth to Response Zone bottom (m) : 12.00
Comments : Gravel 12.0-2.0m, seal 2.0-0.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study

DRILLHOLE NO : BGB3
SHEET: Sheet 2 of 3

CLIENT: Fingal County Council
ENGINEER: RPS-MCOS

CORE DIAMETER (mm): 102
GROUND LEVEL (mOD): 62.18

DATE STARTED: 15/06/2004
DATE COMPLETED: 16/06/2004

CO-ORDINATES: 257144.70
317314.90

INCLINATION (Degrees): 90
FLUSH: Polymer Gel

DRILLED BY: MILLENIUM
LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10		94	0	0									Firm to stiff, dark brown/black, sandy gravelly CLAY with occasional cobbles.
	10.30	100	0	0									
	10.50								51.38	10.80			
11		100	0	0									Returns of COBBLES with sandy clay matrix
	11.80												
12		57	0	0									
	12.50												
13		92	0	0									
	13.80												
14		40	0	0									
15													
	15.30	50	0	0									
16	15.90	33	0	0									
	16.50								45.48	16.70			Brown/black (locally brown), sandy, very gravelly CLAY with many cobbles.
		100	0	0									Continued next sheet

REMARKS: Second standpipe installed at 24.0m : Gravel 24.0-14.0m, seal 14.0-12.0m.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 2.00
Depth to Response Zone bottom (m) : 12.00
Comments : Gravel 12.0-2.0m, seal 2.0-0.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study

DRILLHOLE NO : BGB3
SHEET: Sheet 3 of 3

CLIENT: Fingal County Council
ENGINEER: RPS-MCOS

CORE DIAMETER (mm): 102
GROUND LEVEL (mOD): 62.18

DATE STARTED: 15/06/2004
DATE COMPLETED: 16/06/2004

CO-ORDINATES: 257144.70
317314.90

INCLINATION (Degrees): 90
FLUSH: Polymer Gel

DRILLED BY: MILLENIUM
LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
19	18.00	100	0	0									Brown/black (locally brown), sandy, very gravelly CLAY with many cobbles.
	19.50	100	0	0									
20													
21	21.00	100	0	0									
22	22.00	100	0	0									
	22.50	100	0	0									
23													
24	24.00								38.18	24.00			End of Borehole at 24.00 m
25													

REMARKS: Second standpipe installed at 24.0m : Gravel 24.0-14.0m, seal 14.0-12.0m.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 2.00
Depth to Response Zone bottom (m) : 12.00
Comments : Gravel 12.0-2.0m, seal 2.0-0.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC1 SHEET: Sheet 1 of 4
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 59.34	DATE STARTED: 19/05/2004 DATE COMPLETED: 21/05/2004
CO-ORDINATES: 257838.28 317476.68		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
													OPEN HOLE DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles and bolders.
1													
2													
3													
4													
5													
6													
7													Continued next sheet

REMARKS: Water encountered at 5.3m, water at 8.1m at end of drilling. Packer tests carried out - see packer result sheet. Driller standing 0.5hrs looking at position with client.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 27.00
Depth to Response Zone bottom (m) : 34.00
Comments : Gravel 34.0-27.0m, seal 27.0-24.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC1 SHEET: Sheet 2 of 4
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 59.34	DATE STARTED: 19/05/2004 DATE COMPLETED: 21/05/2004
CO-ORDINATES: 257838.28 317476.68		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10		0	0	0									OPEN HOLE DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles and bolders.
11													
12													
13													
14													
15													
16													Continued next sheet

REMARKS: Water encountered at 5.3m, water at 8.1m at end of drilling. Packer tests carried out - see packer result sheet. Driller standing 0.5hrs looking at position with client.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 27.00
Depth to Response Zone bottom (m) : 34.00
Comments : Gravel 34.0-27.0m, seal 27.0-24.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC1 SHEET: Sheet 3 of 4
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 59.34	DATE STARTED: 19/05/2004 DATE COMPLETED: 21/05/2004
CO-ORDINATES: 257838.28 317476.68		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
19													OPEN HOLE DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles and bolders.
20	20.00												
21													
22													
23		0	0	0									
24													
25									33.94	25.40			OPEN HOLE DRILLING: No recovery, observed by driller as returns of weathered rock
	26.50								32.84	26.50			Continued next sheet

REMARKS: Water encountered at 5.3m, water at 8.1m at end of drilling. Packer tests carried out - see packer result sheet. Driller standing 0.5hrs looking at position with client.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 27.00
Depth to Response Zone bottom (m) : 34.00
Comments : Gravel 34.0-27.0m, seal 27.0-24.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC1 SHEET: Sheet 4 of 4
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 59.34	DATE STARTED: 19/05/2004 DATE COMPLETED: 21/05/2004
CO-ORDINATES: 257838.28 317476.68		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
28	27.60	91	9	0									Moderately strong, thinly bedded to thinly laminated, grey/dark grey/black, fine-grained, LIMESTONE (Argillaceous), slightly to locally moderately weathered intersected by closely spaced, irregular, commonly clay-filled fractures of irregular dip.
	28.30	100	14	0									
29		100	14	0									
	29.40	100	0	0									
30	30.30	58	0	0									
31	31.60	83	0	0									
32	33.10	100	0	0									
33	34.10								25.24	34.10			End of Borehole at 34.10 m
34													

REMARKS: Water encountered at 5.3m, water at 8.1m at end of drilling. Packer tests carried out - see packer result sheet. Driller standing 0.5hrs looking at position with client.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 27.00
Depth to Response Zone bottom (m) : 34.00
Comments : Gravel 34.0-27.0m, seal 27.0-24.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC2 SHEET: Sheet 1 of 3
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 56.15	DATE STARTED: 01/06/2004 DATE COMPLETED: 03/06/2004
CO-ORDINATES: 256749.85 316994.35		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0									56.15	0.00			OPEN HOLE DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles.
4		0	0	0					51.65	4.50			OPEN HOLE DRILLING: No recovery, observed by driller as returns of gravel.
7									49.45	6.70			OPEN HOLE DRILLING: No recovery, observed by driller as returns of possible weathered rock.
	8.25	36	14	0					47.90	8.25			Strong to locally moderately strong, medium to thinly bedded to locally thinly laminated, grey/blue/black,

Continued next sheet

REMARKS: Water encountered at 2.1m, water at 11.8m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 9.70
Depth to Response Zone bottom (m) : 18.70
Comments : Gravel 18.7-9.0m, seal 9.0-7.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC2 SHEET: Sheet 2 of 3
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 56.15	DATE STARTED: 01/06/2004 DATE COMPLETED: 03/06/2004
CO-ORDINATES: 256749.85 316994.35		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10	9.50	87	44	35									fine-grained, LIMESTONE (Argillaceous layers at 10.25-12.8m, 13.1-13.4m, 13.9-14.3m, 14.5-14.8m, 15.41-15.5m, 15.6-15.8m, 16.12-16.3m & 17.4-17.43m) fresh to locally moderately/highly weathered (at 8.25-9.26m, 10.25-12.8m, 14.6-14.8m, 16.57-16.6m & 18.59-18.7m), intersected by smooth, planar, tight to narrow, locally clay-smeared, commonly calcite-filled fractures of 45° & locally irregular dip.
11	11.00	23	5	0									
12	12.30	79	36	17									
13	13.70	96	56	45									
14	15.00	100	50	37									
15	16.00	100	82	49									
16	17.40												Continued next sheet

REMARKS: Water encountered at 2.1m, water at 11.8m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 9.70
Depth to Response Zone bottom (m) : 18.70
Comments : Gravel 18.7-9.0m, seal 9.0-7.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study

DRILLHOLE NO : BRC2
SHEET: Sheet 3 of 3

CLIENT: Fingal County Council
ENGINEER: RPS-MCOS

CORE DIAMETER (mm): 74
GROUND LEVEL (mOD): 56.15

DATE STARTED: 01/06/2004
DATE COMPLETED: 03/06/2004

CO-ORDINATES: 256749.85
316994.35

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: IGSL
LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
19	18.70	100	83	32					37.45	18.70			Strong to locally moderately strong, medium to thinly bedded to locally thinly laminated, grey/blue/black, fine-grained, LIMESTONE (Argillaceous layers at 10.25-12.8m, 13.1-13.4m, 13.9-14.3m, 14.5-14.8m, 15.41-15.5m, 15.6-15.8m, 16.12-16.3m & 17.4-17.43m) fresh to locally moderately/highly weathered (at 8.25-9.26m, 10.25-12.8m, 14.6-14.8m, 16.57-16.6m & 18.59-18.7m), intersected by smooth, planar, tight to narrow, locally clay-smeared, commonly calcite-filled fractures of 45° & locally irregular dip.
20													End of Borehole at 18.70 m
21													
22													
23													
24													
25													

REMARKS: Water encountered at 2.1m, water at 11.8m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 9.70
Depth to Response Zone bottom (m) : 18.70
Comments : Gravel 18.7-9.0m, seal 9.0-7.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC3 SHEET: Sheet 1 of 3
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 38.22	DATE STARTED: 22/05/2004 DATE COMPLETED: 23/05/2004
CO-ORDINATES: 256495.92 317838.75		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
1													OPEN HOLE DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles and bolders.
2													
3													
4													
5													
6		0	0	0									
7													

Continued next sheet

REMARKS: Water at 5.4m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 11.00
Depth to Response Zone bottom (m) : 18.40
Comments : Gravel 18.4-11.0m, seal 11.0-8.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC3 SHEET: Sheet 2 of 3
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 38.22	DATE STARTED: 22/05/2004 DATE COMPLETED: 23/05/2004
CO-ORDINATES: 256495.92 317838.75		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10									27.72	10.50			OPEN HOLE DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles and bolders.
11													OPEN HOLE DRILLING: No recovery, observed by driller as returns of rock
	11.50								26.72	11.50			
12		100	85	75									Strong to moderately strong/weak, thinly bedded to thinly laminated, grey/blue/black, fine-grained, LIMESTONE (Argillaceous layers at 13.08-14.2m & 14.8-20.4m), slightly to moderately/highly weathered (at 13.08-14.11m, 14.57-15.35m & 18.6-19.0m) intersected by smooth, planar, tight to narrow, locally clay-smeared, locally slightly iron-oxide stained fracures of 45° & sub-horizontal to irregular dip.
	12.10												
13		100	45	38									
	13.50												
14		67	0	0									
	14.10												
15		80	37	19									
	15.60												
16		87	23	9									
	17.10												
		50	14	0									Continued next sheet

REMARKS: Water at 5.4m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 11.00
Depth to Response Zone bottom (m) : 18.40
Comments : Gravel 18.4-11.0m, seal 11.0-8.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC3 SHEET: Sheet 3 of 3
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 38.22	DATE STARTED: 22/05/2004 DATE COMPLETED: 23/05/2004
CO-ORDINATES: 256495.92 317838.75		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
19	18.10	96	27	0									Strong to moderately strong/weak, thinly bedded to thinly laminated, grey/blue/black, fine-grained, LIMESTONE (Argillaceous layers at 13.08-14.2m & 14.8-20.4m), slightly to moderately/highly weathered (at 13.08-14.11m, 14.57-15.35m & 18.6-19.0m) intersected by smooth, planar, tight to narrow, locally clay-smeared, locally slightly iron-oxide stained fracures of 45° & sub-horizontal to irregular dip.
20	19.40	85	24	0									
21	20.40								17.82	20.40			End of Borehole at 20.40 m
22													
23													
24													
25													

REMARKS: Water at 5.4m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 11.00
Depth to Response Zone bottom (m) : 18.40
Comments : Gravel 18.4-11.0m, seal 11.0-8.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC4 SHEET: Sheet 1 of 2
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 30.06	DATE STARTED: 24/05/2002 DATE COMPLETED: 25/05/2004
CO-ORDINATES: 256513.26 318174.24		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
0													OPEN HOLE DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles and bolders.
1													
2													
3													
4		0	0	0									
5									25.06	5.00			OPEN HOLE DRILLING: No recovery, observed by driller as returns of gravels
6													
7													
									22.26	7.80			OPEN HOLE DRILLING: No recovery, observed by driller as returns of weathered rock
	8.25								21.81	8.25			Strong to locally moderately strong, thinly bedded to thinly laminated,
		100	61	26									Continued next sheet

REMARKS: Water encountered at 2.0m, water at 0.2m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 4.60
Depth to Response Zone bottom (m) : 11.30
Comments : Gravel 7.6-4.6m, seal 11.3-7.6 & 4.6-2.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC4 SHEET: Sheet 2 of 2
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 30.06	DATE STARTED: 24/05/2002 DATE COMPLETED: 25/05/2004
CO-ORDINATES: 256513.26 318174.24		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
10	9.50	100	60	0									grey/blue/black, fine-grained, LIMESTONE (Argillaceous layers at 8.25-8.8m, 9.61-9.74m, 10.19-10.5m & 10.94-12.0m), fresh to moderately weathered (at 10.94-12.0m) intersected by smooth, planar, tight to narrow, locally clay-smeared fracures of sub-horizontal & locally 60° & sub-vertical dip.
	9.70	100	67	46									
11	10.70	87	58	30									
	11.10	65	17	0									
12	12.10								17.96	12.10			End of Borehole at 12.10 m
13													
14													
15													
16													

REMARKS: Water encountered at 2.0m, water at 0.2m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 4.60
Depth to Response Zone bottom (m) : 11.30
Comments : Gravel 7.6-4.6m, seal 11.3-7.6 & 4.6-2.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC5 SHEET: Sheet 1 of 4
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 56.89	DATE STARTED: 25/05/2004 DATE COMPLETED: 01/06/2004
CO-ORDINATES: 257260.77 317526.49		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
1													OPEN HOLE DRILLING: No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles.
2													
3													
4		0	0	0									
5													
6													
7													
	7.50								49.39	7.50			No recovery, observed by driller as returns of brown sandy gravelly clay with occasional cobbles.
		0	0	0									
	8.20								48.69	8.20			Returns of still, brown, sandy gravelly clay with occasional cobbles
													Continued next sheet

REMARKS: Water encountered at 19.5m, water at 11.8m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 24.00
Depth to Response Zone bottom (m) : 33.00
Comments : Gravel 33.0-24.0m, seal 24.0-22.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC5 SHEET: Sheet 2 of 4
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 56.89	DATE STARTED: 25/05/2004 DATE COMPLETED: 01/06/2004
CO-ORDINATES: 257260.77 317526.49		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
		63	0	0									Returns of still, brown, sandy gravelly clay with occasional cobbles
	9.70												
10		10	0	0									
11	11.20												
12		103	0	0									
	12.70												
13		27	0	0									
14	14.20												
		87	0	0									
15	15.70												
16		73	0	0									
	17.20												

Continued next sheet

REMARKS: Water encountered at 19.5m, water at 11.8m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 24.00
Depth to Response Zone bottom (m) : 33.00
Comments : Gravel 33.0-24.0m, seal 24.0-22.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study			DRILLHOLE NO : BRC5 SHEET: Sheet 3 of 4
CLIENT: Fingal County Council ENGINEER: RPS-MCOS		CORE DIAMETER (mm): 74 GROUND LEVEL (mOD): 56.89	DATE STARTED: 25/05/2004 DATE COMPLETED: 01/06/2004
CO-ORDINATES: 257260.77 317526.49		INCLINATION (Degrees): 90 FLUSH: Air/Mist	DRILLED BY: IGSL LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
		100	0	0									Returns of still, brown, sandy gravelly clay with occasional cobbles
19	18.70												
		53	0	0									
20													
	20.20								36.69	20.20			
21													OPEN HOLE DRILLING: No recovery, observed by driller as returns of gravel.
		0	0	0									
22									34.89	22.00			
													OPEN HOLE DRILLING: No recovery, observed by driller as returns of rock.
23													
	23.20								33.69	23.20			
		100	98	80									Strong to very strong to locally moderately strong, medium to thinly bedded to locally thinly laminated, grey/blue/black, fine-grained, LIMESTONE (Argillaceous layers at 23.99-24.05m, 25.04-25.56m, 26.24-26.4m, 26.72-26.87m, 27.02-27.2m, 28.15-29.71m, 30.1-30.4m, 31.0-31.1m, 32.24-32.52m & 32.8-33.0m) fresh to locally slightly weathered, intersected by smooth to locally rough, planar to curviplanar, tight to narrow, locally clay-smeared, commonly calcite-filled fractures of 45° & locally sub-vertical & sub-horizontal dip.
	23.70												
24													
		100	79	48									
25													
	25.20												
		100	50	20									
	25.80												
		100	68	34									Continued next sheet

REMARKS: Water encountered at 19.5m, water at 11.8m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 24.00
Depth to Response Zone bottom (m) : 33.00
Comments : Gravel 33.0-24.0m, seal 24.0-22.0m, headworks.

REPORT NO.	9716	GEOTECHNICAL CORE LOG RECORD	IGSL Ltd.

CONTRACT: Dublin Landfill Siting Study

DRILLHOLE NO : BRC5
SHEET: Sheet 4 of 4

CLIENT: Fingal County Council
ENGINEER: RPS-MCOS

CORE DIAMETER (mm): 74
GROUND LEVEL (mOD): 56.89

DATE STARTED: 25/05/2004
DATE COMPLETED: 01/06/2004

CO-ORDINATES: 257260.77
317526.49

INCLINATION (Degrees): 90
FLUSH: Air/Mist

DRILLED BY: IGSL
LOGGED BY: DO'S

DOWNHOLE DEPTH (m)	CORE RUN DEPTH (m)	T.C.R.%	S.C.R.%	R.Q.D.%	Fracture Spacing (mm) 0 250 500	UCS (MPa)	POINT LOAD Is(50) MPa	SYMBOLIC LOG	ELEVATION (mOD)	DEPTH (m)	SPT (N value)	STANDPIPE DETAILS	GEOTECHNICAL DESCRIPTION
28	27.20												Strong to very strong to locally moderately strong, medium to thinly bedded to locally thinly laminated, grey/blue/black, fine-grained, LIMESTONE (Argillaceous layers at 23.99-24.05m, 25.04-25.56m, 26.24-26.4m, 26.72-26.87m, 27.02-27.2m, 28.15-29.71m, 30.1-30.4m, 31.0-31.1m, 32.24-32.52m & 32.8-33.0m) fresh to locally slightly weathered, intersected by smooth to locally rough, planar to curviplanar, tight to narrow, locally clay-smeared, commonly calcite-filled fractures of 45° & locally sub-vertical & sub-horizontal dip.
	28.20	100	72	45									
29	29.50	100	79	28									
30	30.50	100	86	24									
31	32.10	100	99	35									
32	33.00	100	67	18					23.89	33.00			End of Borehole at 33.00 m
33													
34													

REMARKS: Water encountered at 19.5m, water at 11.8m at end of drilling. Packer tests carried out - see packer result sheet. 1hr extra over move.

INSTALLATION DETAILS
Installation Type : SP
Depth to Response Zone top (m) : 24.00
Depth to Response Zone bottom (m) : 33.00
Comments : Gravel 33.0-24.0m, seal 24.0-22.0m, headworks.

Summary of Classification Tests

BS1377:Part 2:1990, clauses 3.2, 4.3, 5.3 & 5.4

BH/TP No.	Sample No.	Depth (m)	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	<425µm %	Preparation	Description	Classification
BH BSA1	A5828	3.00	D	12.9	33	17	16	62	WS	Brown slightly sandy slightly gravelly CLAY	C L
BH BSA1	A5830	5.00	D	12.3	31	9	22	62	WS	Grey/black slightly sandy slightly gravelly CLAY	C L
BH BSA1	A5834	8.00	D	8.2	28	5	23	56	WS	Grey/black slightly sandy slightly gravelly CLAY	C L
BH BSA1	A5838	13.00	D	7.1	24	3	21	56	WS	Dark brown slightly sandy gravelly CLAY	C L
BH BSA1	A5802	14.00	U	7	30	19	11		WS		C L
BH BSA1	A5842	16.00	D	17.5	49	14	35	75	WS	Dark brown sandy slightly gravelly CLAY	C I
BH BSA2	L1410	2	U				0		WS		
BH BSA2	L1414	3	D	13	38	19	19	56	WS	Grey brown slightly sandy gravelly CLAY	C I
BH BSA2	L1418	5	D	13.9	36	18	18	70	WS	Dark brown slightly sandy slightly gravelly CLAY	C I
BH BSA2	L1420	6	D	10.2	26	13	13	48	WS	Dark brown slightly sandy gravelly CLAY	C L
BH BSA3A	A5860	6	D	13.6	38	19	19	70	WS	Grey black slightly sandy slightly gravelly CLAY	C I
BH BSA3A	A5846	7	U	13.2			0		WS	Grey/black sandy gravelly CLAY	
BH BSA3A	A5866	9	D	14.2	36	12	24	61	WS	Dark brown slightly sandy slightly gravelly CLAY with fill mat	C I
BH BSA3A	A5848	12	U	4.3	28	14	14		WS	Grey/black sandy gravelly CLAY	C L
BH BSA3A	A5874	13	D	13.2	30	14	16	74	WS	Brown slightly sandy slightly gravelly CLAY	C L
BH BSA3A	A5851	16	U				0		WS		
BH BSA3A	A5882	17	D	14.3	29	15	14	37	WS	Brown slightly sandy gravelly CLAY	C L

Notes: NAT - tested as received WS - Wet sieved (425µm) NP - Non Plastic

IGSL	Contract	Dublin Landfill Sitting Study			Contract No. 9716
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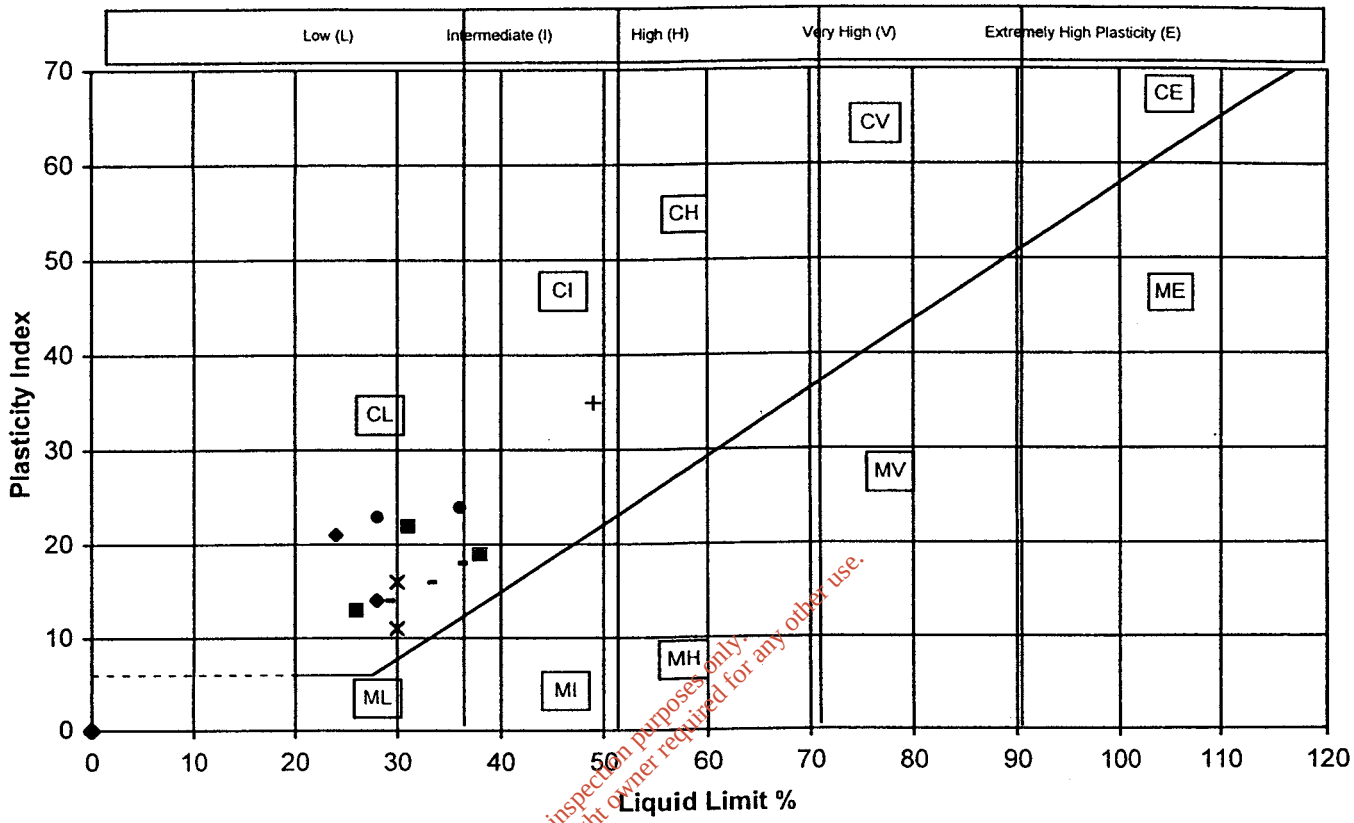
Plasticity Chart - Summary of Liquid & Plastic Limit Tests

BS1377:Part 2:1990, clauses 3.2, 4 & 5

Chart in accordance with BS5930:1999, fig.18

Contract No. 9716 Contract: Dublin Landfill Sitting Study



Code	BH/TP	Sample	Depth (m)	MC%	LL%	PL%	PI%	%<425µm	Description
-	BH BSA1	A5828	3.00	12.9	33	17	16	62	Brown slightly sandy slightly gravelly CLAY
■	BH BSA1	A5830	5.00	12.3	31	9	22	62	Grey/black slightly sandy slightly gravelly CLAY
●	BH BSA1	A5834	8.00	8.2	28	5	23	56	Grey/black slightly sandy slightly gravelly CLAY
◆	BH BSA1	A5838	13.00	7.1	24	3	21	56	Dark brown slightly sandy gravelly CLAY
x	BH BSA1	A5802	14.00	7	30	19	11	0	0
+	BH BSA1	A5842	16.00	17.5	49	14	35	75	Dark brown sandy slightly gravelly CLAY
o	BH BSA2	L1410	2.00						
□	BH BSA2	L1414	3.00	13	38	19	19	56	Grey brown slightly sandy gravelly CLAY
-	BH BSA2	L1418	5.00	13.9	36	18	18	70	Dark brown slightly sandy slightly gravelly CLAY
■	BH BSA2	L1420	6.00	10.2	26	13	13	48	Dark brown slightly sandy gravelly CLAY
●	BH BSA3A	A5860	6.00	13.6	38	19	19	70	Grey black slightly sandy slightly gravelly CLAY
◆	BH BSA3A	A5846	7.00	13.2	0	0	0	0	Grey/black sandy gravelly CLAY
x	BH BSA3A	A5866	9.00	14.2	36	12	24	61	Dark brown slightly sandy slightly gravelly CLAY with fill material
+	BH BSA3A	A5848	12.00	4.3	28	14	14	0	Grey/black sandy gravelly CLAY
o	BH BSA3A	A5874	13.00	13.2	30	14	16	74	Brown slightly sandy slightly gravelly CLAY
□	BH BSA3A	A5851	16.00						
-	BH BSA3A	A5882	17.00	14.3	29	15	14	37	Brown slightly sandy gravelly CLAY

NP denotes specimen is non-plastic.

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Summary of Classification Tests

BS1377:Part 2:1990, clauses 3.2, 4.3, 5.3 & 5.4

BH/TP No.	Sample No.	Depth (m)	Sample Type	Moisture Content %	Liquid Limit %	Plastic Limit %	Plasticity Index	<425µm %	Preparation	Description	Classification
BH BSA4	L1429	3.00	D	17.6	33	12	21	54	WS	Grey/black slightly sandy gravelly CLAY with fill material	C L
BH BSA4	L1434	5.00	D	15.8	35	9	26	68	WS	Grey/black slightly sandy slightly gravelly CLAY with root hairs	C L
BH BSA4	L1439	8.00	D	13.6	42	21	21	47	WS	Grey/black slightly sandy gravelly CLAY with many cobbles	C I
BH BSA4	L1446	11.00	D	17.8	40	20	20	61	WS	Dark brown slightly sandy slightly gravelly CLAY	C I
BH BSA4		2.00	U				0		WS		
BH BSA5	A5845	3.00	D	13.4	34	6	28	67	WS	Dark brown slightly sandy slightly gravelly CLAY	C L
BH BSA5	A5807	6.00	U				0		WS		
BH BSA5	A5823	6.80	D	4.9	24	15	9	6	WS	Dark brown slightly clayey slightly sandy GRAVEL with many cobbles	
BH BSA6	L1681	3.00	D	13.8	33	13	20	58	WS	Grey/black slightly sandy slightly gravelly CLAY with root ha	C L
BH BSA6	L1686	5.00	D	12.5	33	10	23	54	WS	Grey/black slightly sandy gravelly CLAY	C L
BH BSA6	L1693	9.00	D	13	35	18		65	WS	Grey/black slightly sandy slightly gravelly CLAY	M L
BH BSA6	L1697	11.00	D	14.4	38	17	21	57	WS	Grey/black slightly sandy slightly gravelly CLAY	C I
BH BSA6	L1699	12.50	U	11.1			0		WS	Grey/brown sandy gravelly CLAY	
BH BSA6	L1404	13.00	D	15.9	38	18	20	65	WS	Grey black slightly sandy slightly gravelly CLAY	

Notes: NAT - tested as received WS - Wet sieved (425µm) NP - Non Plastic

	Contract				Contract No.
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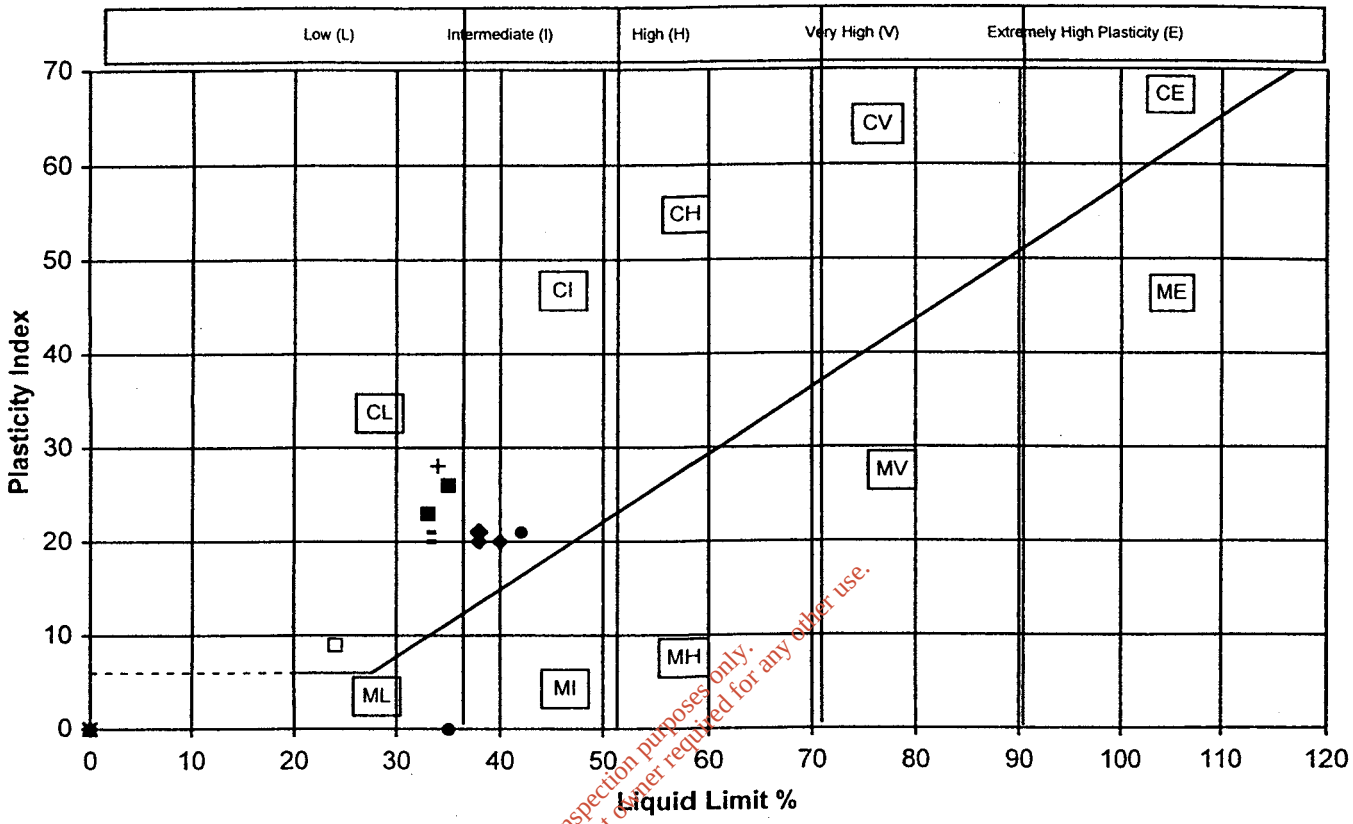
Plasticity Chart - Summary of Liquid & Plastic Limit Tests

BS1377:Part 2:1990, clauses 3.2, 4 & 5

Chart in accordance with BS5930:1999, fig.18

Contract No. 9716 Contract: Dublin Landfill Sitting Study



Code	BH/TP	Sample	Depth (m)	MC%	LL%	PL%	PI%	%<425µm	Description
-	BH BSA4	L1429	3.00	17.6	33	12	21	54	Grey/black slightly sandy gravelly CLAY with fill material
■	BH BSA4	L1434	5.00	15.8	35	9	26	68	Grey/black slightly sandy slightly gravelly CLAY with root hairs
●	BH BSA4	L1439	8.00	13.6	42	21	21	47	Grey/black slightly sandy gravelly CLAY with many cobbles
◆	BH BSA4	L1446	11.00	17.8	40	20	20	61	Dark brown slightly sandy slightly gravelly CLAY
x	BH BSA4		2.00						
+	BH BSA5	A5845	3.00	13.4	34	6	28	67	Dark brown slightly sandy slightly gravelly CLAY
o	BH BSA5	A5807	6.00						
□	BH BSA5	A5823	6.80	4.9	24	15	9	6	Dark brown slightly clayey slightly sandy GRAVEL with many cobbles
-	BH BSA6	L1681	3.00	13.8	33	13	20	58	Grey/black slightly sandy slightly gravelly CLAY with root hairs
■	BH BSA6	L1686	5.00	12.5	33	10	23	54	Grey/black slightly sandy gravelly CLAY
●	BH BSA6	L1693	9.00	13	35	18	0	65	Grey/black slightly sandy slightly gravelly CLAY
◆	BH BSA6	L1697	11.00	14.4	38	17	21	57	Grey/black slightly sandy slightly gravelly CLAY
x	BH BSA6	L1699	12.50	11.1					Grey/brown sandy gravelly CLAY
+	BH BSA6	L1404	13.00	15.9	38	18	20	65	Grey black slightly sandy slightly gravelly CLAY
o									
□									

NP denotes specimen is non-plastic.

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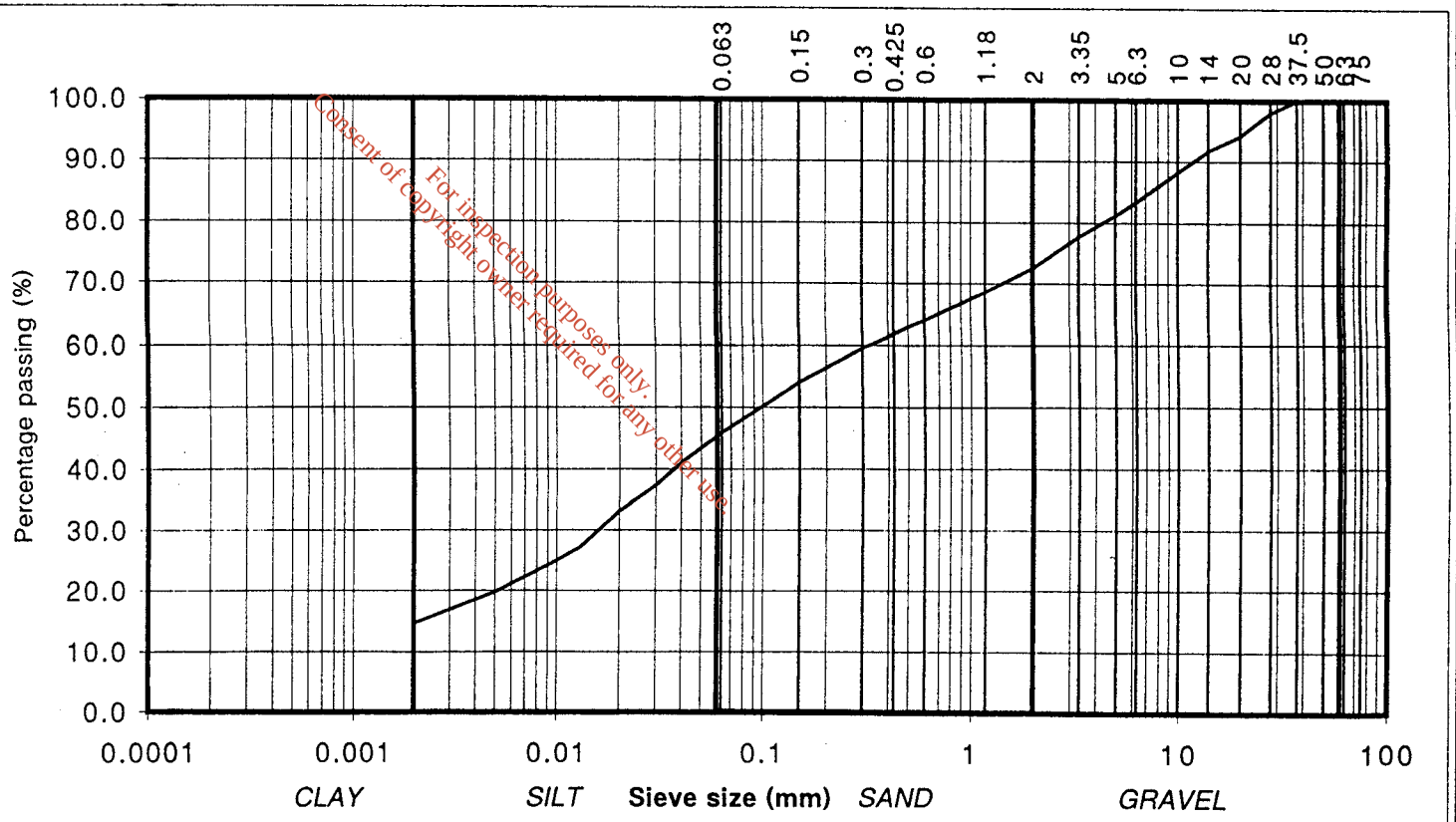
Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	100.0	
28	98.0	
20	94.1	GRAVEL
14	91.8	
10	88.1	
6.3	83.3	
5	81.2	
3.35	77.7	
2	72.5	
1.18	68.6	
0.6	63.9	SAND
0.425	61.8	
0.3	59.4	
0.15	53.9	
0.063	45.9	
0.04	41.0	
0.03	37.4	
0.02	33.0	SILT/CLAY
0.013	27.1	
0.009	24.1	
0.005	19.7	
0.002	14.6	

Contract No: 9716
Contract: Dublin Landfill Sitting Study
BH/TP No: BH BSA1
SAMPLE No.: A5828
DEPTH (m): 3.00
TEST METHOD: Wet sieve and hydrometer
DESCRIPTION: Brown slightly sandy, slightly gravelly, CLAY



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Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare

PSD V3.1 12.01

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	100.0	
28	88.2	
20	88.2	GRAVEL
14	84.2	
10	82.2	
6.3	79.6	
5	77.9	
3.35	75.1	
2	71.2	
1.18	68.0	
0.6	63.9	SAND
0.425	61.8	
0.3	59.5	
0.15	54.0	
0.063	45.7	
0.04	40.5	
0.03	37.2	
0.02	33.1	SILT/CLAY
0.013	28.0	
0.009	25.5	
0.005	21.1	
0.002	16.3	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

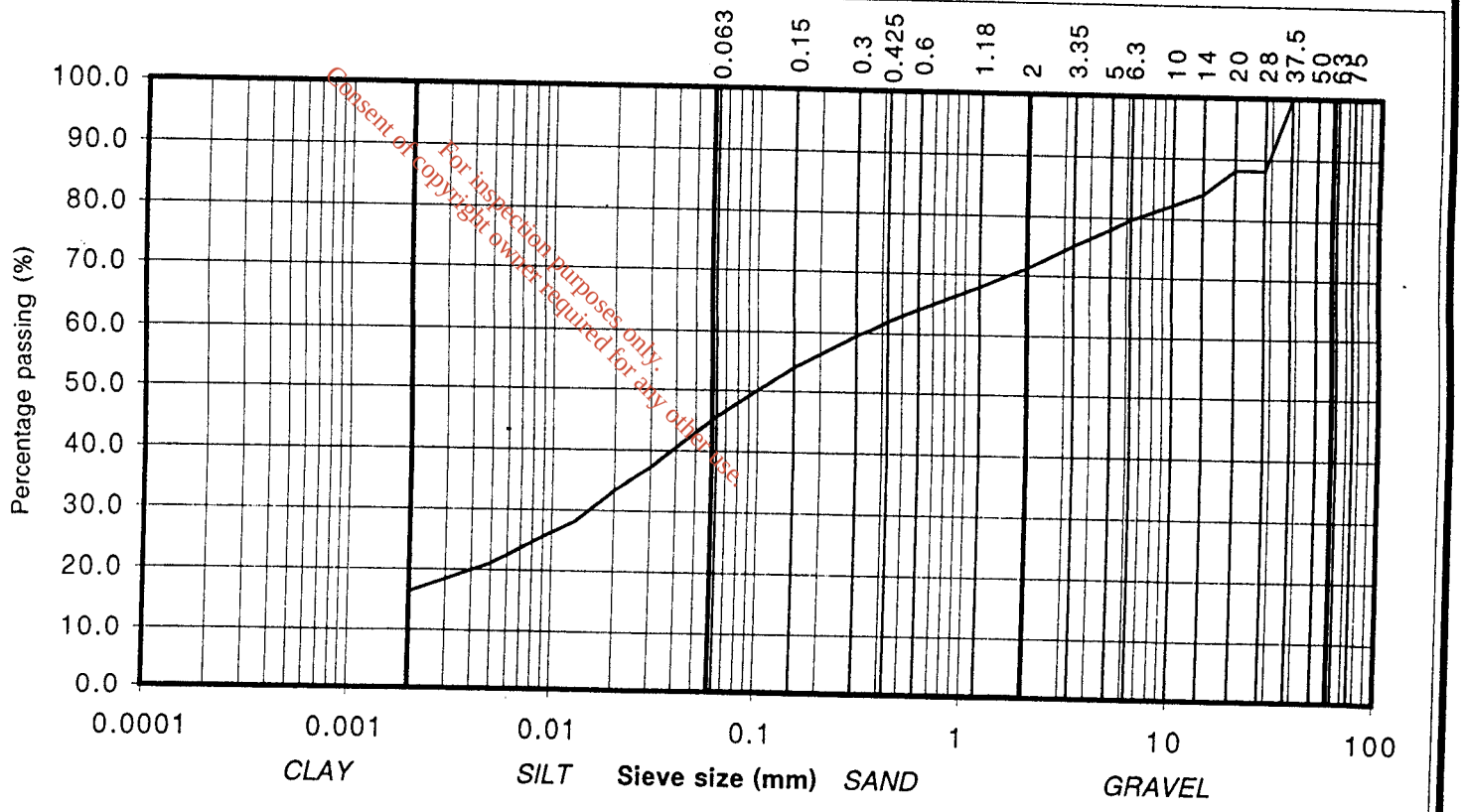
BH/TP No: BH BSA1

SAMPLE No.: A5830

DEPTH (m): 5.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Grey/black slightly sandy, slightly gravelly, CLAY



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Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare

PSD V3.1 12.01

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	GRAVEL
50	100.0	
37.5	90.4	
28	86.2	
20	84.2	
14	79.8	
10	77.1	
6.3	72.9	
5	71.3	
3.35	68.7	
2	65.4	SAND
1.18	62.0	
0.6	58.2	
0.425	56.2	
0.3	53.3	
0.15	46.0	
0.063	36.3	SILT/CLAY
0.04	31.0	
0.03	28.4	
0.02	24.6	
0.013	20.8	
0.009	18.2	
0.005	15.3	
0.002	11.8	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

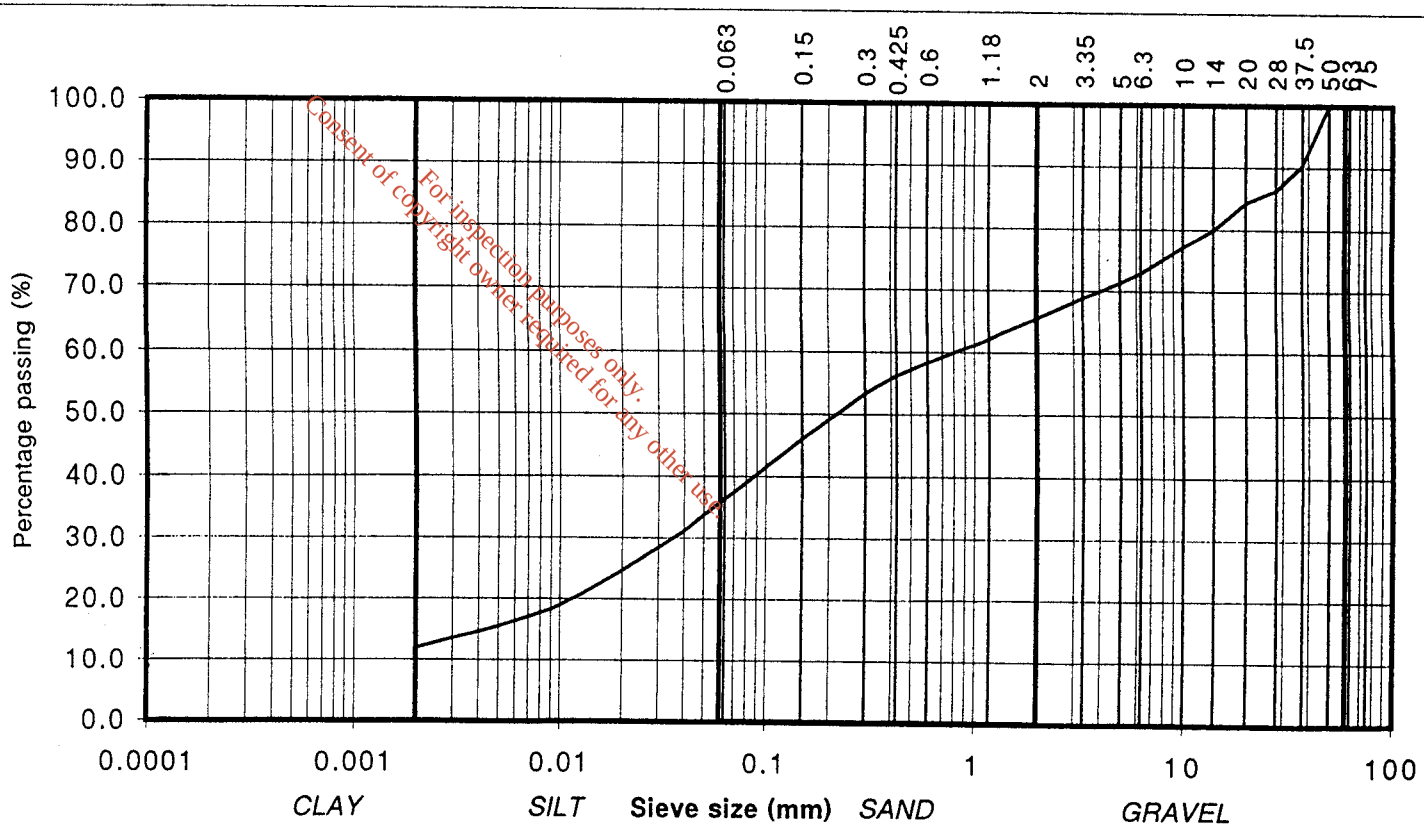
BH/TP No: BH BSA1

SAMPLE No.: A5834

DEPTH (m): 8.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Grey/black slightly sandy, slightly gravelly, CLAY



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Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare PSD V3.1 12.01

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	91.4	
28	84.9	
20	80.0	GRAVEL
14	76.6	
10	74.7	
6.3	70.8	
5	69.1	
3.35	66.7	
2	63.6	
1.18	61.1	
0.6	57.9	SAND
0.425	56.1	
0.3	53.3	
0.15	45.5	
0.063	34.2	
0.04	30.0	
0.03	27.3	
0.02	24.0	SILT/CLAY
0.013	20.4	
0.009	18.0	
0.005	15.2	
0.002	10.9	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

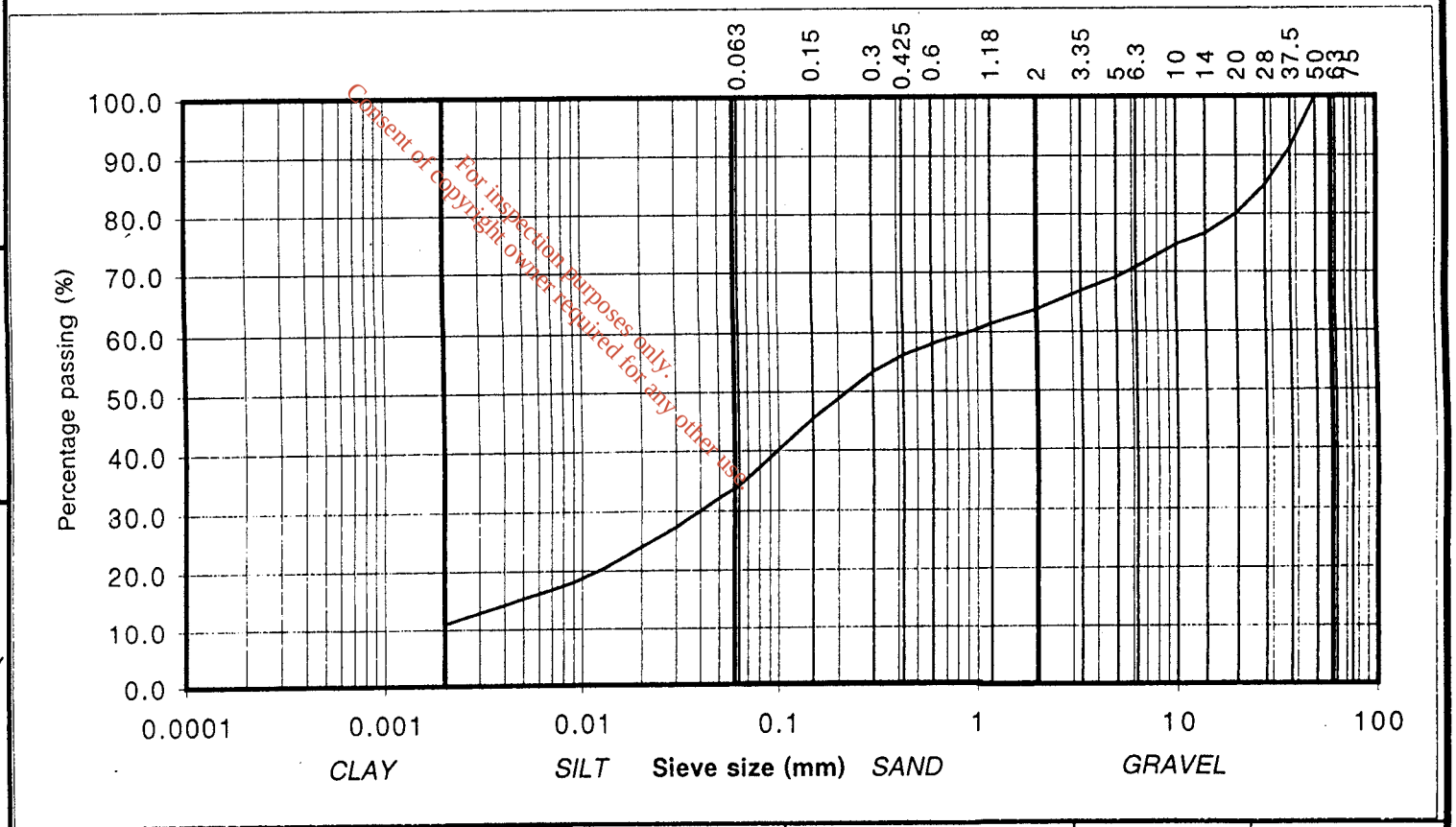
BH/TP No: BH BSA1

SAMPLE No.: A5838

DEPTH (m): 13.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Dark brown slightly sandy, gravelly, CLAY



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Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare

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Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	GRAVEL
50	100.0	
37.5	100.0	
28	100.0	
20	99.0	
14	98.6	
10	98.3	
6.3	97.0	
5	96.5	
3.35	95.1	
2	91.9	SAND
1.18	86.8	
0.6	78.9	
0.425	74.8	
0.3	70.7	
0.15	62.2	
0.063	51.9	SILT/CLAY
0.04	48.9	
0.03	44.7	
0.02	40.6	
0.013	35.2	
0.009	31.4	
0.005	26.0	
0.002	18.6	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

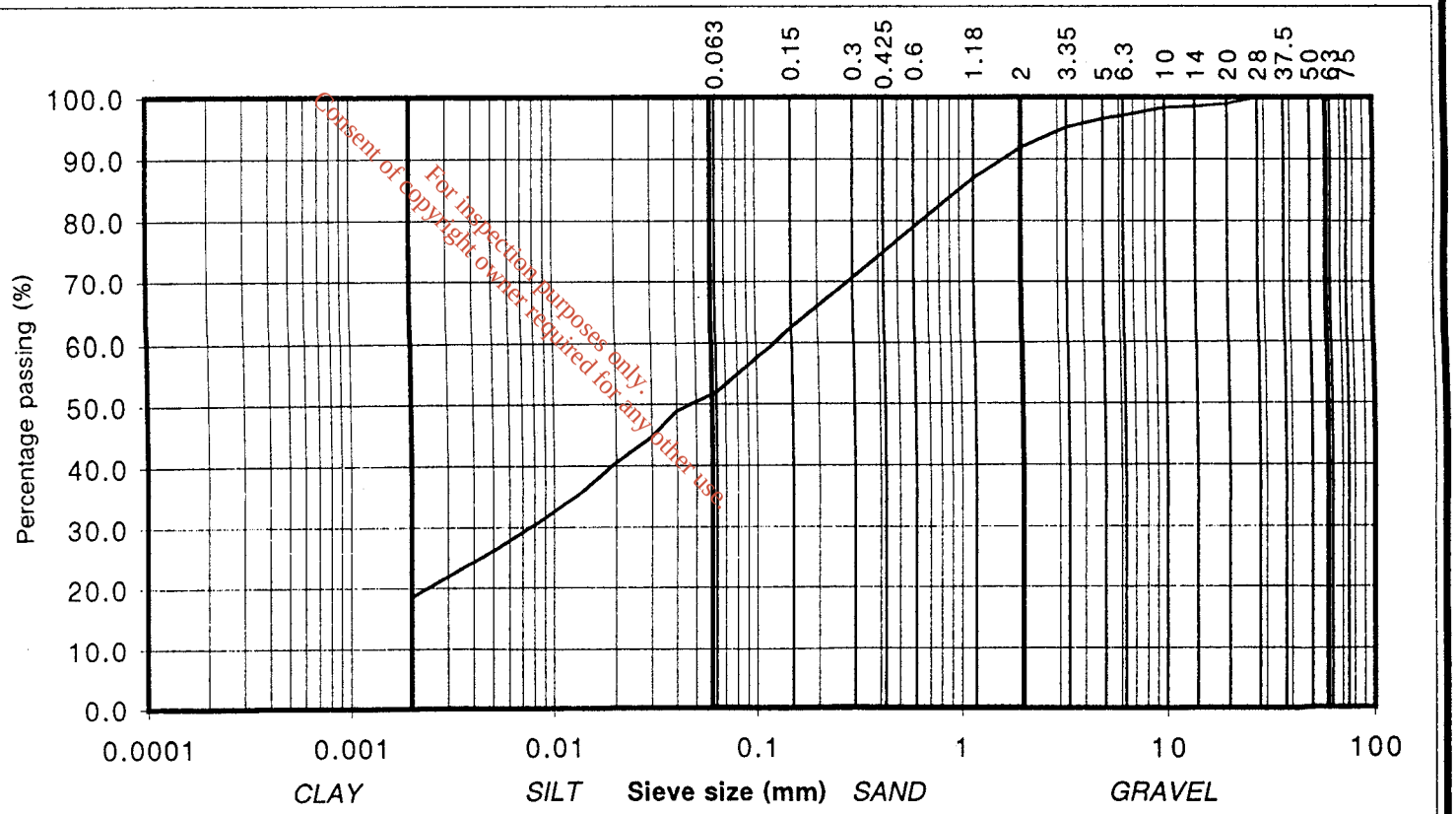
BH/TP No: BH BSA1

SAMPLE No.: A5842

DEPTH (m): 16.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Dark brown sandy, slightly gravelly, CLAY



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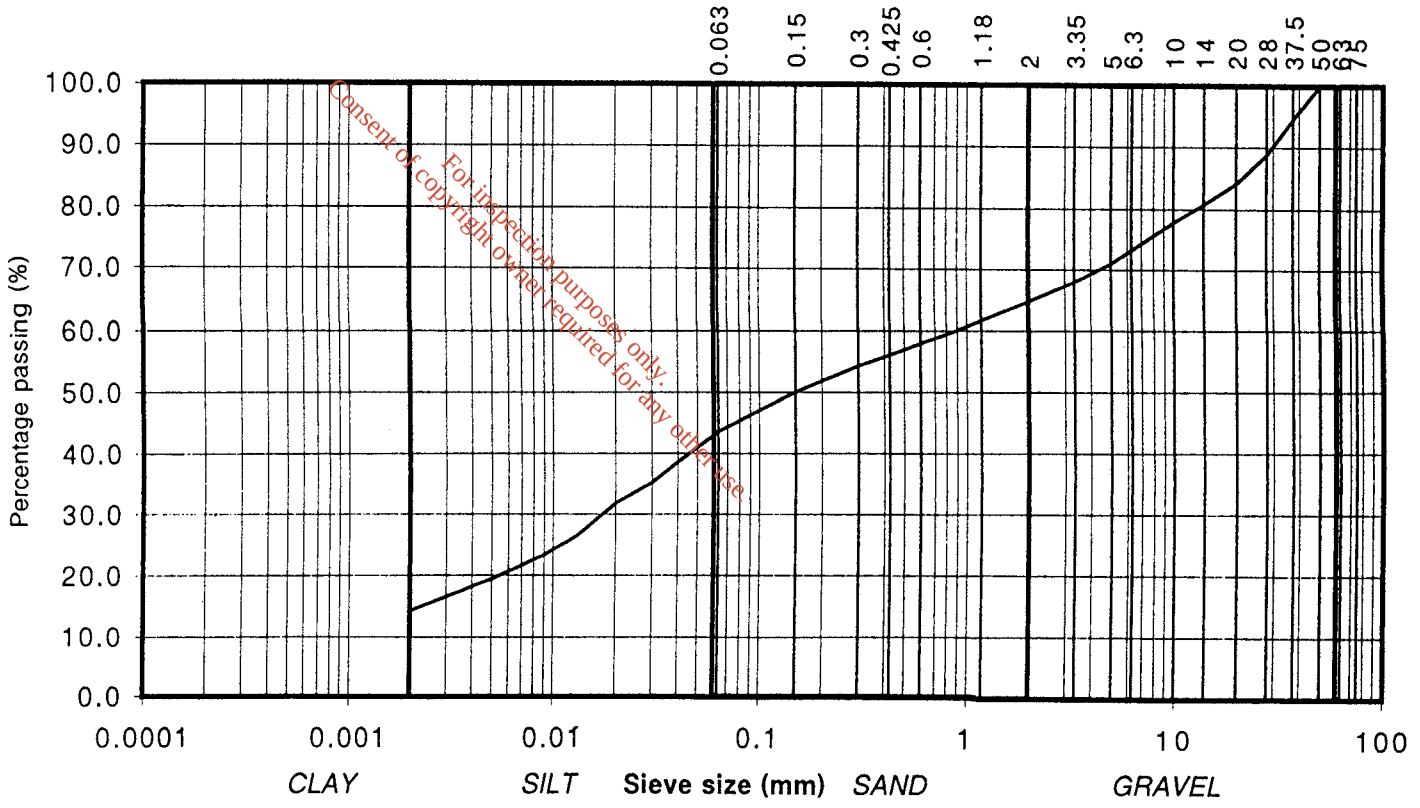
Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare PSD V3.1 12.01

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	GRAVEL
50	100.0	
37.5	94.6	
28	88.7	
20	84.1	
14	80.7	
10	77.8	
6.3	73.2	
5	71.0	
3.35	67.9	
2	64.6	SAND
1.18	61.5	
0.6	57.8	
0.425	56.1	
0.3	54.2	
0.15	50.0	
0.063	43.6	SILT/CLAY
0.04	38.6	
0.03	35.1	
0.02	31.6	
0.013	26.4	
0.009	23.3	
0.005	19.4	
0.002	14.2	

Contract No: 9716
Contract: Dublin Landfill Sitting Study
BH/TP No: BH BSA2
SAMPLE No.: L1414
DEPTH (m): 3.00
TEST METHOD: Wet sieve and hydrometer
DESCRIPTION: Grey/brown slightly sandy, gravelly, CLAY



IGSL

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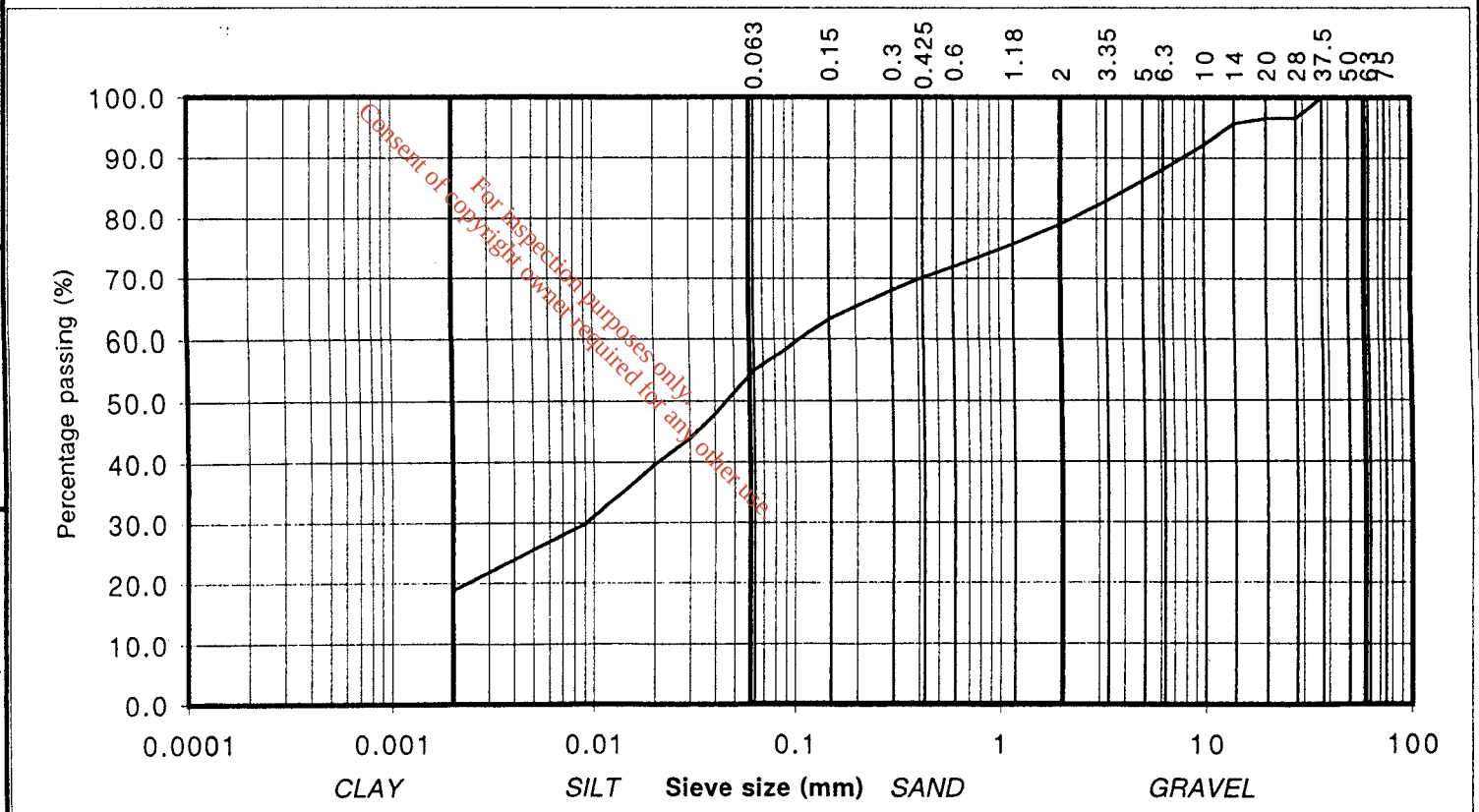
D CONNOLLY	15/7/04			

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	100.0	
28	96.5	
20	96.5	GRAVEL
14	95.7	
10	92.1	
6.3	88.1	
5	86.2	
3.35	82.9	
2	79.0	
1.18	75.8	
0.6	72.0	SAND
0.425	70.1	
0.3	68.0	
0.15	63.1	
0.063	55.0	
0.04	47.8	
0.03	43.9	
0.02	39.5	SILT/CLAY
0.013	34.2	
0.009	29.8	
0.005	25.4	
0.002	18.8	

Contract No: 9716
Contract: Dublin Landfill Sitting Study
BH/TP No: BH BSA2
SAMPLE No.: L1418
DEPTH (m): 5.00
TEST METHOD: Wet sieve and hydrometer
DESCRIPTION: Dark brown slightly sandy, slightly gravelly, CLAY



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D CONNOLLY	15/7/04			

IGSL

Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare

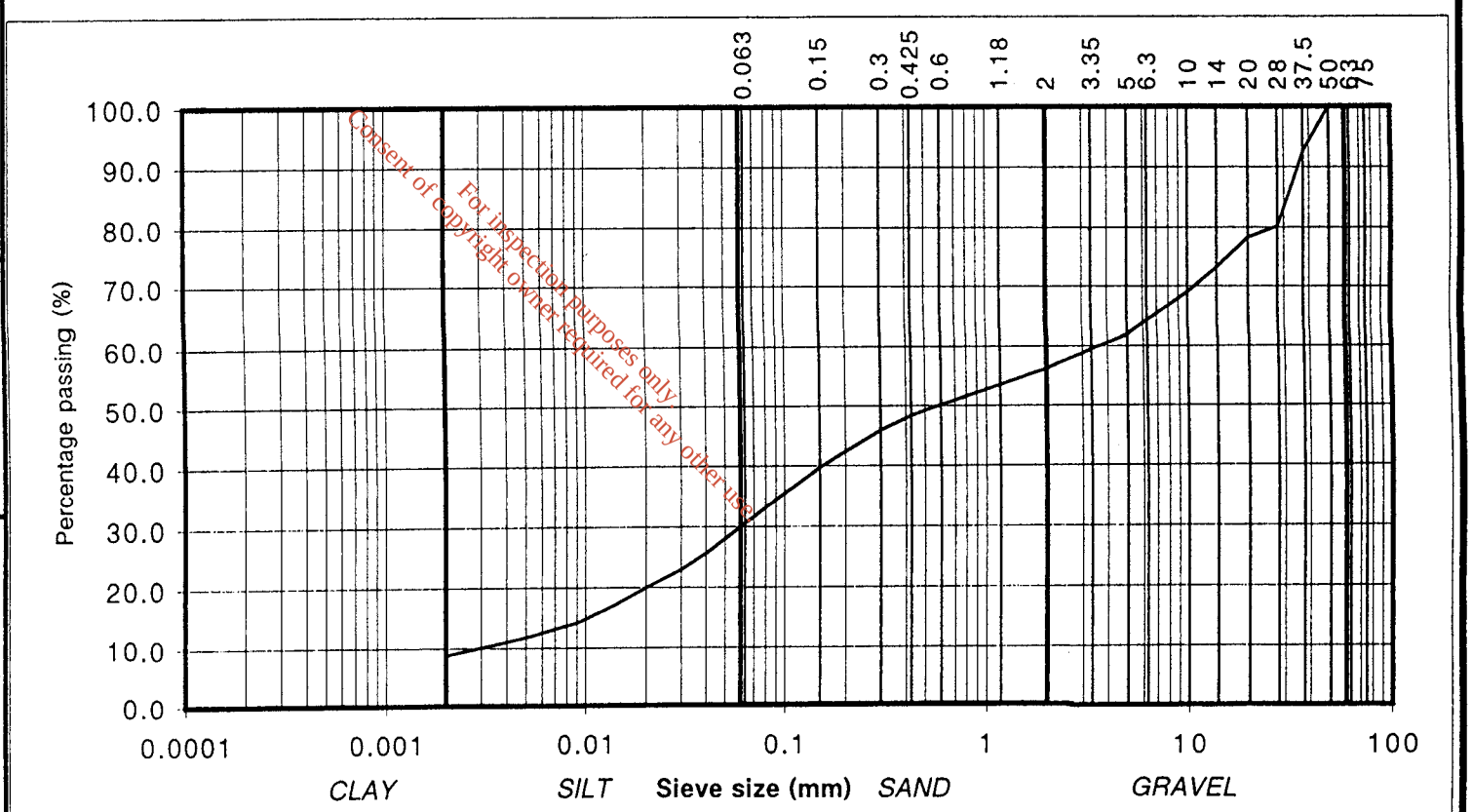
PSD V3.1 12.01

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	GRAVEL
50	100.0	
37.5	92.6	
28	80.1	
20	78.2	
14	73.2	
10	69.0	
6.3	64.2	
5	61.9	
3.35	59.4	
2	56.3	SAND
1.18	53.5	
0.6	50.1	
0.425	48.3	
0.3	45.9	
0.15	39.7	
0.063	30.5	SILT/CLAY
0.04	25.6	
0.03	22.9	
0.02	20.0	
0.013	16.5	
0.009	14.1	
0.005	11.7	
0.002	8.7	

Contract No:	9716
Contract:	Dublin Landfill Sitting Study
BH/TP No:	BH BSA2
SAMPLE No.:	L1420
DEPTH (m):	6.00
TEST METHOD:	Wet sieve and hydrometer
DESCRIPTION:	Dark brown slightly sandy, gravelly, CLAY



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Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare

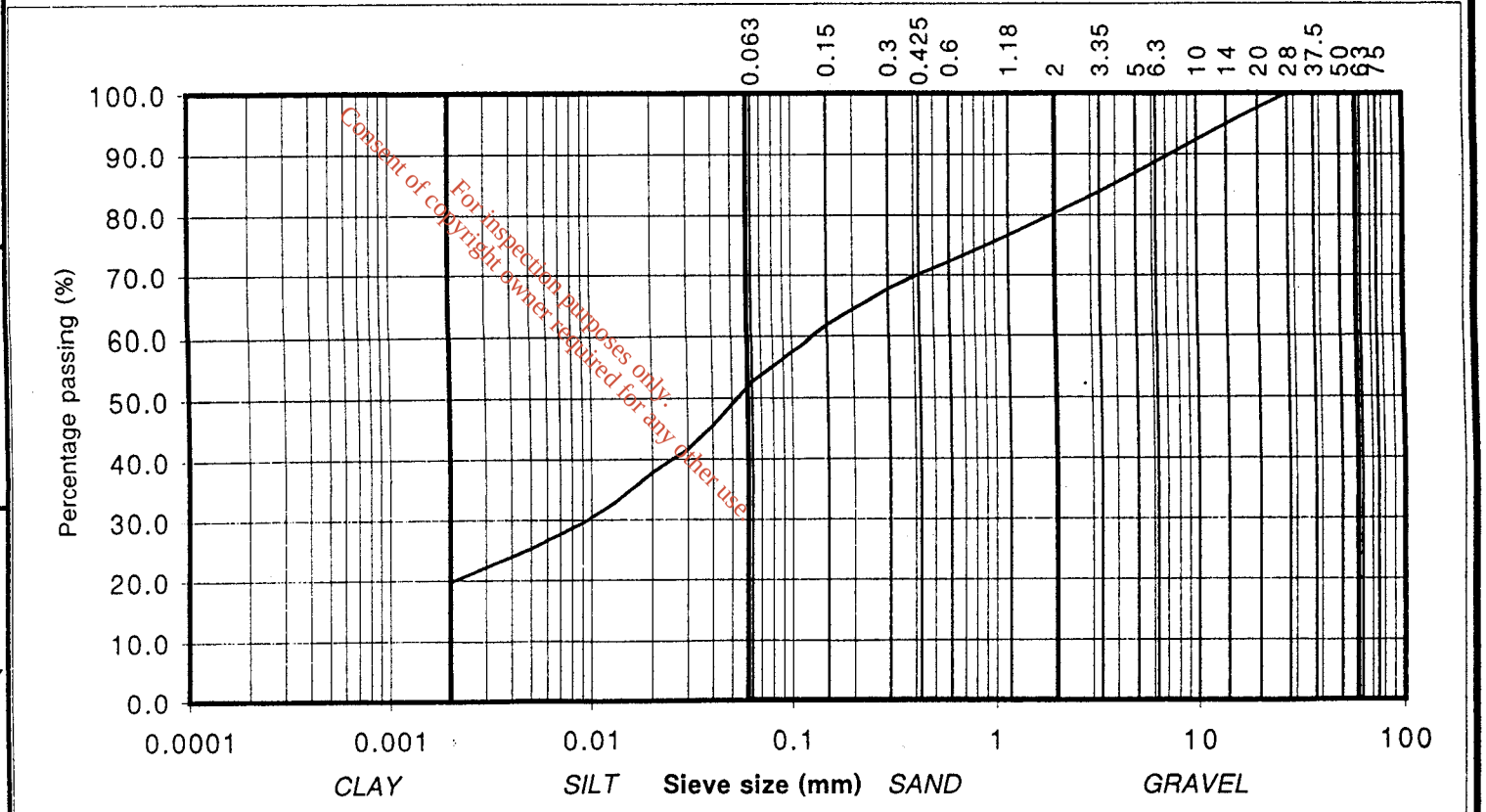
PSD V3.1 12.01

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	GRAVEL
50	100.0	
37.5	100.0	
28	100.0	
20	97.7	
14	95.0	
10	92.4	
6.3	88.8	
5	86.9	
3.35	83.8	
2	80.1	SAND
1.18	76.6	
0.6	72.3	
0.425	70.2	
0.3	67.7	
0.15	61.7	
0.063	52.7	SILT/CLAY
0.04	45.4	
0.03	41.6	
0.02	37.8	
0.013	32.8	
0.009	29.4	
0.005	25.2	
0.002	19.7	

Contract No:	9716
Contract:	Dublin Landfill Sitting Study
BH/TP No:	BH BSA3A
SAMPLE No.:	A5860
DEPTH (m):	6.00
TEST METHOD:	Wet sieve and hydrometer
DESCRIPTION:	Grey/black slightly sandy, slightly gravelly, CLAY



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Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	92.9	
28	92.9	
20	90.0	
14	87.2	GRAVEL
10	83.6	
6.3	78.0	
5	75.9	
3.35	73.0	
2	69.3	
1.18	66.1	
0.6	62.6	
0.425	60.8	SAND
0.3	58.9	
0.15	54.8	
0.063	48.8	
0.04	42.8	
0.03	39.3	
0.02	35.8	
0.013	31.1	SILT/CLAY
0.009	27.2	
0.005	23.3	
0.002	16.7	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

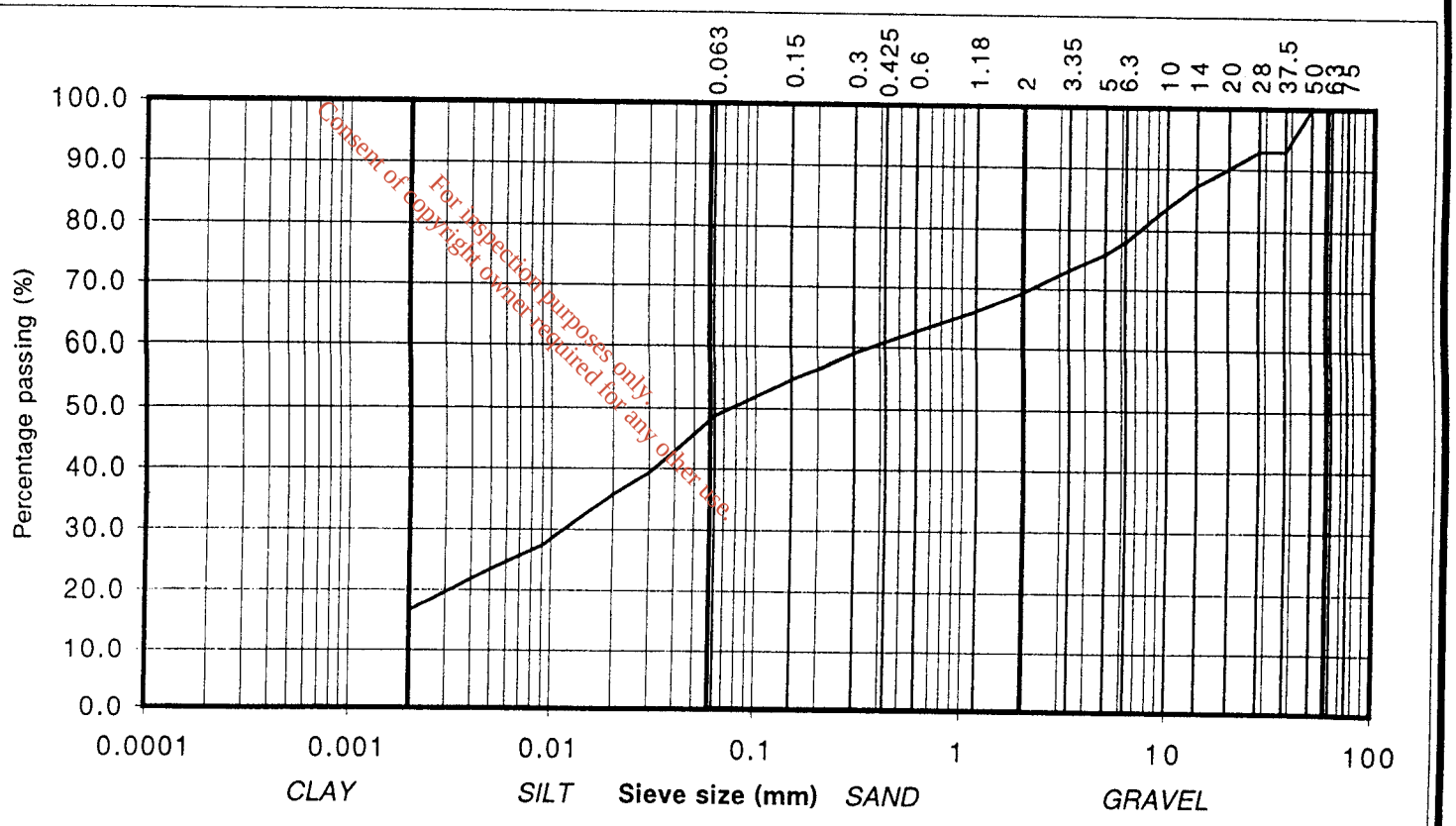
BH/TP No: BH BSA3A

SAMPLE No.: A5866

DEPTH (m): 9.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Dark brown slightly sandy, slightly gravelly, CLAY with fill material



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Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare

PSD V3.1 12.01

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	GRAVEL
50	100.0	
37.5	100.0	
28	100.0	
20	97.5	
14	95.6	
10	92.7	
6.3	90.7	
5	89.3	
3.35	86.3	
2	83.0	SAND
1.18	79.9	
0.6	76.4	
0.425	74.4	
0.3	72.0	
0.15	65.9	
0.063	57.0	SILT/CLAY
0.04	53.2	
0.03	50.0	
0.02	44.5	
0.013	38.6	
0.009	34.5	
0.005	31.3	
0.002	24.0	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

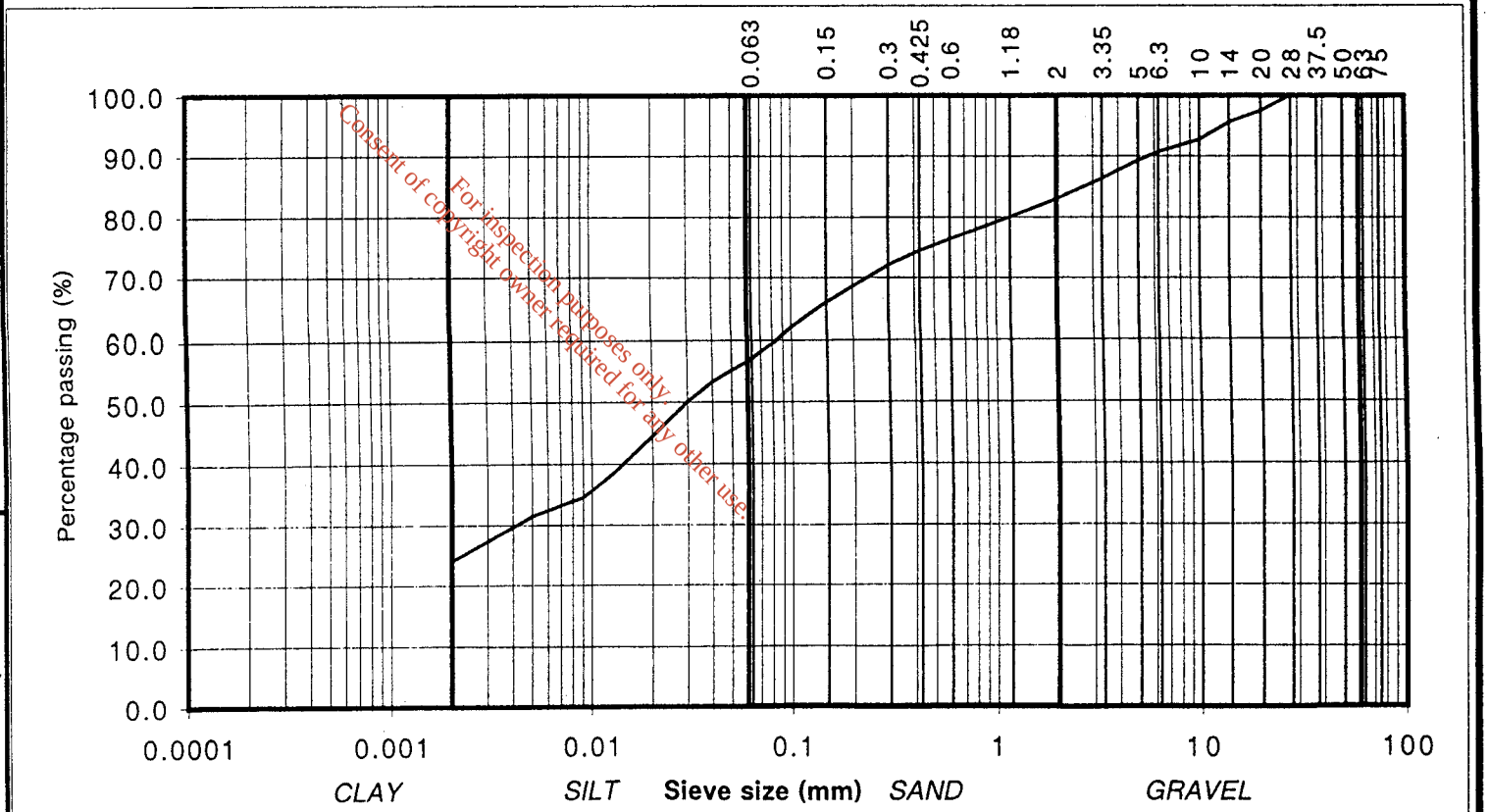
BH/TP No: BH BSA3A

SAMPLE No.: A5874

DEPTH (m): 13.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Brown slightly sandy, slightly gravelly, CLAY



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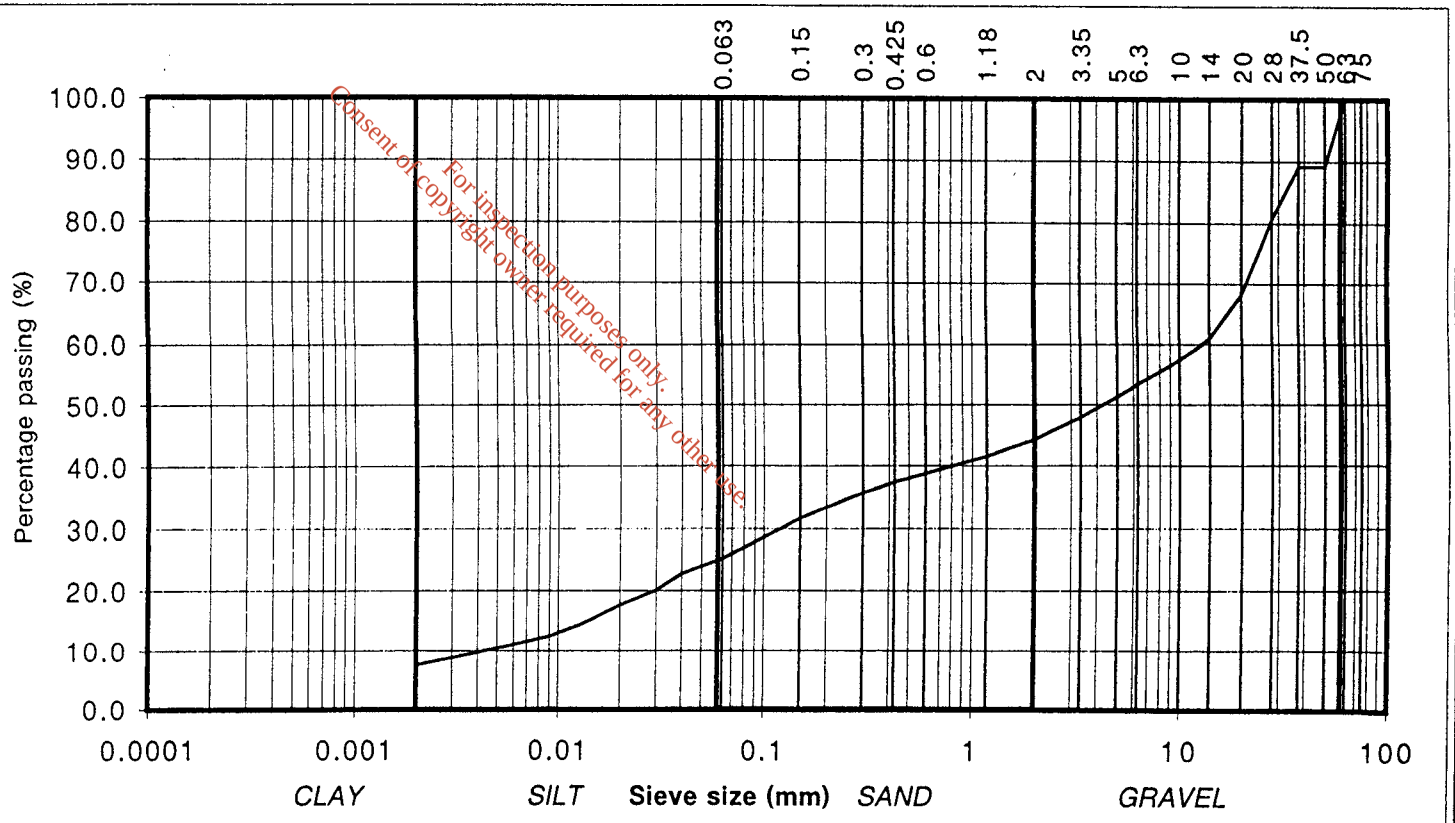
PSD V3.1 12.01

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	89.2	
37.5	89.2	
28	80.6	
20	68.1	GRAVEL
14	60.8	
10	57.3	
6.3	53.4	
5	51.2	
3.35	47.9	
2	44.3	
1.18	41.6	
0.6	38.7	SAND
0.425	37.4	
0.3	35.7	
0.15	31.5	
0.063	25.1	
0.04	22.6	
0.03	20.0	
0.02	17.6	SILT/CLAY
0.013	14.4	
0.009	12.4	
0.005	10.4	
0.002	7.6	

Contract No: 9716
Contract: Dublin Landfill Sitting Study
BH/TP No: BH BSA3A
SAMPLE No.: A5882
DEPTH (m): 17.00
TEST METHOD: Wet sieve and hydrometer
DESCRIPTION: Brown slightly sandy, gravelly, CLAY



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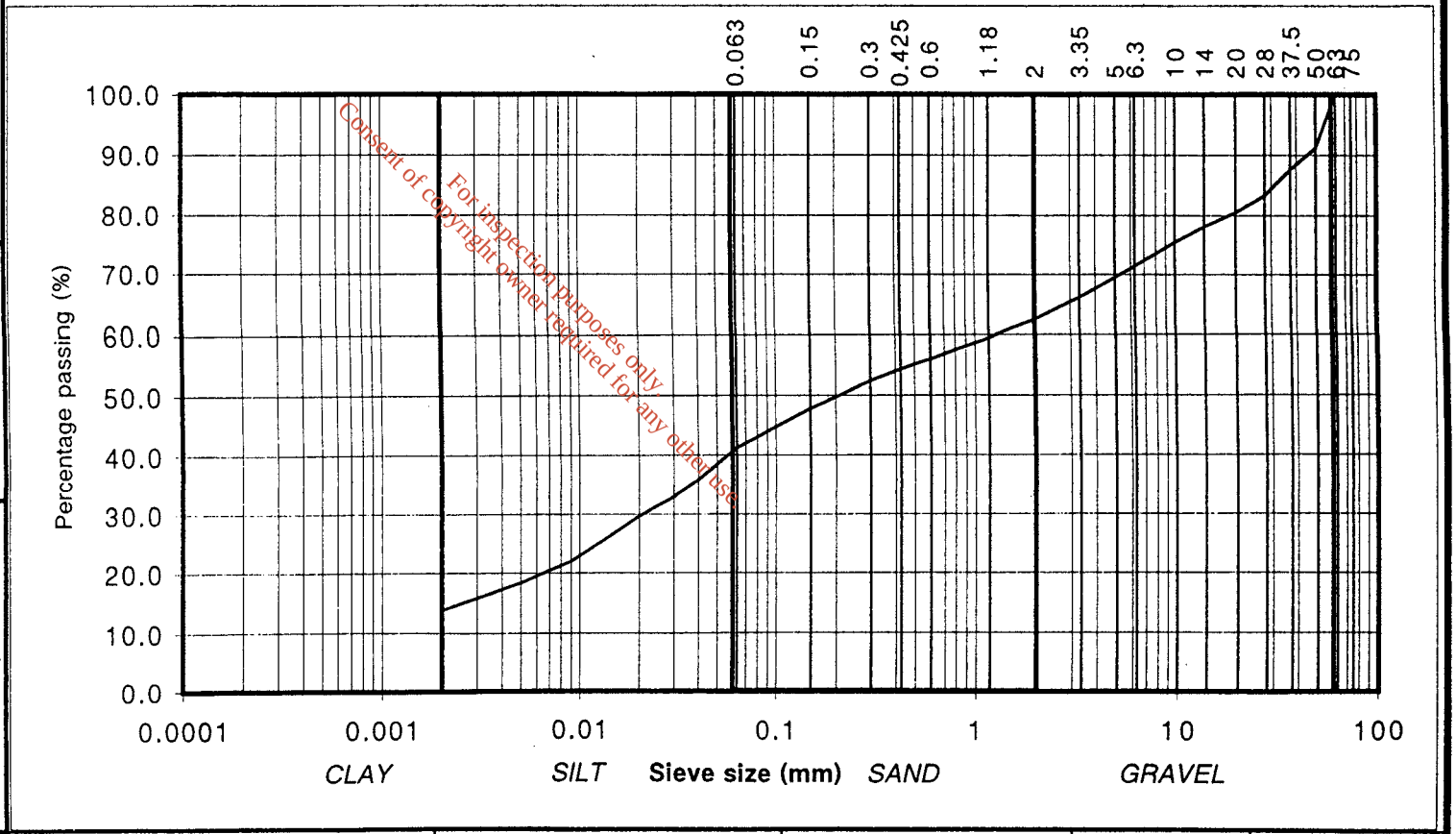
Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	91.2	
37.5	87.6	
28	83.2	
20	80.4	GRAVEL
14	78.0	
10	75.4	
6.3	71.4	
5	69.5	
3.35	66.1	
2	62.4	
1.18	59.4	
0.6	55.9	SAND
0.425	54.2	
0.3	52.3	
0.15	47.8	
0.063	41.2	
0.04	35.8	
0.03	32.8	
0.02	29.6	SILT/CLAY
0.013	25.3	
0.009	22.0	
0.005	18.4	
0.002	13.7	

Contract No:	9716
Contract:	Dublin Landfill Sitting Study
BH/TP No:	BH BSA4
SAMPLE No.:	L1429
DEPTH (m):	3.00
TEST METHOD:	Wet sieve and hydrometer
DESCRIPTION:	Grey/black slightly sandy, gravelly, CLAY with fill material



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Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	GRAVEL
50	100.0	
37.5	100.0	
28	100.0	
20	97.7	
14	95.2	
10	91.0	
6.3	87.1	
5	84.6	
3.35	81.5	
2	77.9	SAND
1.18	74.2	
0.6	69.9	
0.425	67.8	
0.3	65.4	
0.15	59.9	
0.063	51.4	SILT/CLAY
0.04	44.3	
0.03	41.0	
0.02	36.9	
0.013	32.0	
0.009	27.9	
0.005	23.8	
0.002	17.6	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

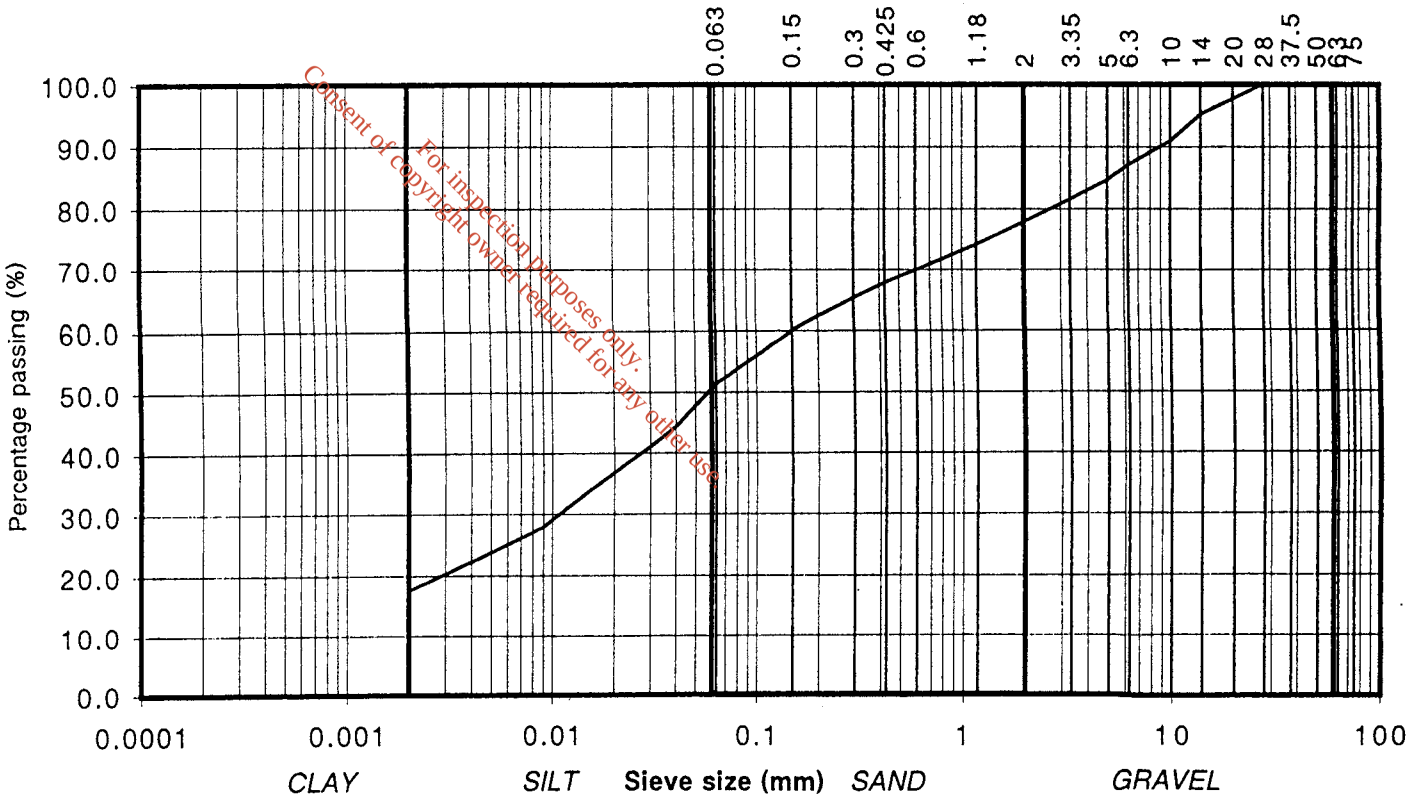
BH/TP No: BH BSA4

SAMPLE No.: L1434

DEPTH (m): 5.00

TEST METHOD: .Wet sieve and hydrometer

DESCRIPTION: Grey/black slightly sandy, slightly gravelly, CLAY with root hairs



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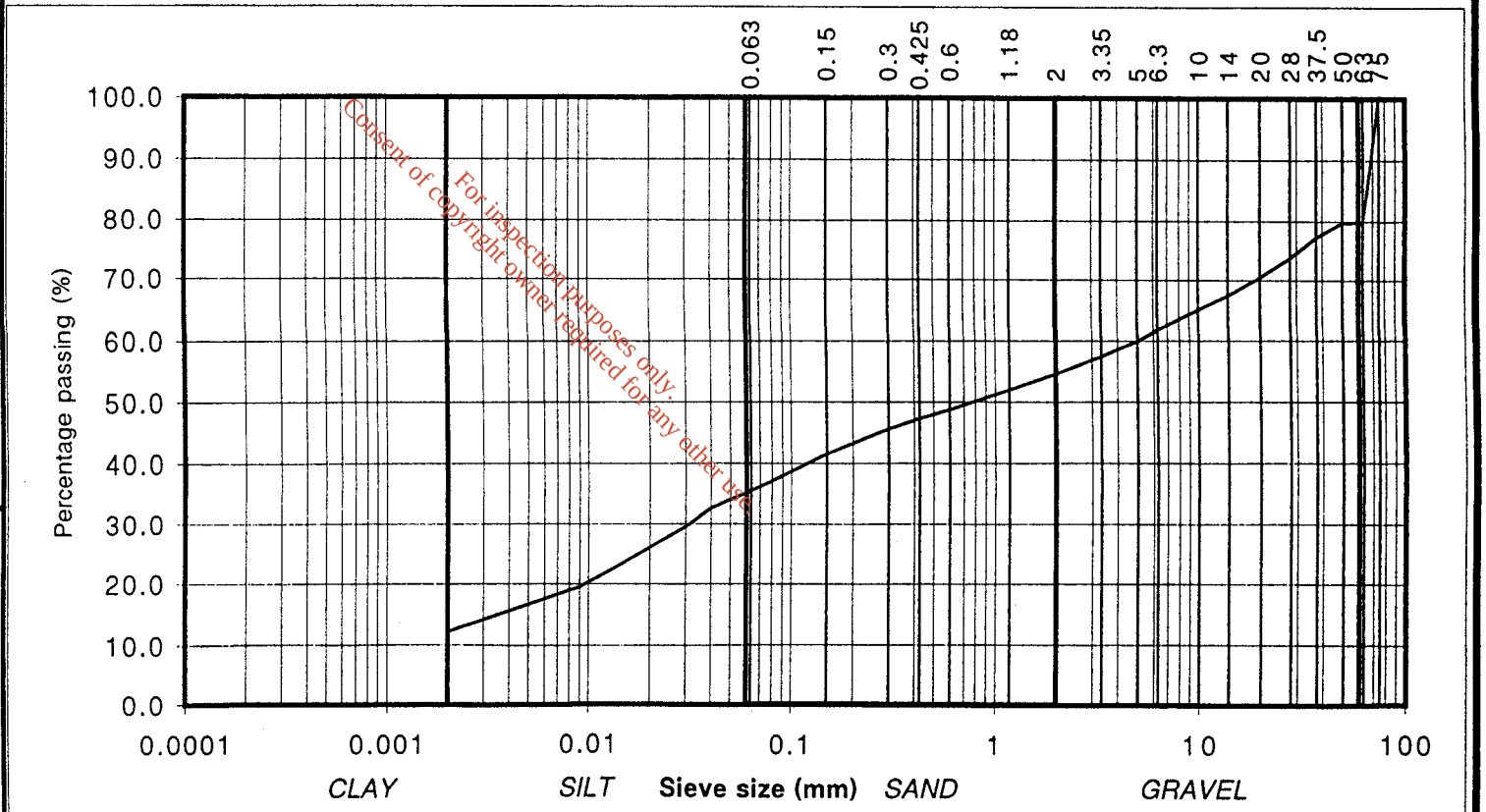
Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	79.6	GRAVEL
50	79.6	
37.5	77.2	
28	73.8	
20	70.4	
14	67.4	
10	64.9	
6.3	61.6	
5	59.8	
3.35	57.3	
2	54.4	SAND
1.18	51.9	
0.6	48.7	
0.425	47.2	
0.3	45.5	
0.15	41.6	
0.063	35.5	SILT/CLAY
0.04	32.5	
0.03	29.4	
0.02	26.0	
0.013	22.3	
0.009	19.5	
0.005	16.7	
0.002	12.1	

Contract No:	9716
Contract:	Dublin Landfill Sitting Study
BH/TP No:	BH BSA4
SAMPLE No.:	L1439
DEPTH (m):	8.00
TEST METHOD:	Wet sieve and hydrometer
DESCRIPTION:	Grey/black slightly sandy, gravelly, CLAY with many cobbles



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Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	GRAVEL
50	100.0	
37.5	90.3	
28	87.0	
20	83.6	
14	80.7	
10	78.7	
6.3	75.1	
5	73.3	
3.35	70.9	
2	67.8	SAND
1.18	65.2	
0.6	62.0	
0.425	60.6	
0.3	59.0	
0.15	55.3	
0.063	49.0	SILT/CLAY
0.04	46.2	
0.03	43.0	
0.02	39.1	
0.013	34.4	
0.009	30.9	
0.005	27.0	
0.002	20.3	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

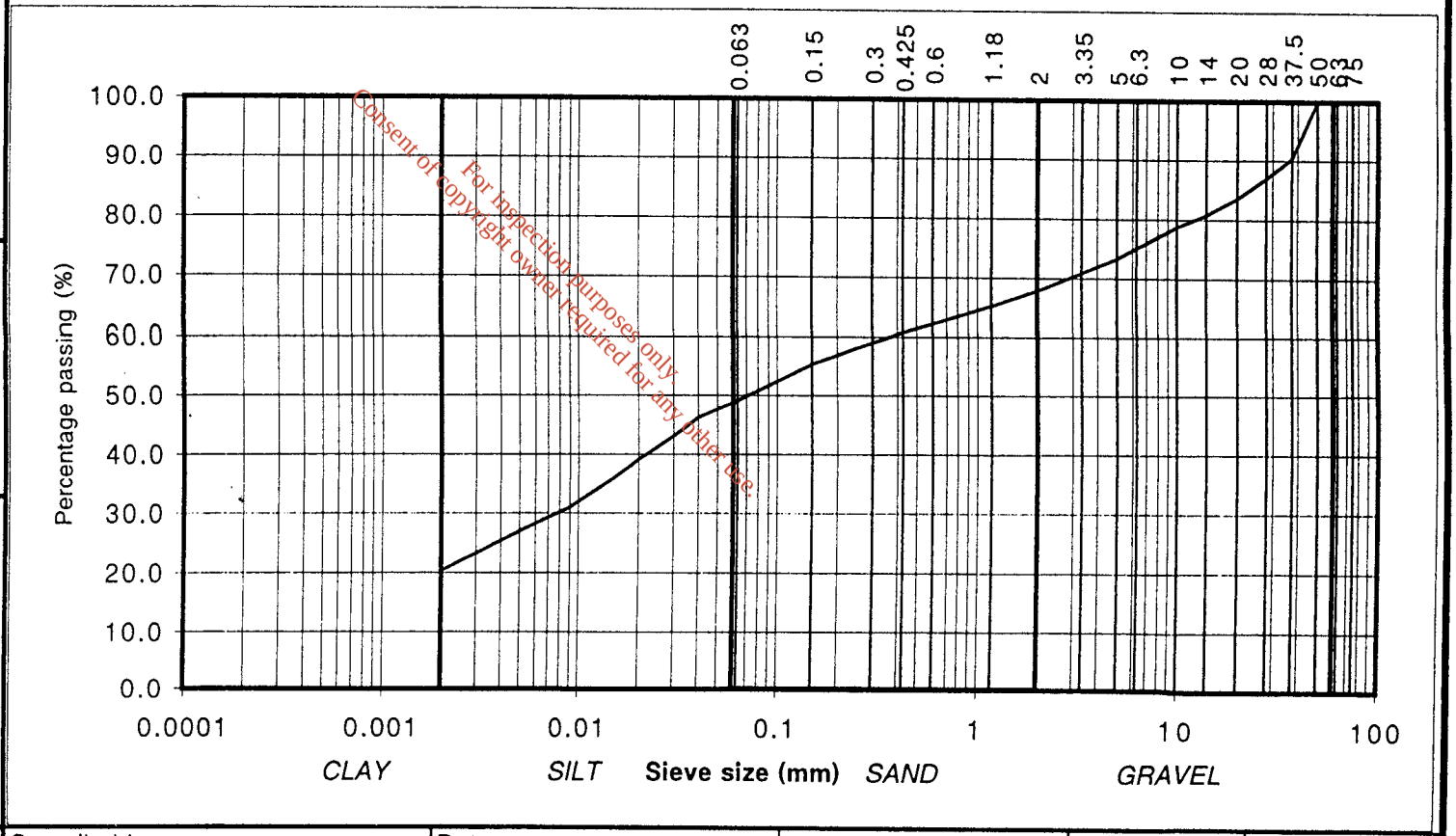
BH/TP No: BH BSA4

SAMPLE No.: L1446

DEPTH (m): 11.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Dark brown slightly sandy, slightly gravelly, CLAY



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Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare PSD V3.1 12.01

Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	GRAVEL
50	100.0	
37.5	100.0	
28	100.0	
20	97.5	
14	94.7	
10	91.4	
6.3	87.1	
5	85.1	
3.35	80.8	
2	76.9	SAND
1.18	73.4	
0.6	68.9	
0.425	66.7	
0.3	64.1	
0.15	58.5	
0.063	49.0	SILT/CLAY
0.04	45.0	
0.03	41.1	
0.02	37.1	
0.013	32.0	
0.009	28.5	
0.005	24.6	
0.002	17.9	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

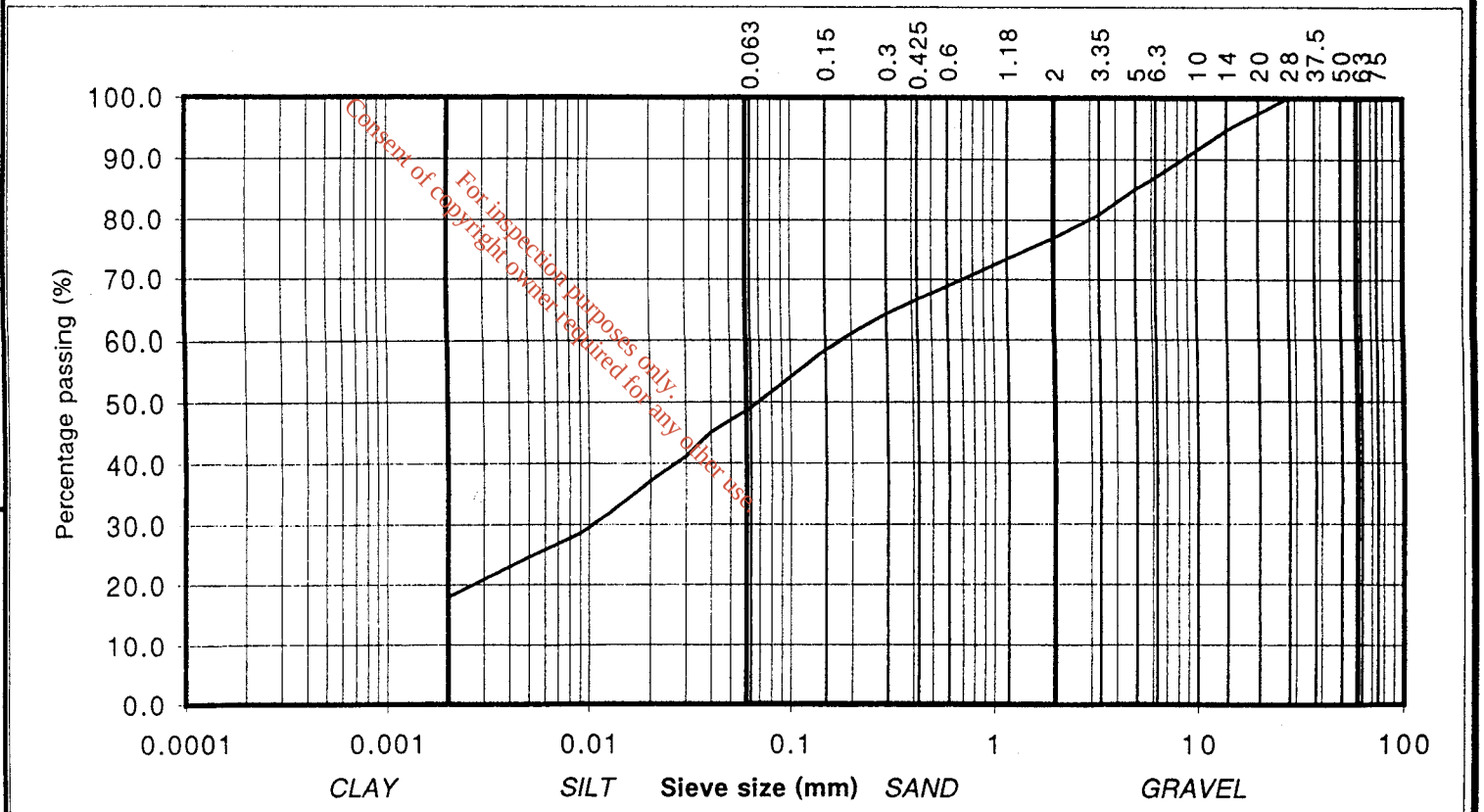
BH/TP No: BH BSA5

SAMPLE No.: A5845

DEPTH (m): 3.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Dark brown slightly sandy, slightly gravelly, CLAY



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Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	76.5	GRAVEL
50	59.5	
37.5	44.2	
28	32.4	
20	25.0	
14	20.1	
10	17.1	
6.3	13.5	
5	11.7	
3.35	9.7	
2	7.9	SAND
1.18	6.9	
0.6	6.0	
0.425	5.7	
0.3	5.4	
0.15	4.4	
0.063	3.0	SILT/CLAY
0.04	#N/A	
0.03	#N/A	
0.02	#N/A	
0.013	#N/A	
0.009	#N/A	
0.005	#N/A	
0.002	#N/A	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

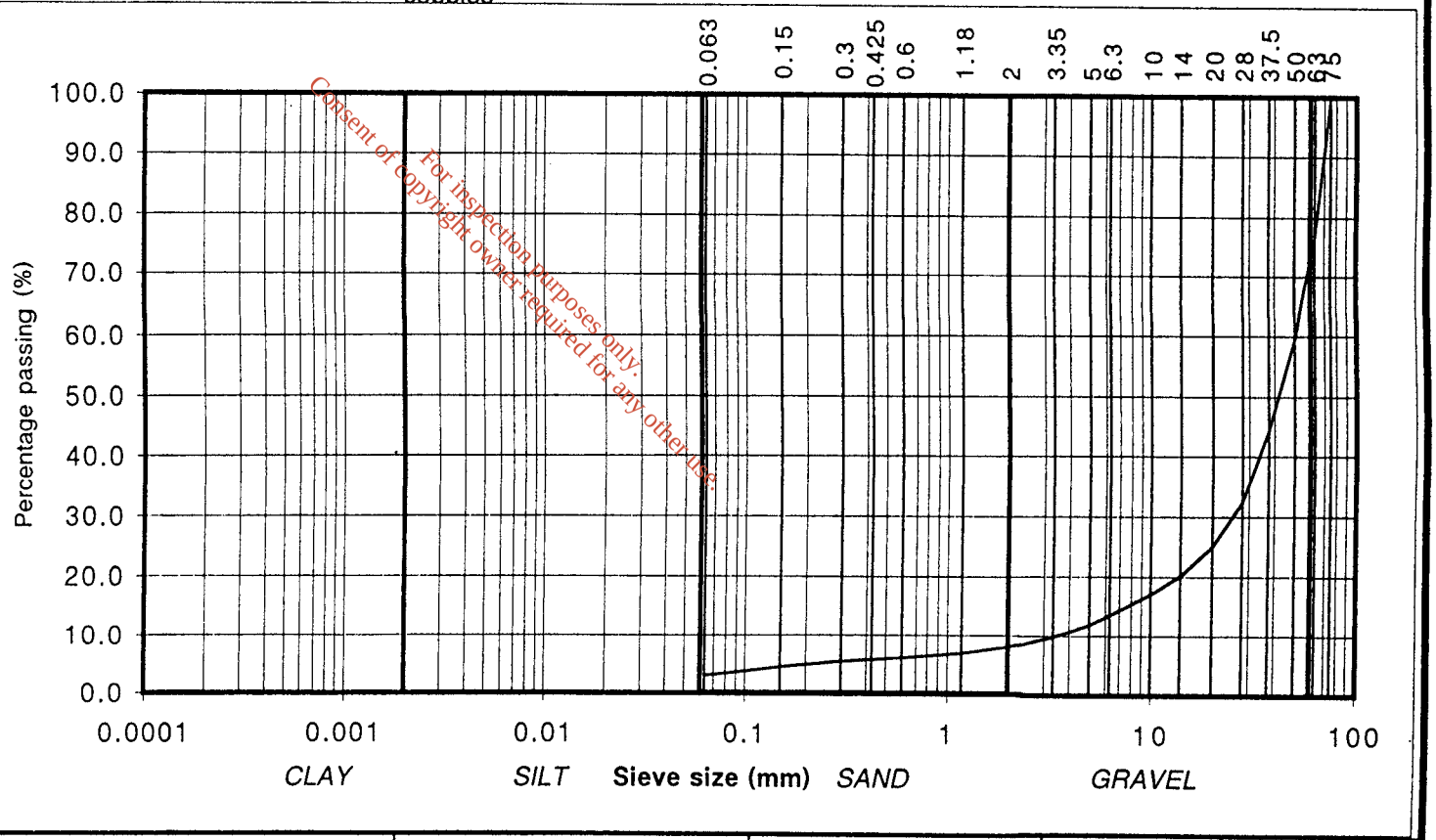
BH/TP No: BH BSA5

SAMPLE No.: A5823

DEPTH (m): 6.80

TEST METHOD: Wet sieve

DESCRIPTION: Dark brown slightly clayey, slightly sandy, GRAVEL with many cobbles



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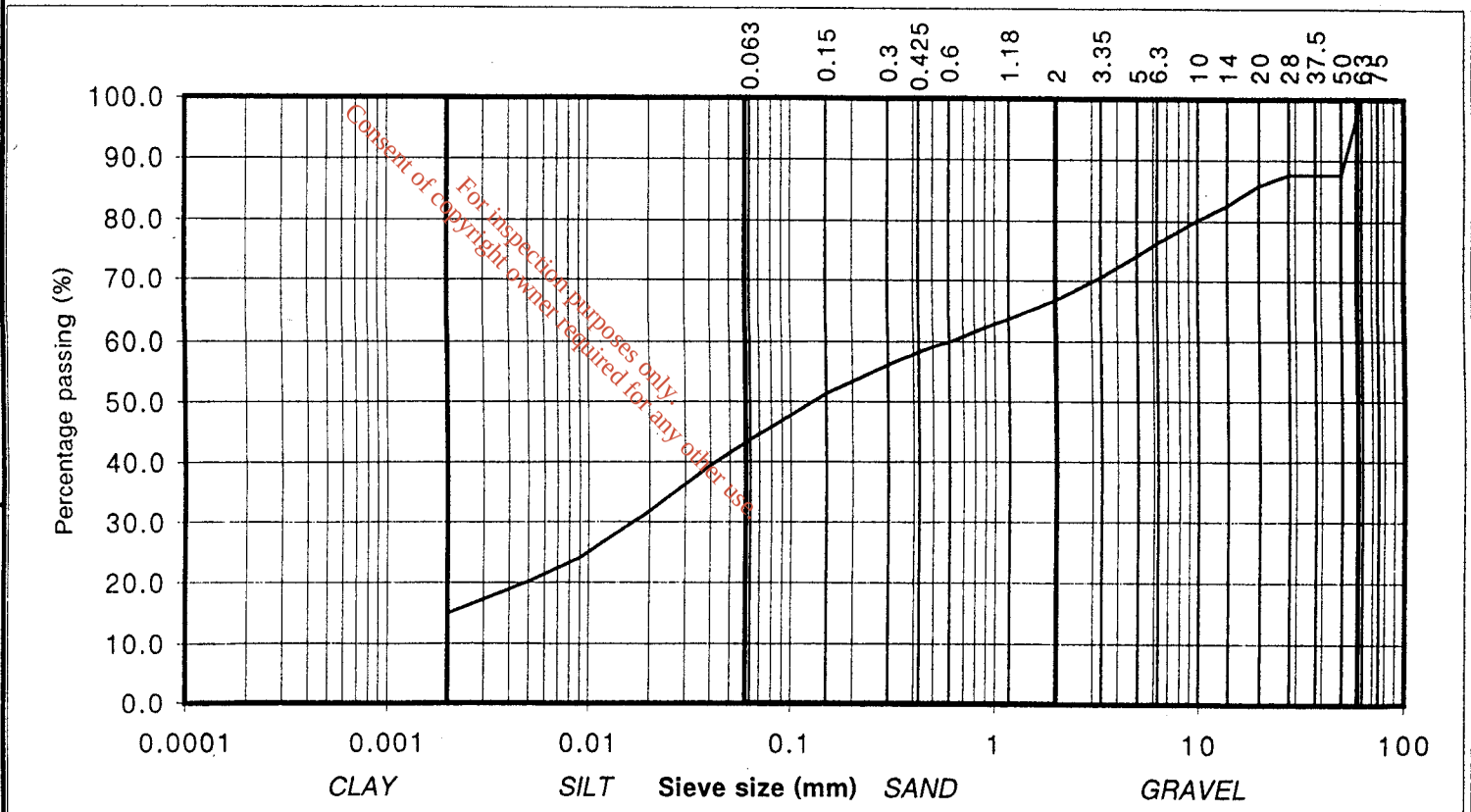
Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	87.6	
37.5	87.6	
28	87.6	
20	85.8	GRAVEL
14	82.6	
10	80.1	
6.3	76.2	
5	74.1	
3.35	70.5	
2	66.6	
1.18	63.5	
0.6	59.8	SAND
0.425	58.1	
0.3	56.1	
0.15	51.3	
0.063	43.7	
0.04	39.4	
0.03	36.2	
0.02	31.7	SILT/CLAY
0.013	27.5	
0.009	24.0	
0.005	20.2	
0.002	14.9	

Contract No: 9716
Contract: Dublin Landfill Sitting Study
BH/TP No: BH BSA6
SAMPLE No.: L1681
DEPTH (m): 3.00
TEST METHOD: Wet sieve and hydrometer
DESCRIPTION: Grey/black slightly sandy, slightly gravelly, CLAY with root hairs



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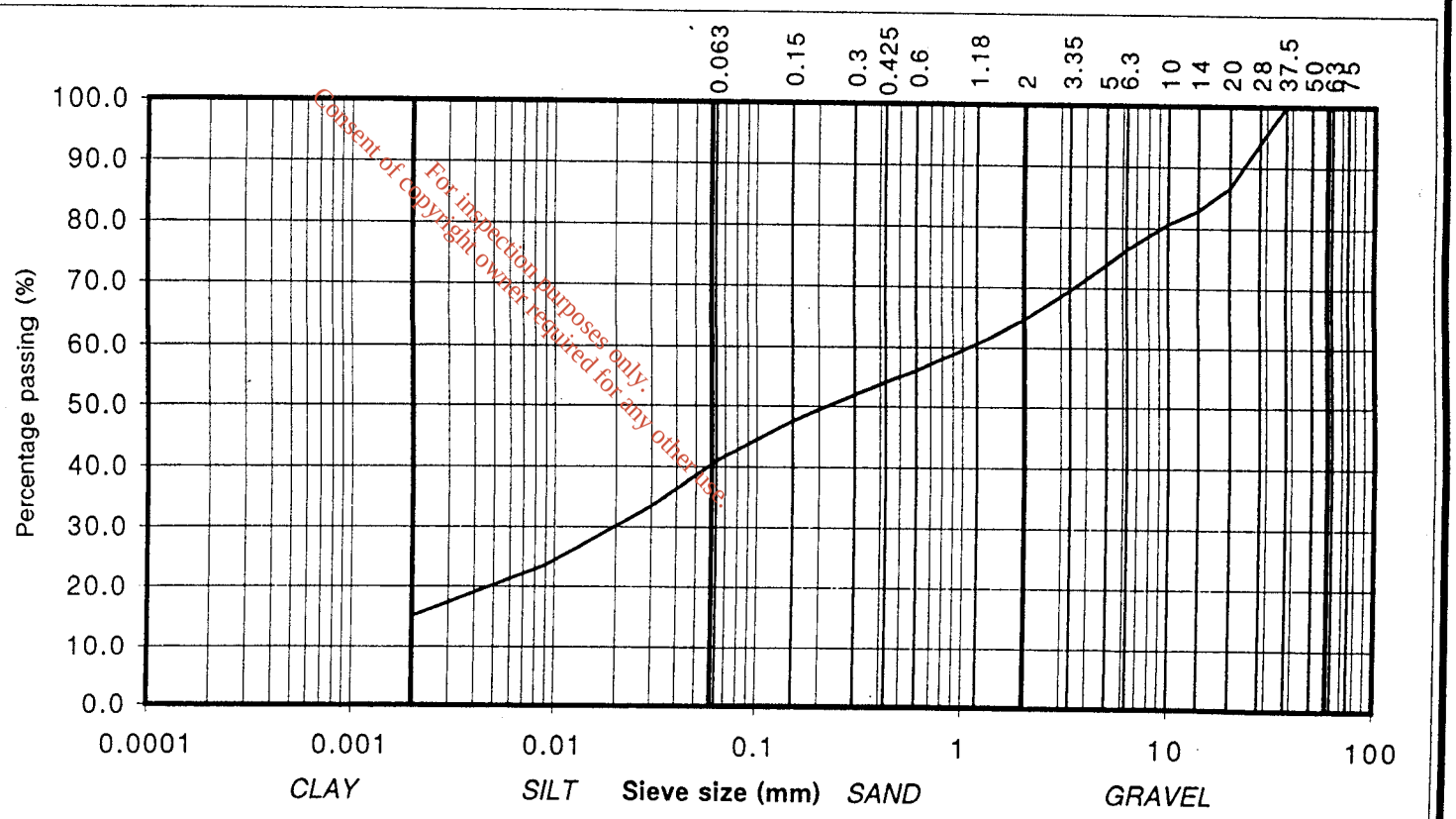
Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	100.0	
28	94.0	
20	86.7	GRAVEL
14	82.9	
10	80.6	
6.3	76.4	
5	73.8	
3.35	69.5	
2	64.5	
1.18	60.5	
0.6	56.1	SAND
0.425	54.1	
0.3	51.9	
0.15	47.5	
0.063	41.0	
0.04	36.3	
0.03	33.4	
0.02	30.1	SILT/CLAY
0.013	26.5	
0.009	23.5	
0.005	20.2	
0.002	15.0	

Contract No: 9716
Contract: Dublin Landfill Sitting Study
BH/TP No: BH BSA6
SAMPLE No.: L1686
DEPTH (m): 5.00
TEST METHOD: Wet sieve and hydrometer
DESCRIPTION: Grey/black slightly sandy, gravelly, CLAY



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Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	100.0	
28	100.0	
20	96.4	
14	94.8	GRAVEL
10	90.8	
6.3	85.8	
5	83.2	
3.35	80.1	
2	75.9	
1.18	72.0	
0.6	67.4	
0.425	65.3	SAND
0.3	62.9	
0.15	57.6	
0.063	49.5	
0.04	42.2	
0.03	37.9	
0.02	33.9	
0.013	30.0	SILT/CLAY
0.009	26.4	
0.005	23.2	
0.002	18.1	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

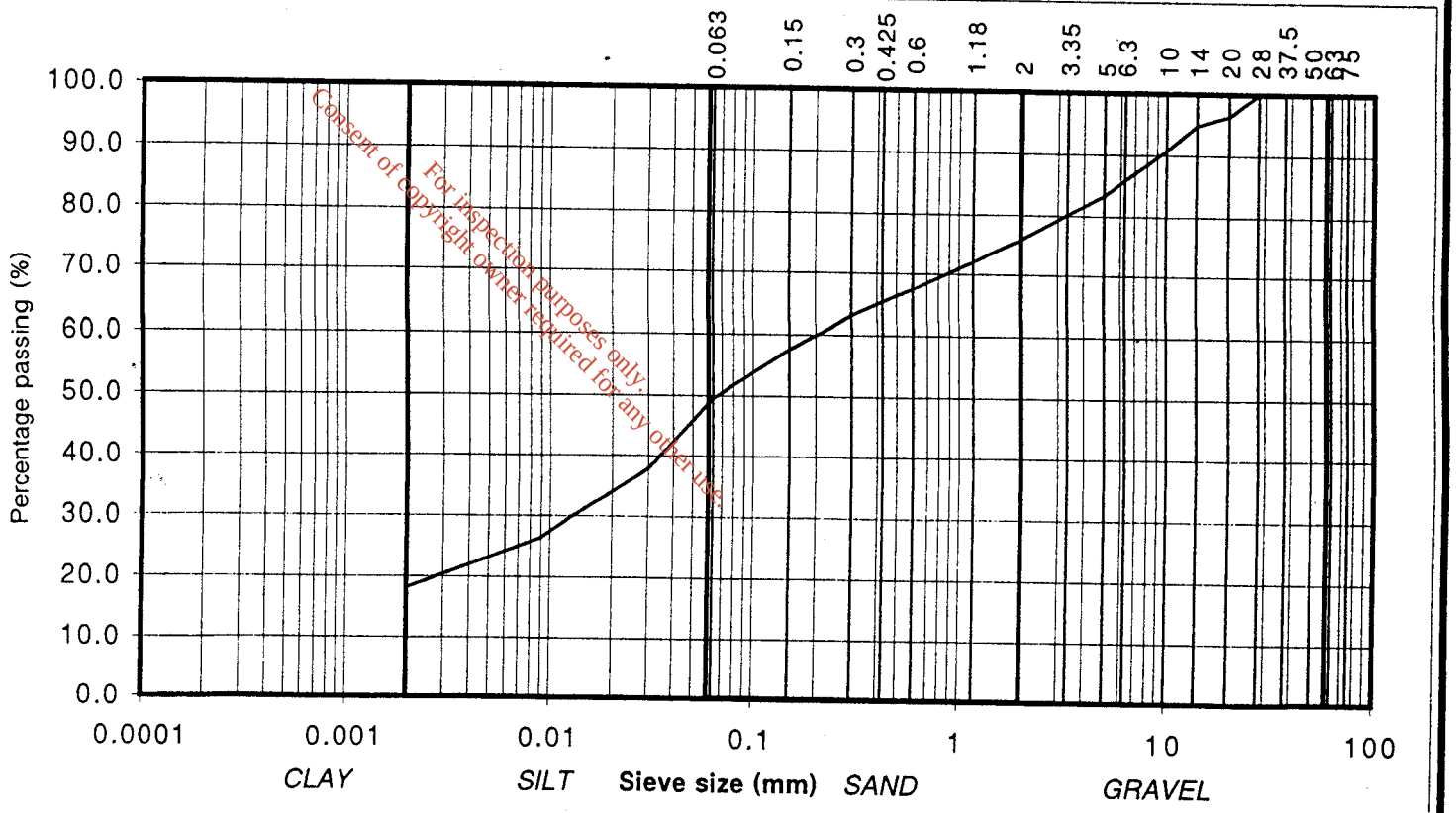
BH/TP No: BH BSA6

SAMPLE No.: L1693

DEPTH (m): 9.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Grey/black slightly sandy, slightly gravelly, CLAY



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Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	88.7	
28	85.0	
20	85.0	GRAVEL
14	84.4	
10	81.0	
6.3	76.8	
5	74.5	
3.35	71.1	
2	66.9	
1.18	63.4	
0.6	59.2	SAND
0.425	57.4	
0.3	55.5	
0.15	51.5	
0.063	45.2	
0.04	37.1	
0.03	34.2	
0.02	30.6	SILT/CLAY
0.013	26.6	
0.009	23.0	
0.005	20.5	
0.002	15.4	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

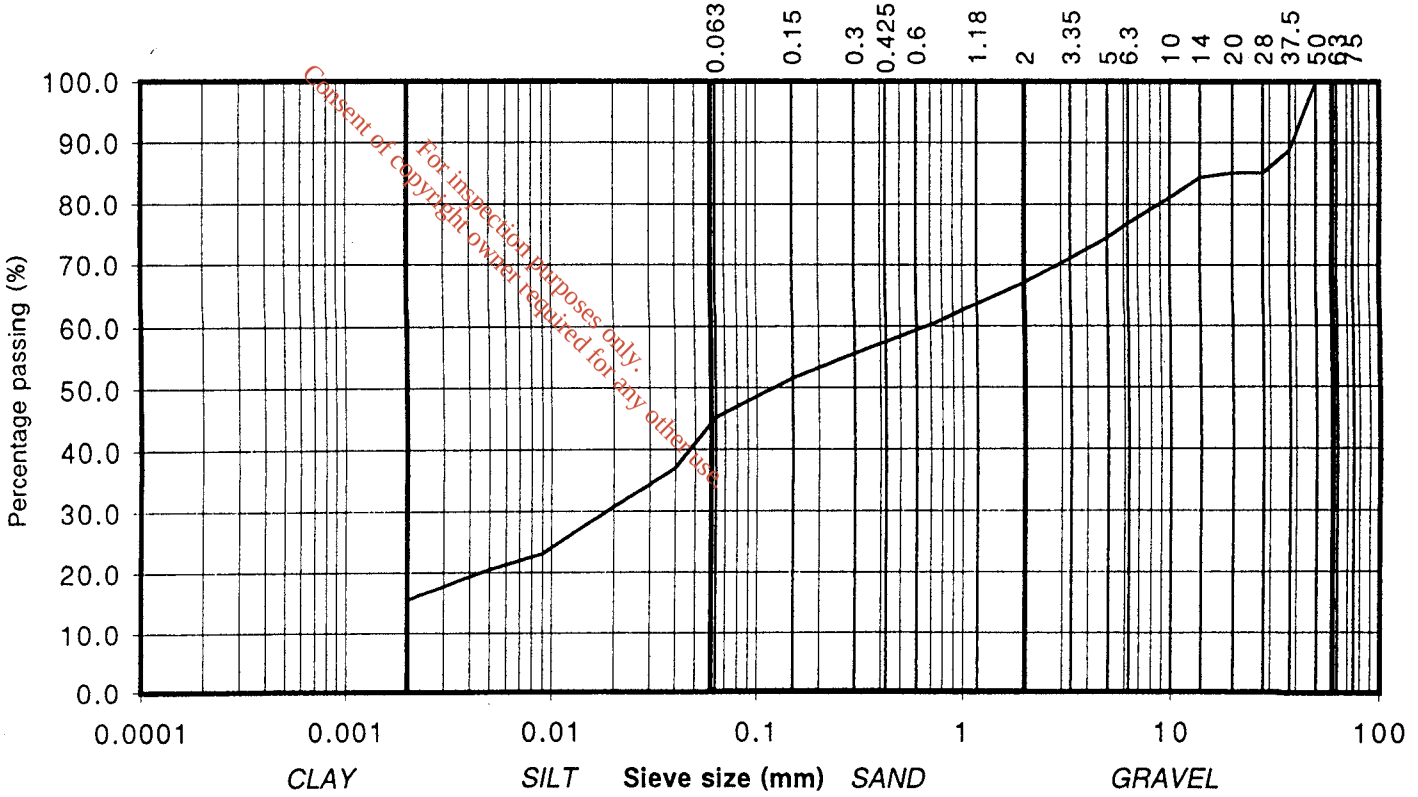
BH/TP No: BH BSA6

SAMPLE No.: L1697

DEPTH (m): 11.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Grey/black slightly sandy, slightly gravelly, CLAY



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Determination of Particle Size Distribution

BS1377:Part2:1990 , clauses 9.2

particle size	% passing	
75	100.0	COBBLES
63	100.0	
50	100.0	
37.5	100.0	
28	93.3	
20	92.5	GRAVEL
14	89.7	
10	86.8	
6.3	82.9	
5	81.1	
3.35	77.4	
2	74.0	
1.18	70.5	
0.6	66.7	SAND
0.425	64.8	
0.3	62.7	
0.15	57.6	
0.063	49.8	
0.04	46.9	
0.03	43.3	
0.02	38.2	SILT/CLAY
0.013	33.8	
0.009	30.2	
0.005	27.0	
0.002	23.8	

Contract No: 9716

Contract: Dublin Landfill Sitting Study

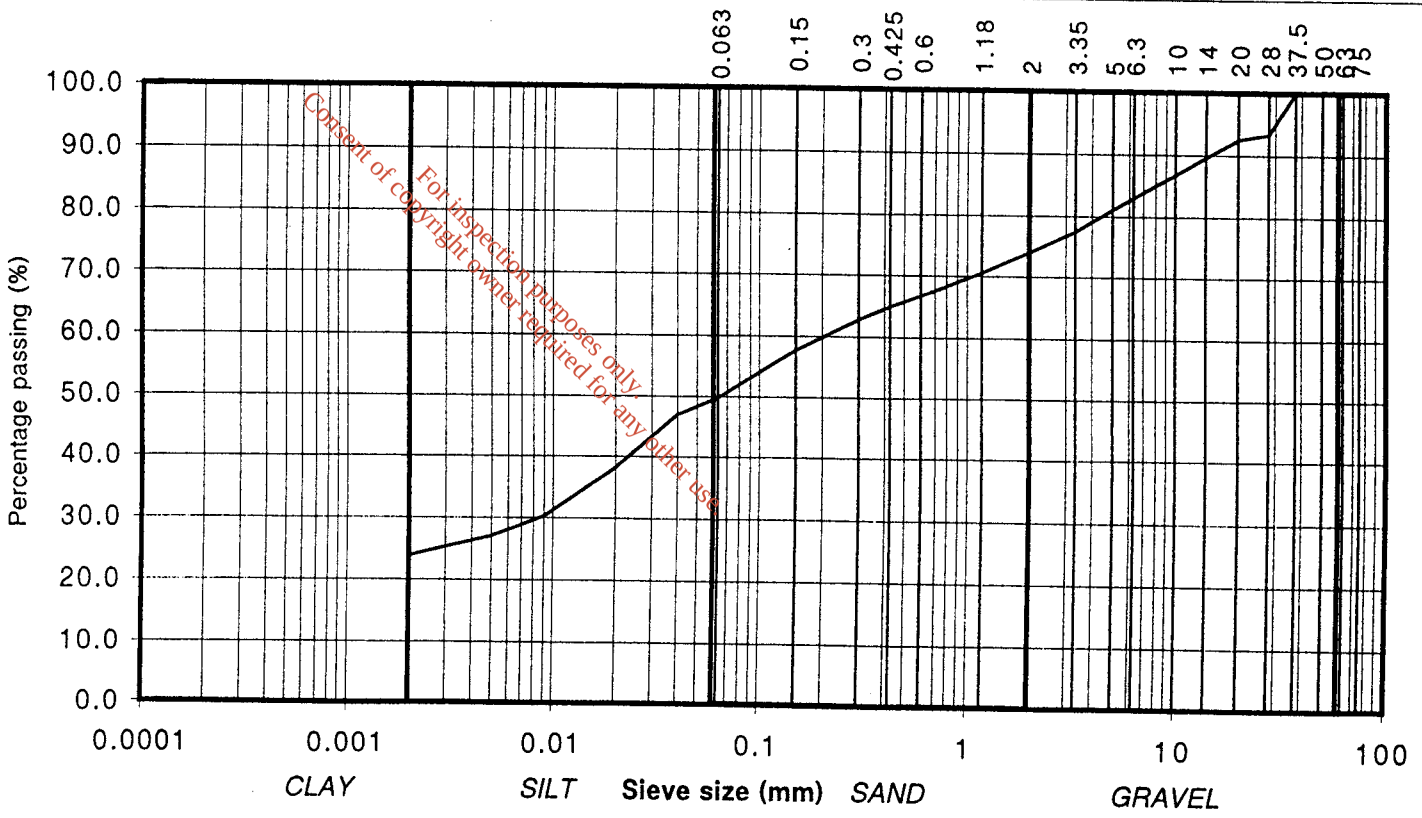
BH/TP No: BH BSA6

SAMPLE No.: L1404

DEPTH (m): 13.00

TEST METHOD: Wet sieve and hydrometer

DESCRIPTION: Grey/black slightly sandy, slightly gravelly, CLAY



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Irish Geotechnical Services Ltd., Industrial Estate, Newbridge, Co kildare

PSD V3.1 12.01

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract:	Dublin Landfill	Contract No.	9716
Location:	BSA1 @ 3.0m	Sample No.	L5827

Method of Preparation: Remoulded 4.5kg Rammer

Description: Greyish brown sandy gravelly CLAY

Specimen Dimensions: Height (mm) 105.1 Diameter (mm) 100.1

Specimen Conditions:	Initial	Final
Moisture Content (%)	13	15
Bulk Density (Mg/m^3)	2.21	2.26
Dry Density (Mg/m^3)	1.95	1.97

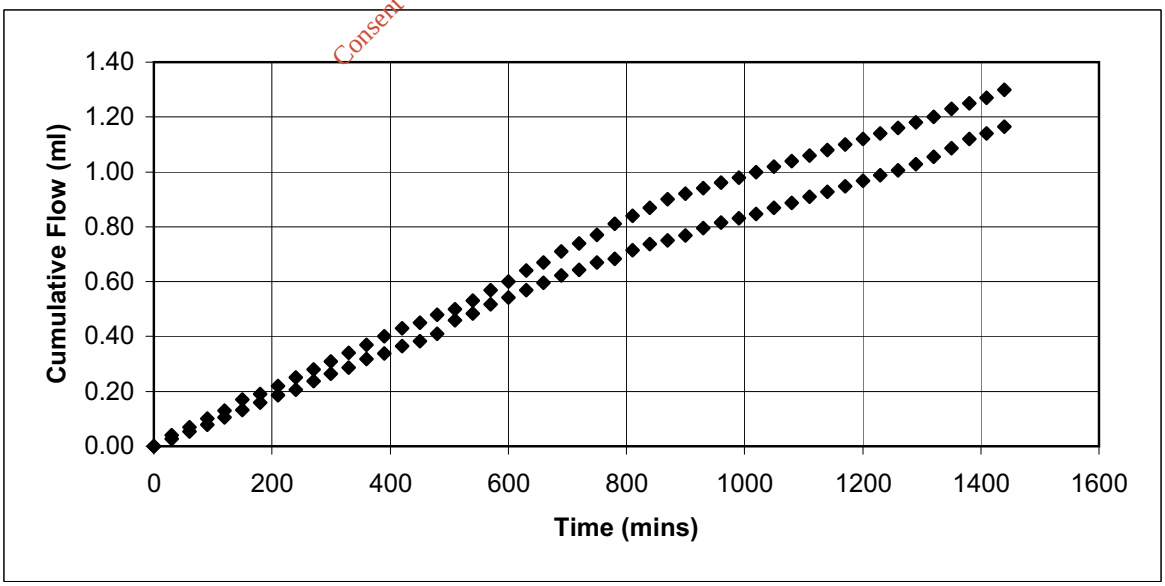
Saturation Stage
Method: Cell & back pressure stages Final *B* Value: 0.98
Duration of Stage (days): 6

Consolidation Stage

Cell Pressure (kPa)	380	Back Pressure (kPa)	300
Volume change (ml)	6.91	Duration of Stage (days)	3

Permeability Stage

Mean Effective Stress	70	Hydraulic gradient	19
Coefficient of Permeability (m/s)	7.69E-11	Duration of Stage (days)	1

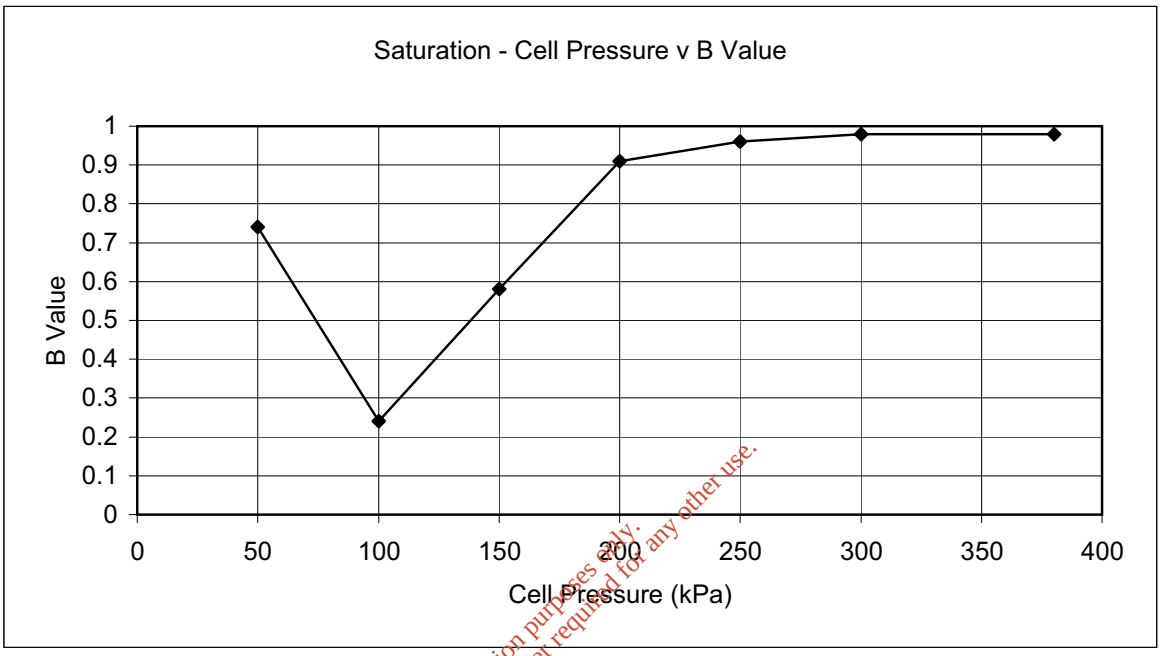


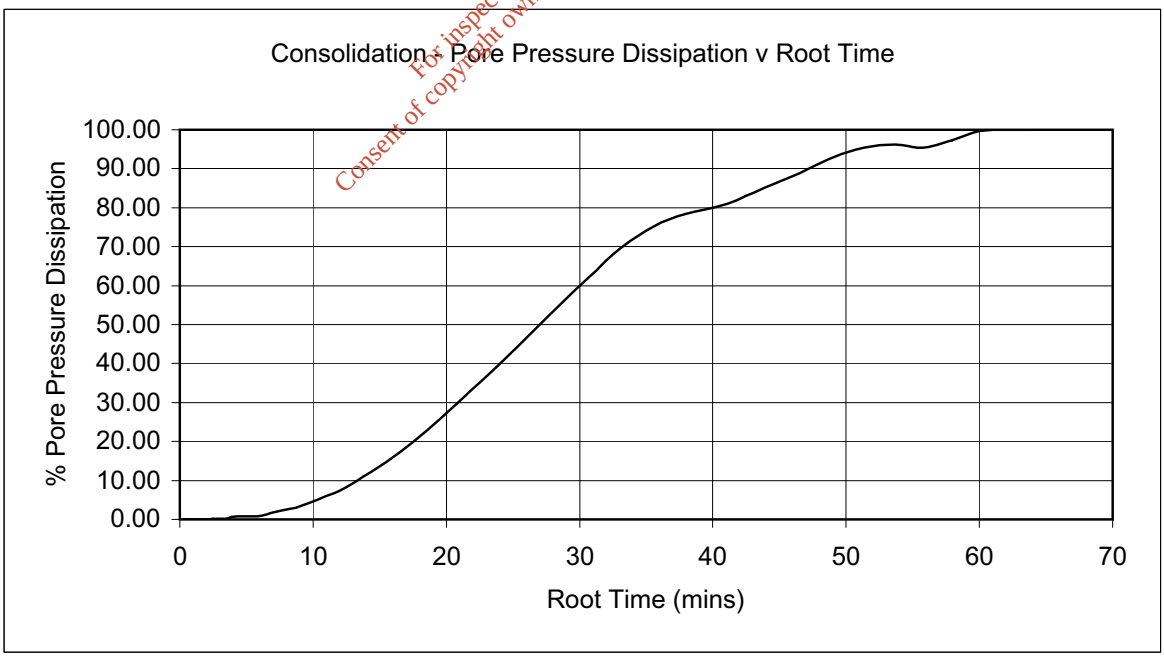
Total duration of test (days) 10

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Location: BSA1 @ 3.0m Sample No. L5827





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Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract:	Dublin Landfill	Contract No.	9716
Location:	BSA1 @ 14.0m	Sample No.	L5802

Method of Preparation: Undisturbed

Description: Dark grey sandy slightly gravelly CLAY

Specimen Dimensions: Height (mm) 104.4 Diameter (mm) 105.0

Specimen Conditions:	Initial	Final
Moisture Content (%)	11	13
Bulk Density (Mg/m^3)	2.21	2.32
Dry Density (Mg/m^3)	1.99	2.05

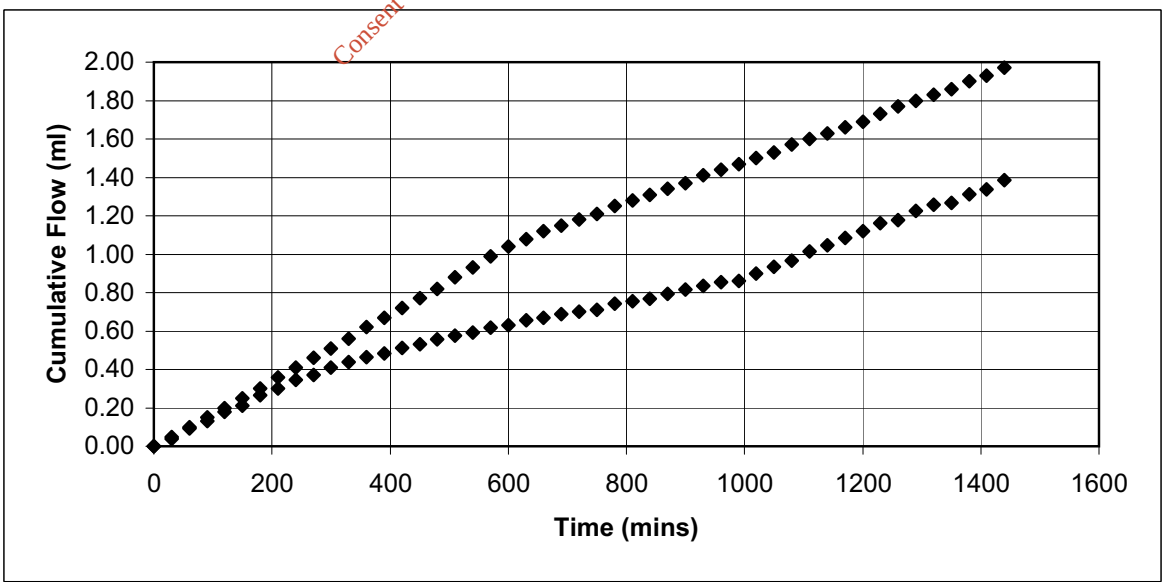
Saturation Stage
Method: Cell & back pressure stages Final *B* Value: 1.0
Duration of Stage (days): 6

Consolidation Stage

Cell Pressure (kPa)	600	Back Pressure (kPa)	310
Volume change (ml)	25.07	Duration of Stage (days)	2

Permeability Stage

Mean Effective Stress	275	Hydraulic gradient	29
Coefficient of Permeability (m/s)	7.36E-11	Duration of Stage (days)	1

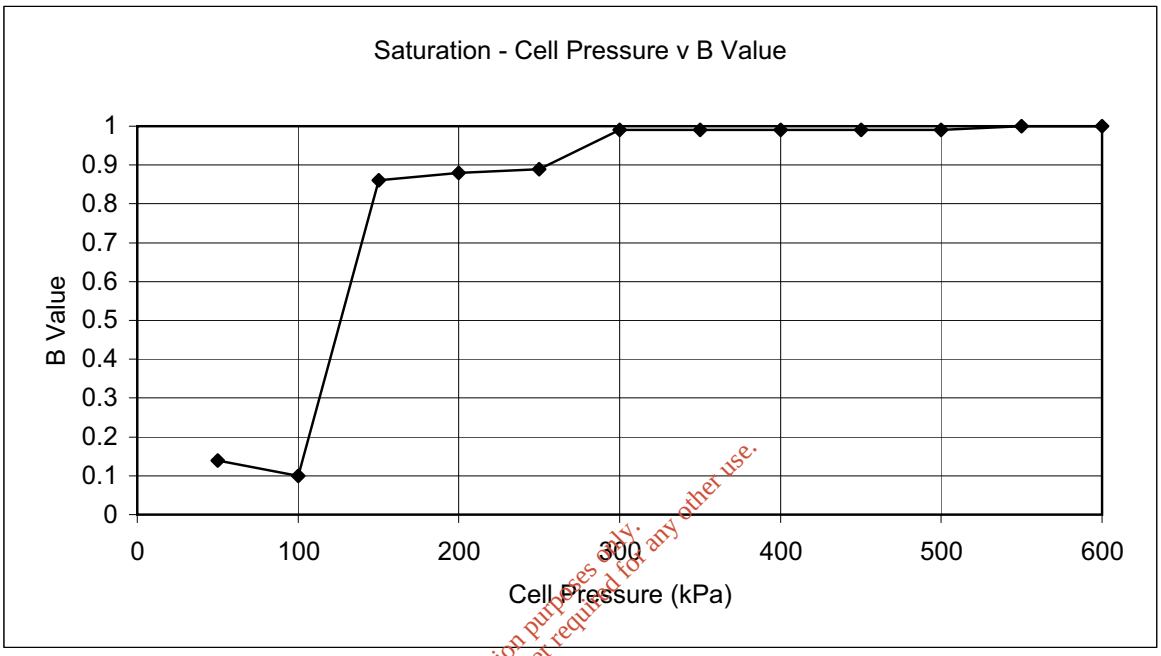


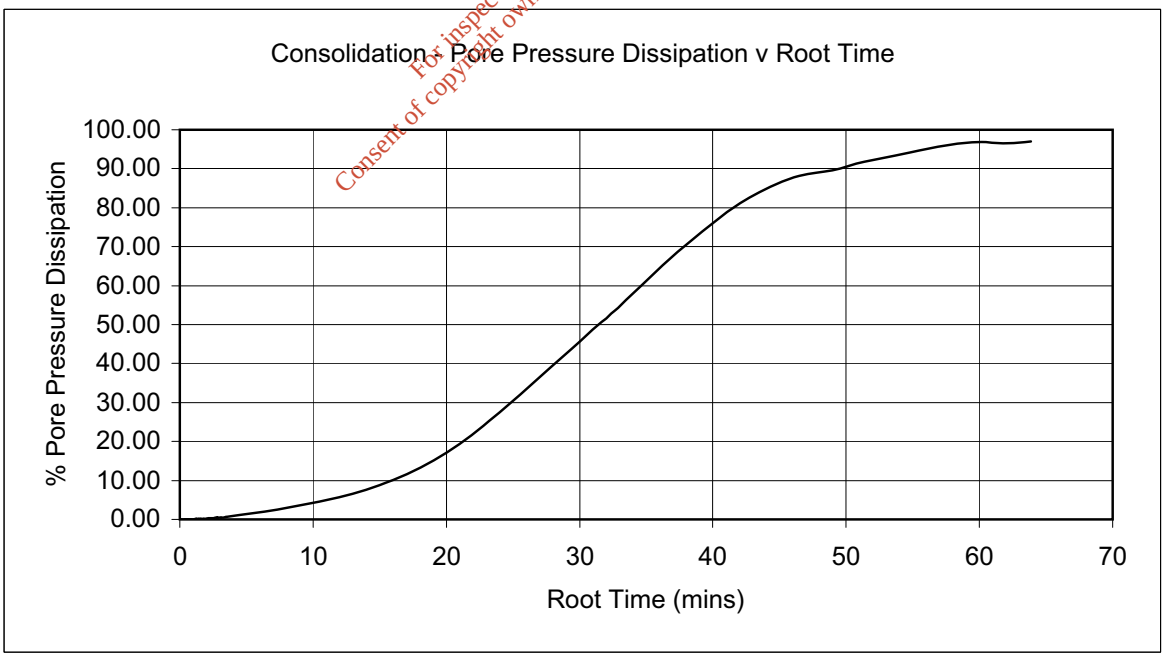
Total duration of test (days) 9

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Location: BSA1 @ 14.0m Sample No. L5802





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Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract:	Dublin Landfill	Contract No.	9716
Location:	BSA1@16.5m	Sample No.	L5803

Method of Preparation: Remoulded 4.5kg rammer

Description: Greyish brown sandy gravelly CLAY

Specimen Dimensions: Height (mm) 107.4 Diameter (mm) 102.1

Specimen Conditions:	Initial	Final
Moisture Content (%)	16	19
Bulk Density (Mg/m^3)	2.05	2.15
Dry Density (Mg/m^3)	1.77	1.81

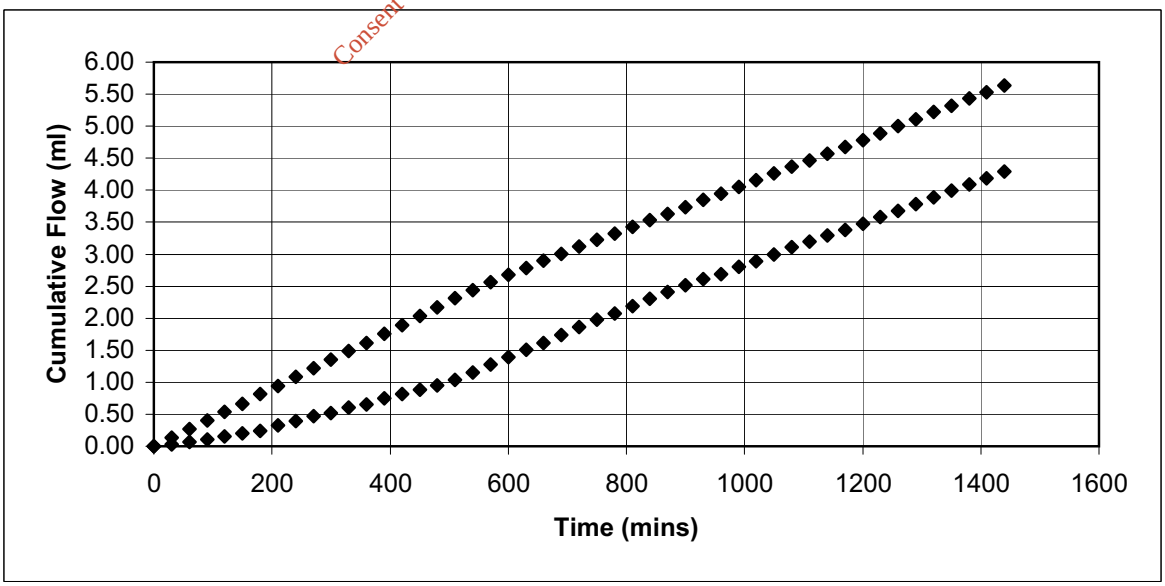
Saturation Stage
Method: Cell & back pressure stages Final *B* Value: 0.99
Duration of Stage (days): 11

Consolidation Stage

Cell Pressure (kPa)	630	Back Pressure (kPa)	300
Volume change (ml)	20.63	Duration of Stage (days)	1

Permeability Stage

Mean Effective Stress	320	Hydraulic gradient	19
Coefficient of Permeability (m/s)	3.67E-10	Duration of Stage (days)	1

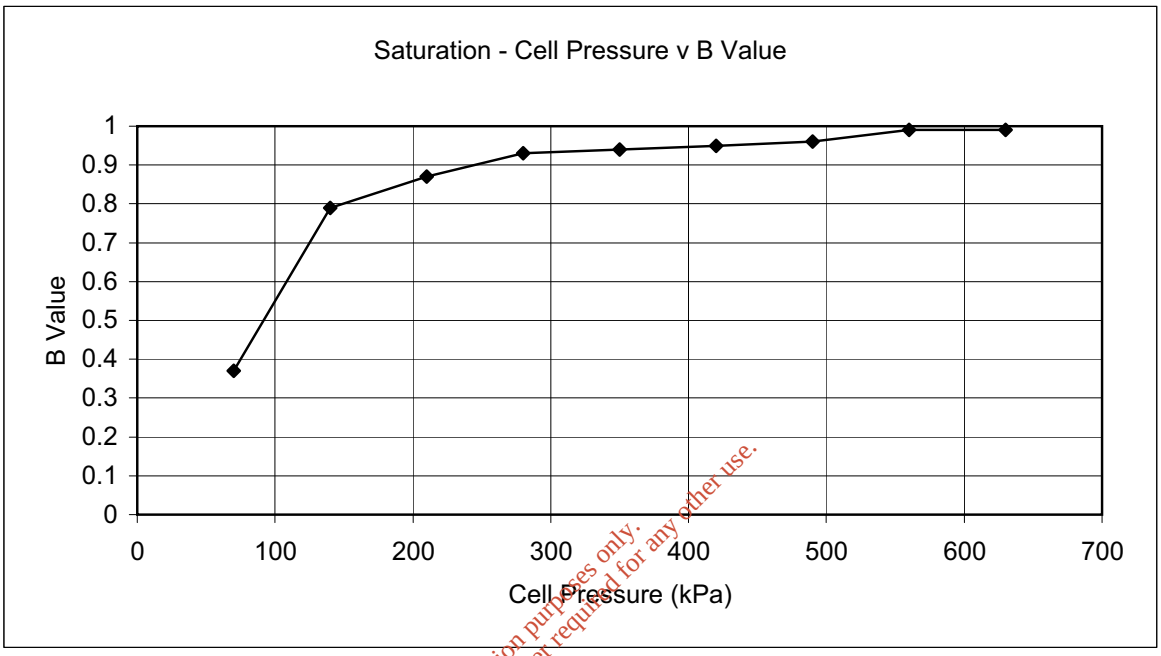


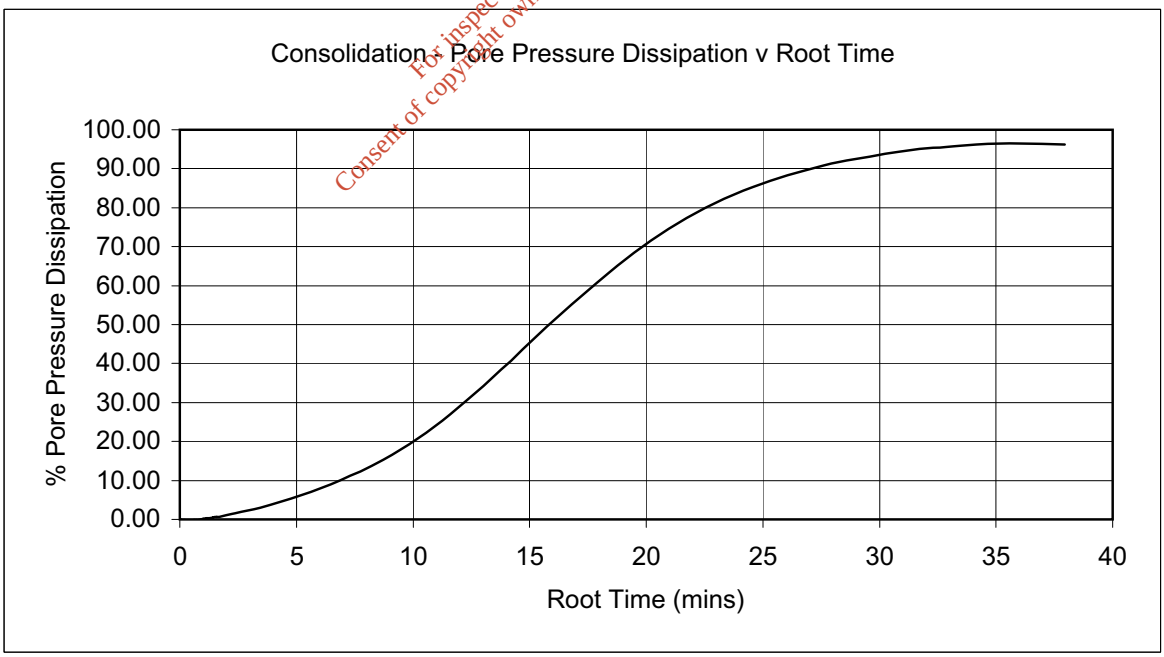
Total duration of test (days) 13

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Location: BSA1@16.5m Sample No. L5803





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Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract:	Dublin Landfill	Contract No.	9716
Location:	BSA2 @ 2.0-2.6m	Sample No.	L1410

Method of Preparation: Remoulded 4.5kg rammer

Description: Greyish brown sandy gravelly CLAY

Specimen Dimensions: Height (mm) 104.9 Diameter (mm) 100.4

Specimen Conditions:	Initial	Final
Moisture Content (%)	13	15
Bulk Density (Mg/m^3)	2.18	2.22
Dry Density (Mg/m^3)	1.93	1.93

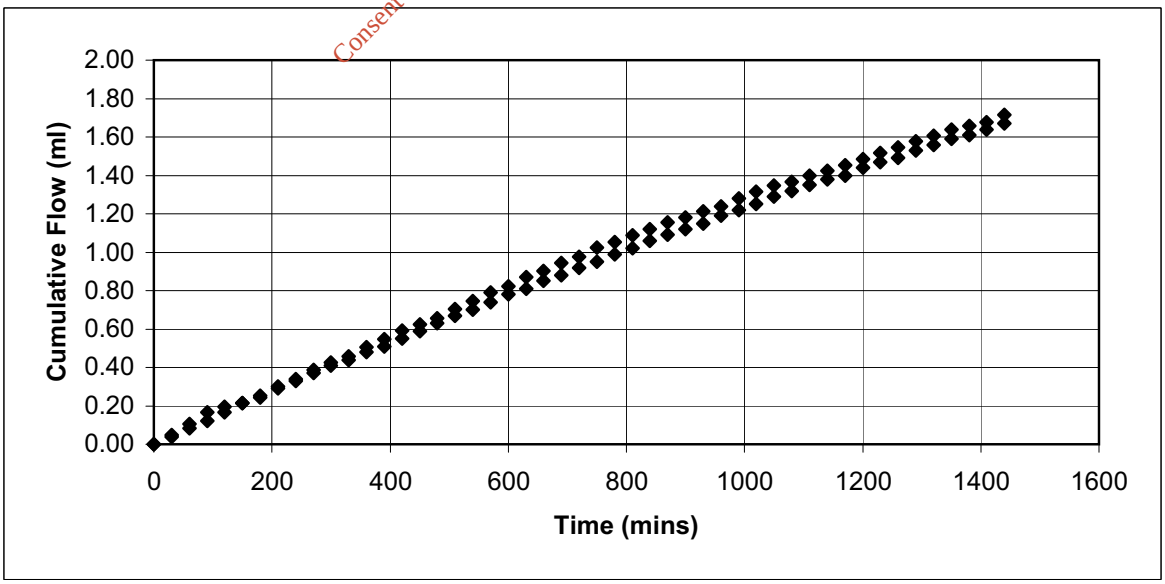
Saturation Stage
Method: Cell & back pressure stages Final *B* Value: 0.97
Duration of Stage (days): 7

Consolidation Stage

Cell Pressure (kPa)	420	Back Pressure (kPa)	360
Volume change (ml)	4.16	Duration of Stage (days)	2

Permeability Stage

Mean Effective Stress	50	Hydraulic gradient	19
Coefficient of Permeability (m/s)	1.08E-10	Duration of Stage (days)	1

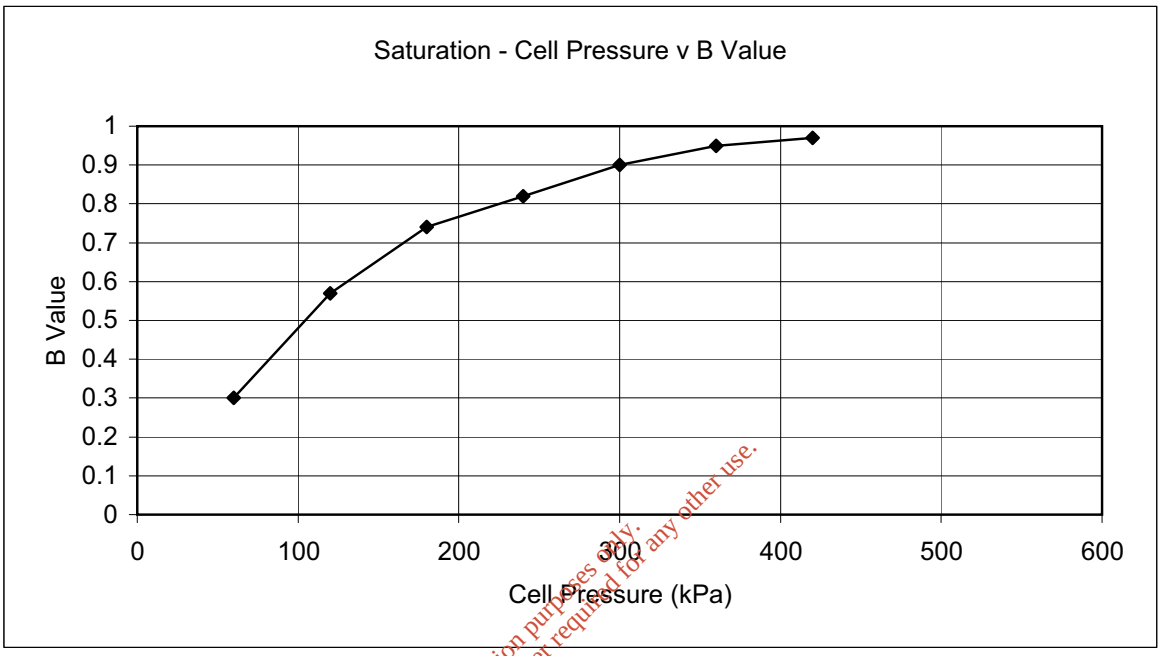


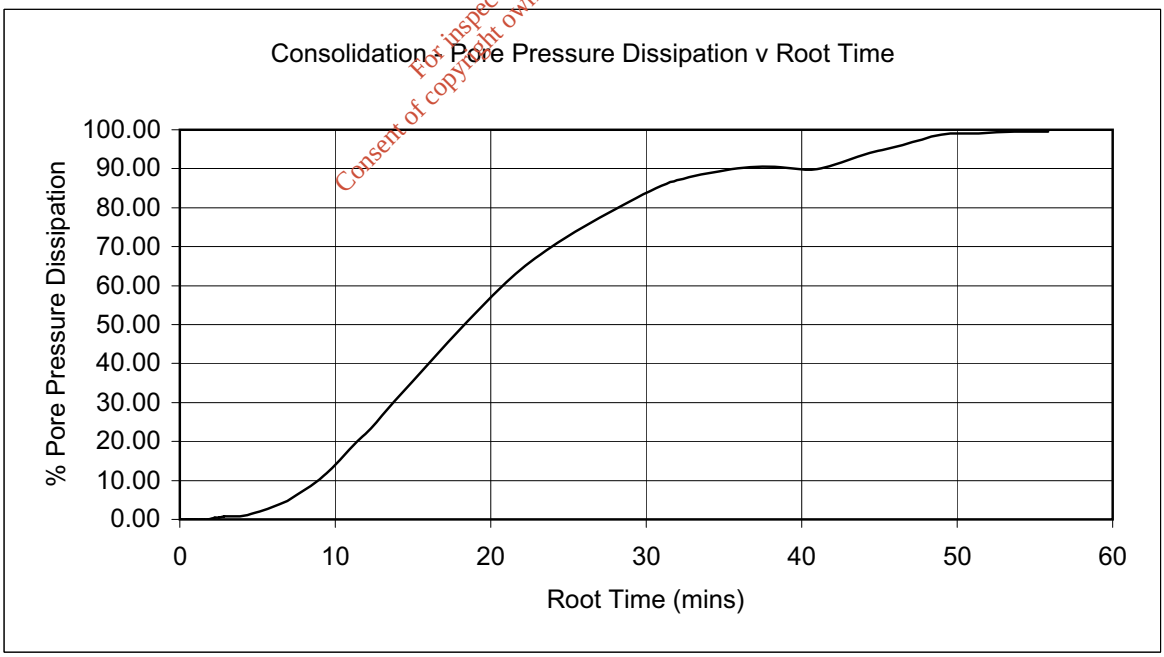
Total duration of test (days) 10

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Location: BSA2 @ 2.0-2.6m Sample No. L1410





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Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract:	Dublin Landfill	Contract No.	9716
Location:	BSA3A @ 7.0m	Sample No.	A5846

Method of Preparation: Undisturbed

Description: Dark grey slightly sandy gravelly CLAY

Specimen Dimensions: Height (mm) 96.0 Diameter (mm) 104.3

Specimen Conditions:	Initial	Final
Moisture Content (%)	13	15
Bulk Density (Mg/m^3)	2.13	2.20
Dry Density (Mg/m^3)	1.88	1.92

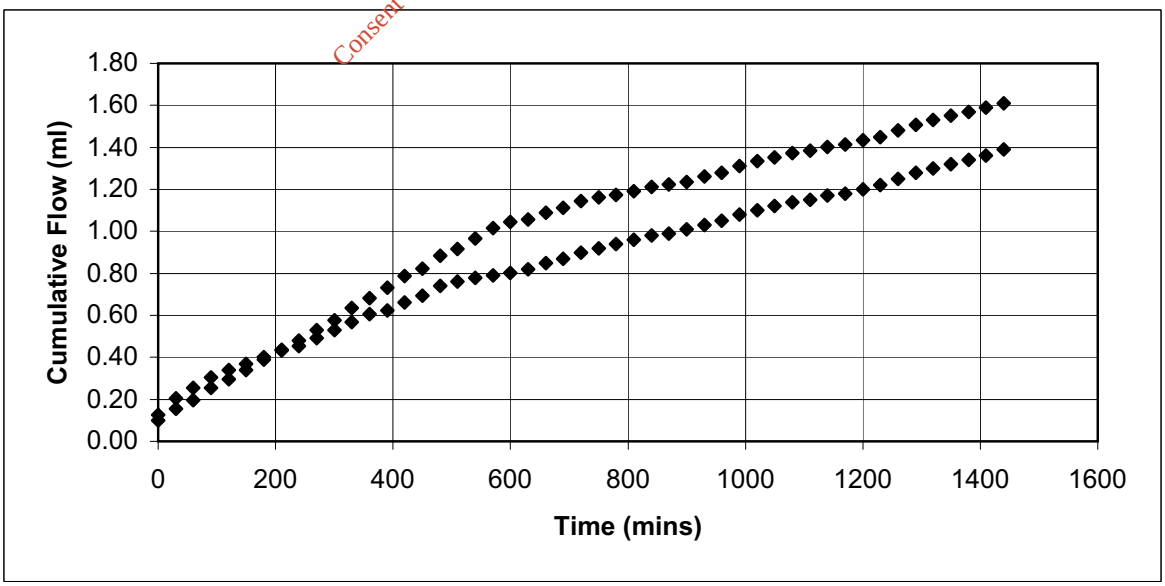
Saturation Stage
Method: Cell & back pressure stages Final *B* Value: 1
Duration of Stage (days): 9

Consolidation Stage

Cell Pressure (kPa)	500	Back Pressure (kPa)	340
Volume change (ml)	16.63	Duration of Stage (days)	2

Permeability Stage

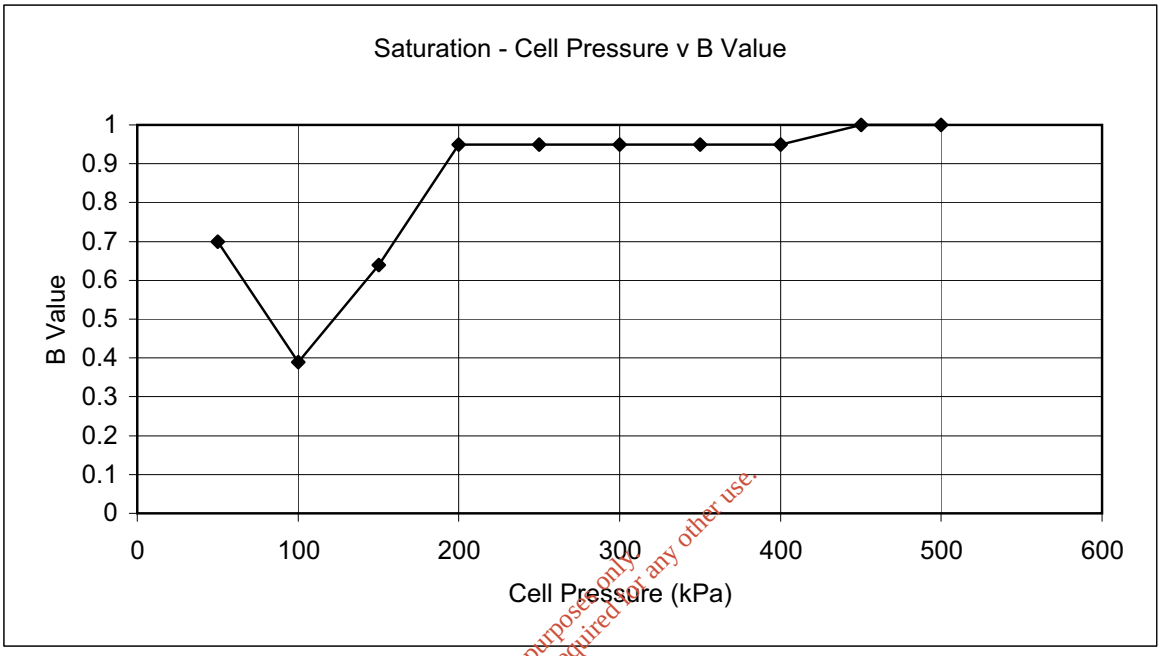
Mean Effective Stress	150	Hydraulic gradient	21
Coefficient of Permeability (m/s)	6.07E-11	Duration of Stage (days)	1

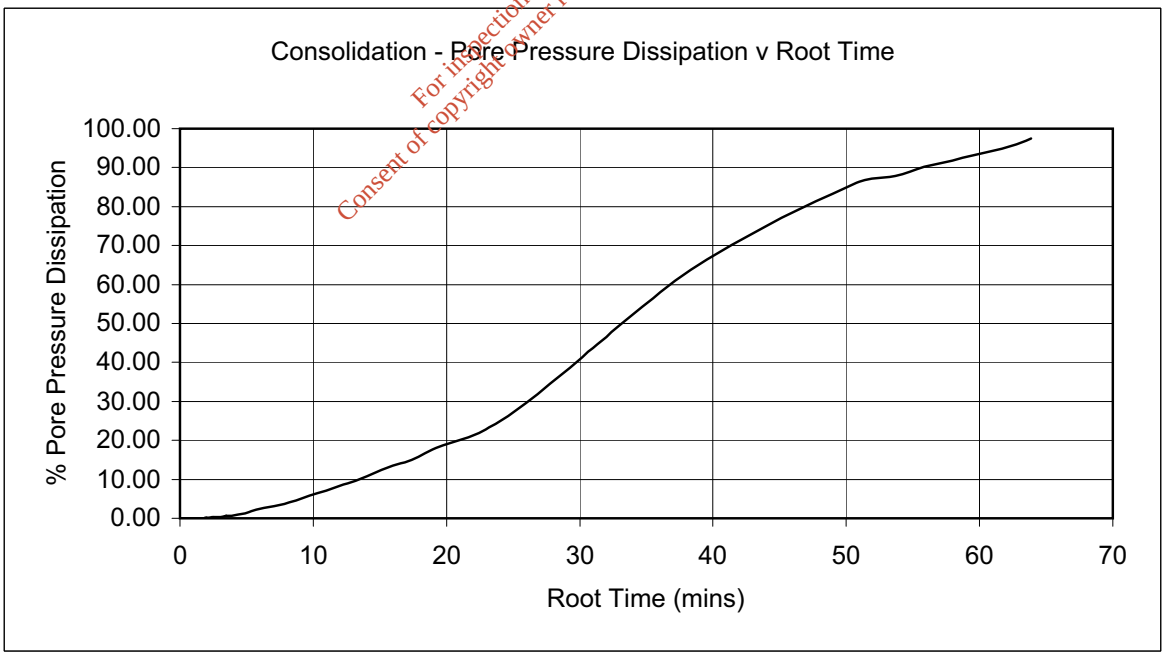


Total duration of test (days) 12

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6





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Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract:	Dublin Landfill	Contract No.	9716
Location:	BSA3A @ 12.0m	Sample No.	A5848

Method of Preparation: Remoulded 4.5kg rammer

Description: Greyish brown sandy gravelly CLAY

Specimen Dimensions: Height (mm) 102.9 Diameter (mm) 100.8

Specimen Conditions:	Initial	Final
Moisture Content (%)	6.8	9.2
Bulk Density (Mg/m^3)	2.31	2.46
Dry Density (Mg/m^3)	2.17	2.25

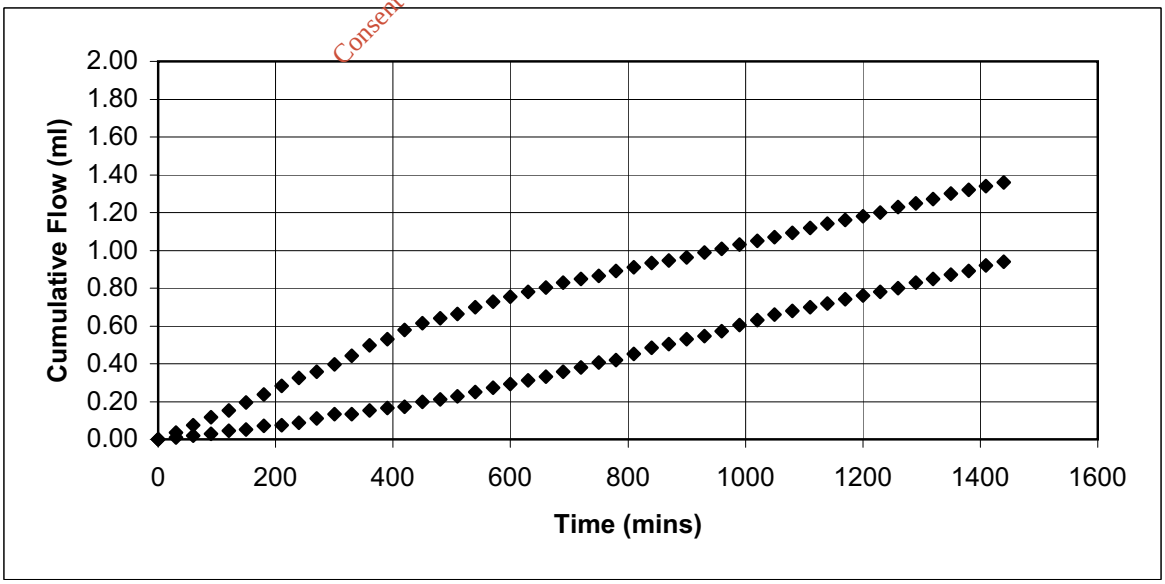
Saturation Stage
Method: Cell & back pressure stages Final *B* Value: 0.98
Duration of Stage (days): 9

Consolidation Stage

Cell Pressure (kPa)	550	Back Pressure (kPa)	300
Volume change (ml)	32.07	Duration of Stage (days)	4

Permeability Stage

Mean Effective Stress	235	Hydraulic gradient	30
Coefficient of Permeability (m/s)	5.15E-11	Duration of Stage (days)	1

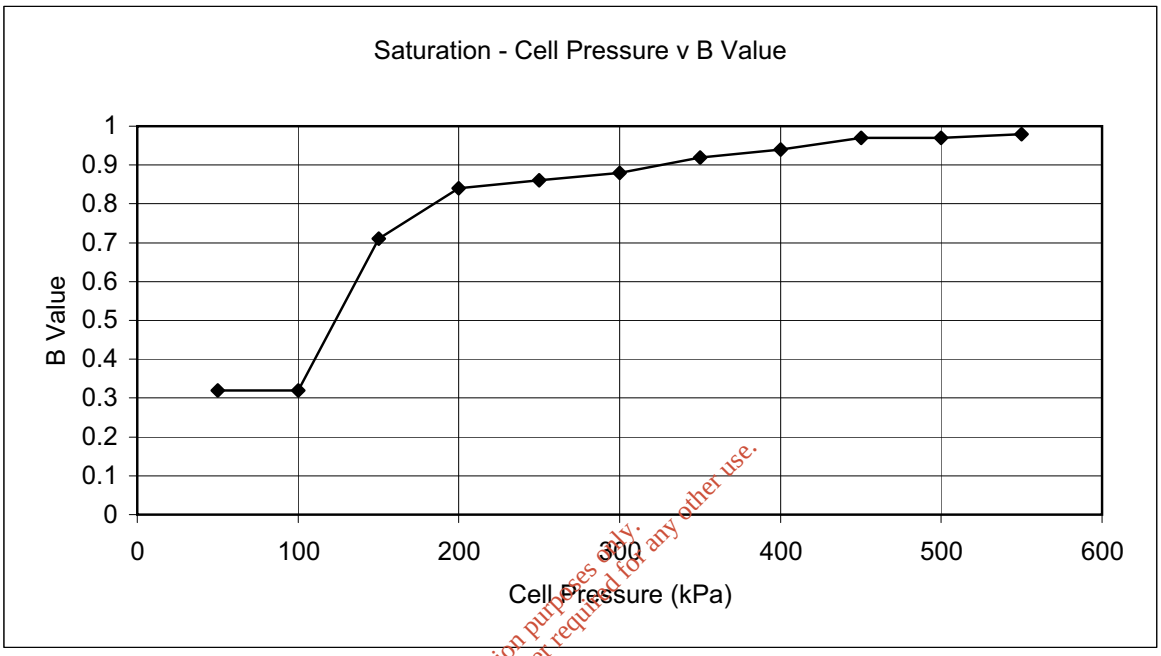


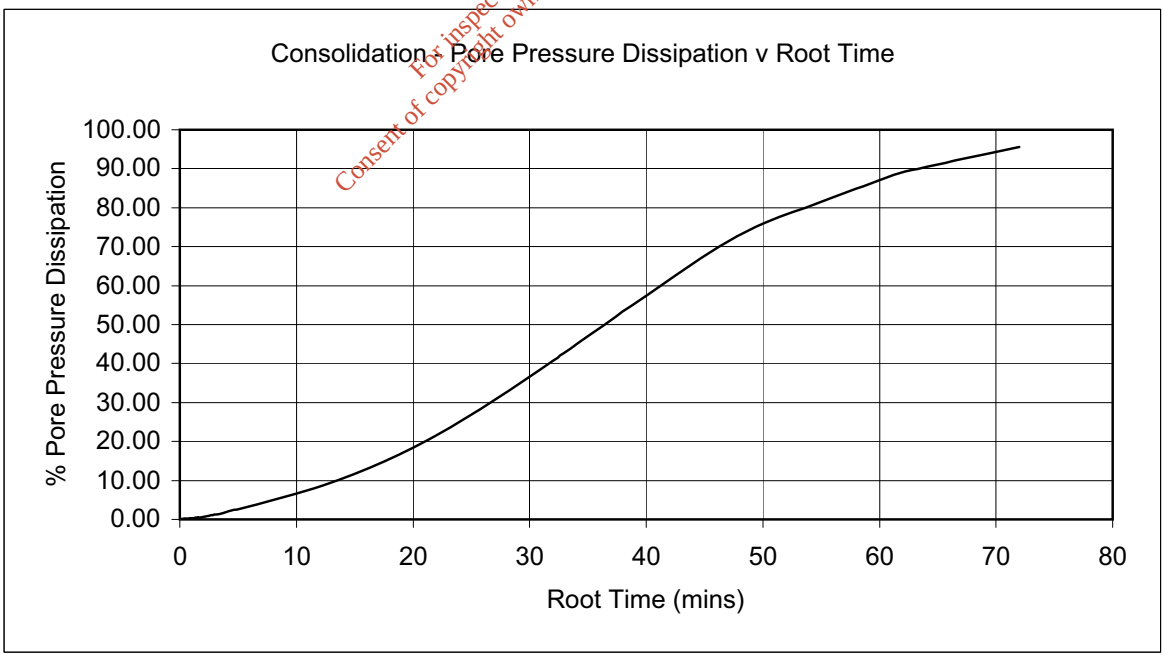
Total duration of test (days) 14

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Location: BSA3A @ 12.0m Sample No. A5848





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Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract:	Dublin Landfill	Contract No.	9716
Location:	BSA3A @ 16.0m	Sample No.	A5851

Method of Preparation: Undisturbed

Description: Greyish brown sandy gravelly CLAY

Specimen Dimensions: Height (mm) 103.4 Diameter (mm) 100.7

Specimen Conditions:	Initial	Final
Moisture Content (%)	9.5	11
Bulk Density (Mg/m^3)	2.31	2.40
Dry Density (Mg/m^3)	2.11	2.17

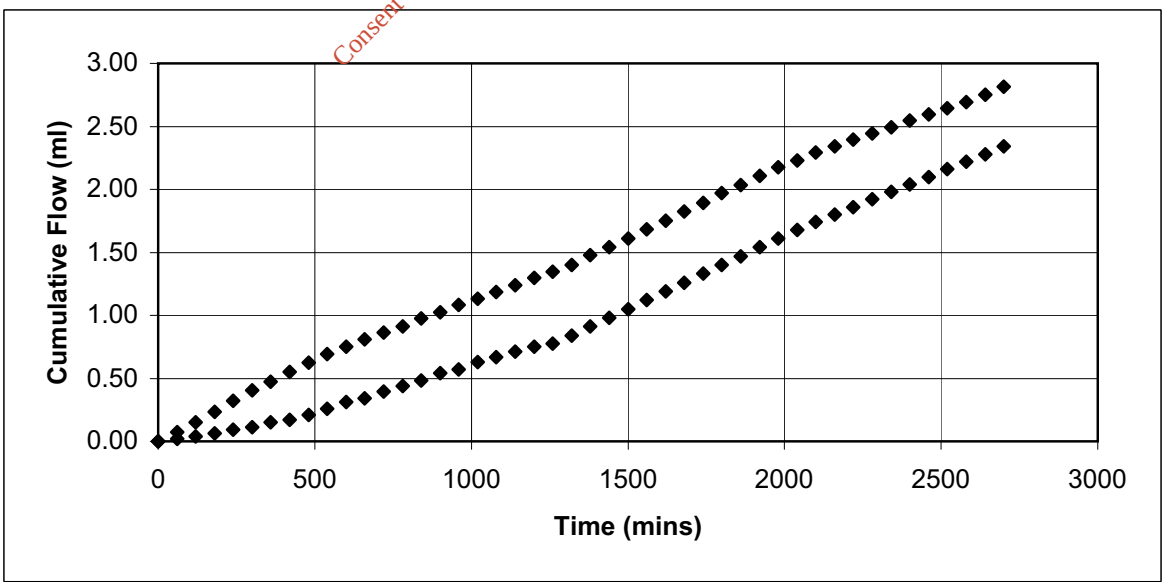
Saturation Stage
Method: Cell & back pressure stages Final *B* Value: 0.99
Duration of Stage (days): 6

Consolidation Stage

Cell Pressure (kPa)	630	Back Pressure (kPa)	300
Volume change (ml)	21.55	Duration of Stage (days)	7

Permeability Stage

Mean Effective Stress	305	Hydraulic gradient	49
Coefficient of Permeability (m/s)	4.65E-11	Duration of Stage (days)	1

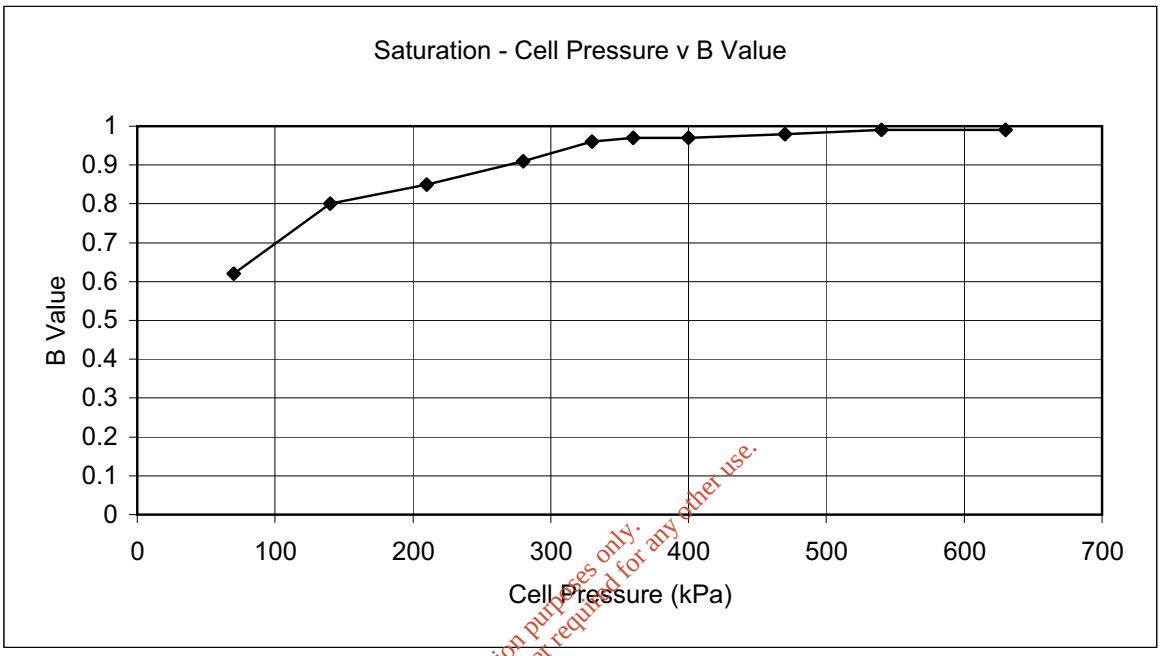


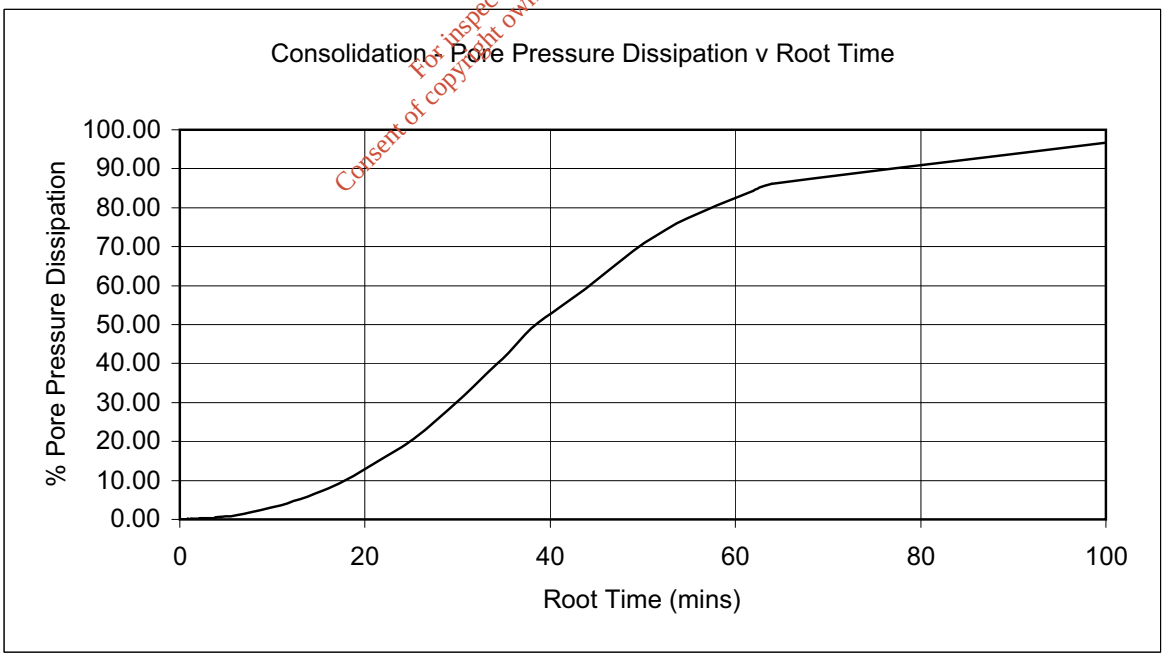
Total duration of test (days) 14

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Location: BSA3A @ 16.0m Sample No. A5851





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Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract: Dublin Landfill — Contract No. 9716

Location: BSA4 @ 1.0-1.6m — Sample No. L1423

Method of Preparation: Remoulded 4.5kg Rammer

Description: Greyish brown sandy gravelly CLAY

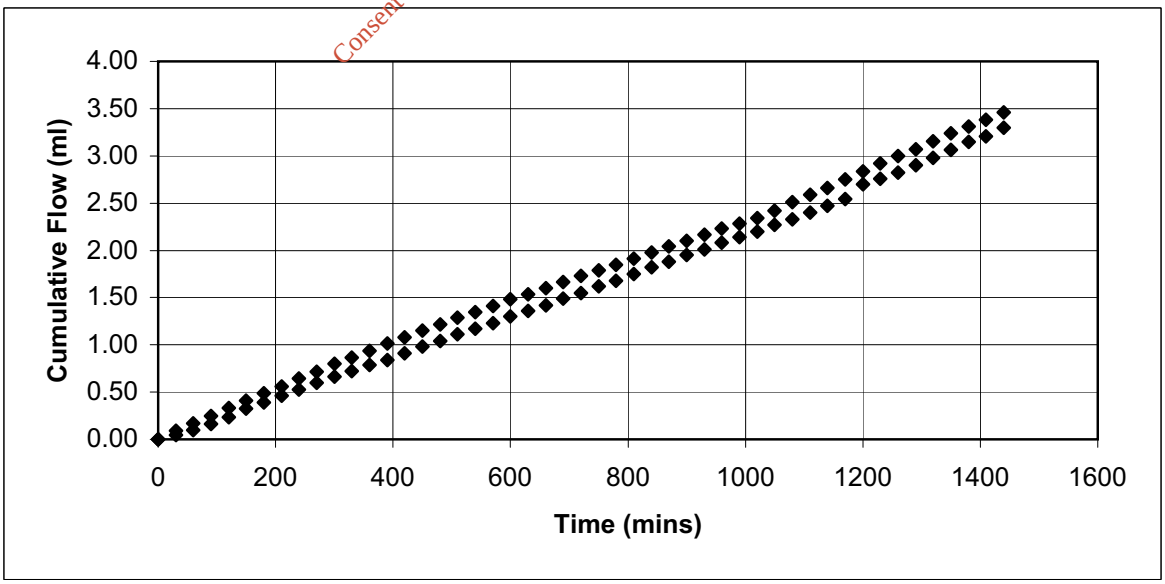
Specimen Dimensions: Height (mm) 105.7 Diameter (mm) 100.8

Specimen Conditions:	Initial	Final
Moisture Content (%)	16	16
Bulk Density (Mg/m^3)	2.07	2.09
Dry Density (Mg/m^3)	1.78	1.80

Saturation Stage
Method: Cell & back pressure stages — Final *B* Value: 1.0
Duration of Stage (days): 6

Consolidation Stage
Cell Pressure (kPa) 360 — Back Pressure (kPa) 300
Volume change (ml) 6.12 — Duration of Stage (days) 2

Permeability Stage
Mean Effective Stress 50 — Hydraulic gradient 19
Coefficient of Permeability (m/s) 2.66E-10 — Duration of Stage (days) 1

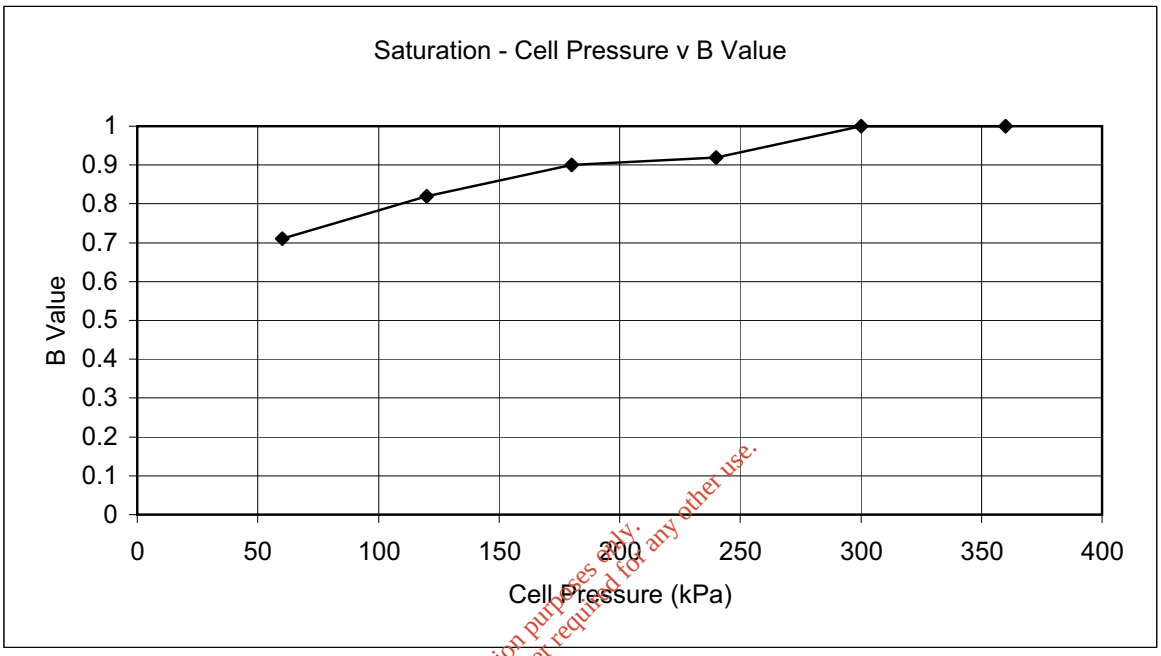


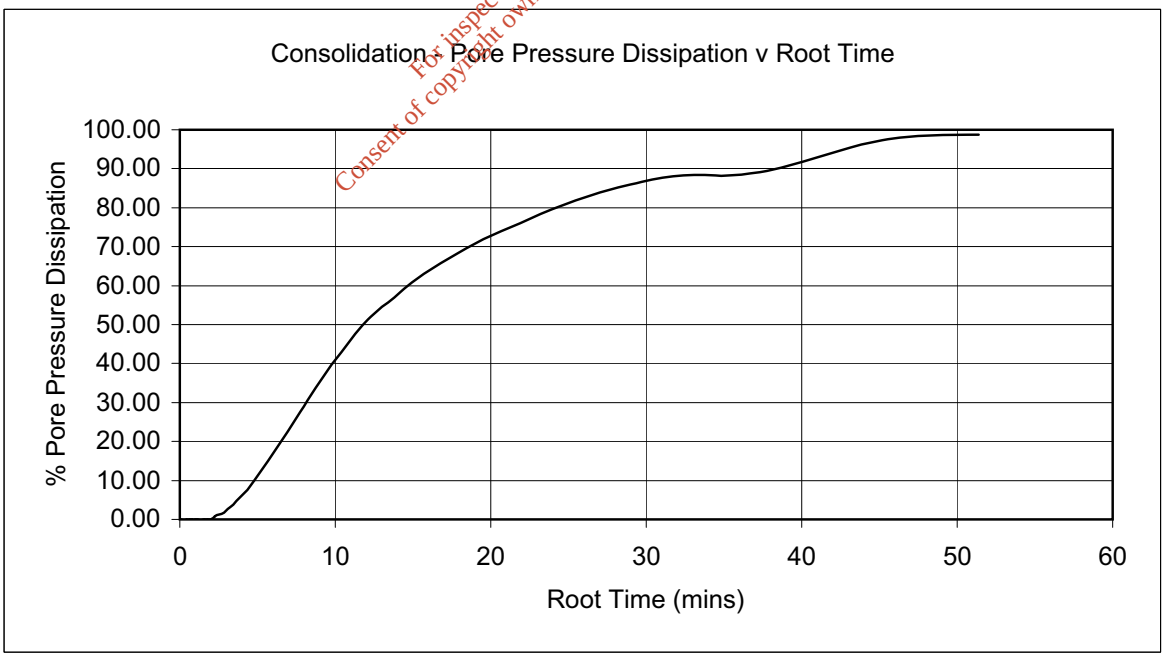
Total duration of test (days) 9

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Location: BSA4 @ 1.0-1.6m Sample No. L1423





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Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract:	Dublin Landfill	Contract No.	9716
Location:	BSA5 @ 6.0m	Sample No.	A5807

Method of Preparation: Undisturbed

Description: Brown sandy gravelly CLAY

Specimen Dimensions: Height (mm) 103.0 Diameter (mm) 100.4

Specimen Conditions:	Initial	Final
Moisture Content (%)	9.7	10
Bulk Density (Mg/m^3)	2.37	2.42
Dry Density (Mg/m^3)	2.16	2.20

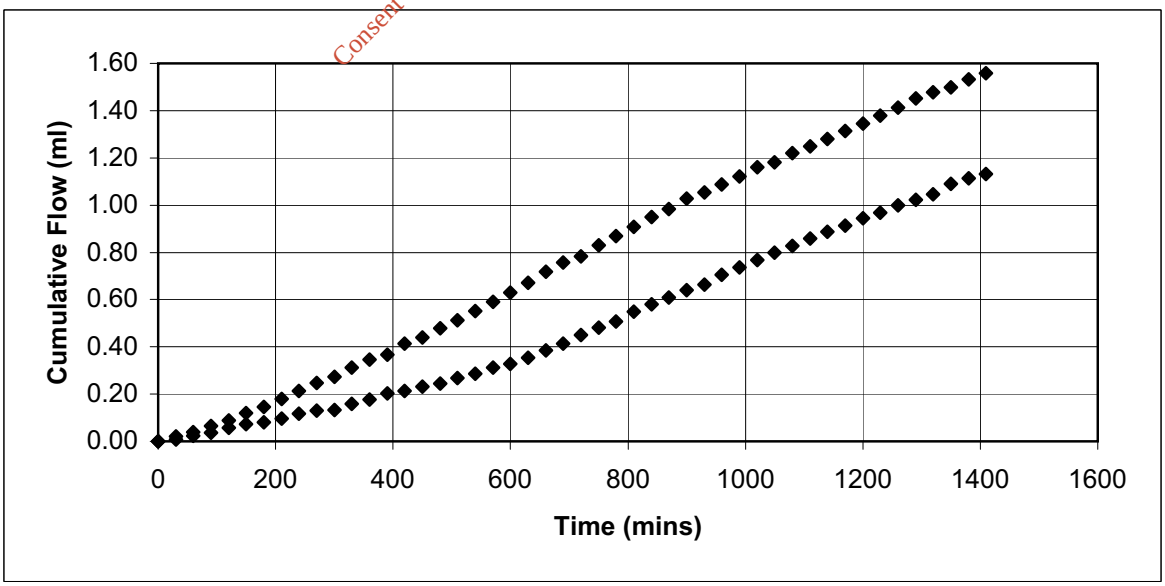
Saturation Stage
Method: Cell & back pressure stages Final *B* Value: 0.96
Duration of Stage (days): 6

Consolidation Stage

Cell Pressure (kPa)	440	Back Pressure (kPa)	300
Volume change (ml)	13.76	Duration of Stage (days)	5

Permeability Stage

Mean Effective Stress	130	Hydraulic gradient	20
Coefficient of Permeability (m/s)	1.10E-10	Duration of Stage (days)	1

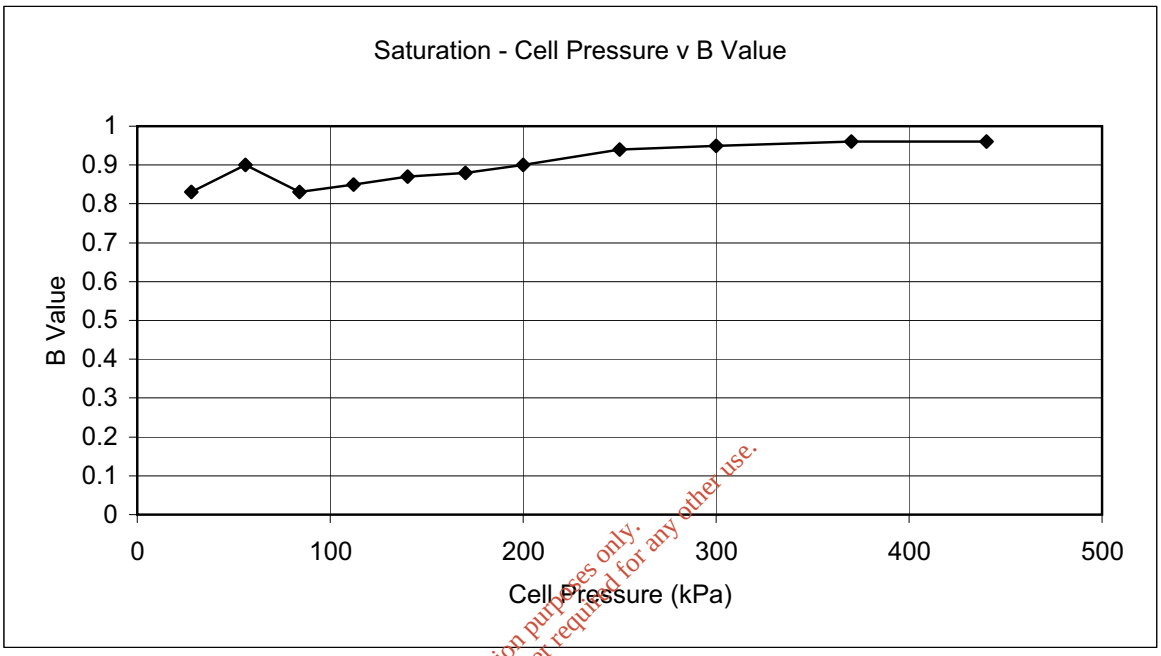


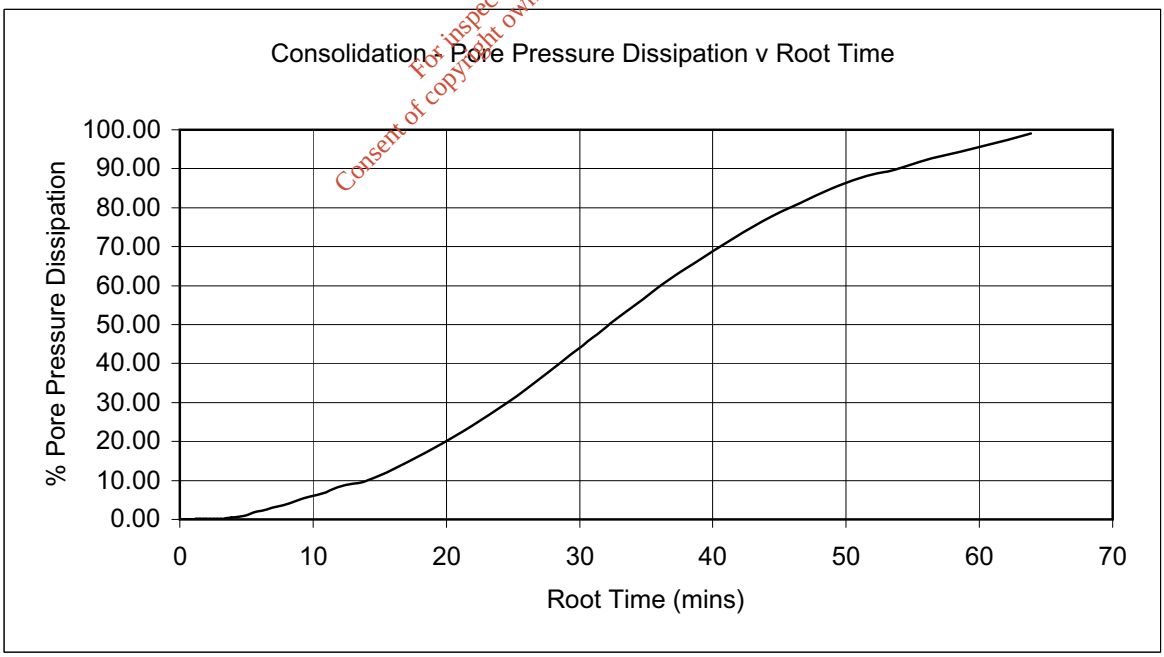
Total duration of test (days) 12

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Location: BSA5 @ 6.0m Sample No. A5807





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Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Contract:	Dublin Landfill	Contract No.	9716
Location:	BSA6 @ 12.5m	Sample No.	L1699

Method of Preparation: Undisturbed

Description: Dark grey sandy slightly gravelly CLAY

Specimen Dimensions: Height (mm) 109.1 Diameter (mm) 101.5

Specimen Conditions:	Initial	Final
Moisture Content (%)	14	12
Bulk Density (Mg/m^3)	2.22	2.26
Dry Density (Mg/m^3)	1.95	2.02

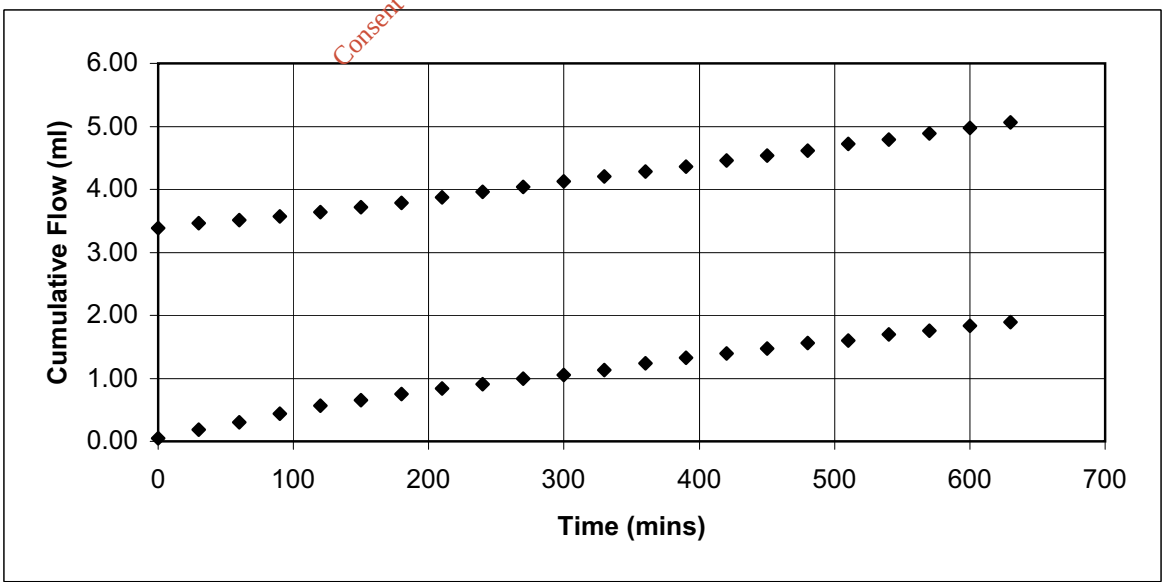
Saturation Stage
Method: Cell & back pressure stages Final *B* Value: 1.0
Duration of Stage (days): 6

Consolidation Stage

Cell Pressure (kPa)	600	Back Pressure (kPa)	340
Volume change (ml)	31.03	Duration of Stage (days)	2

Permeability Stage

Mean Effective Stress	245	Hydraulic gradient	28
Coefficient of Permeability (m/s)	1.91E-10	Duration of Stage (days)	1

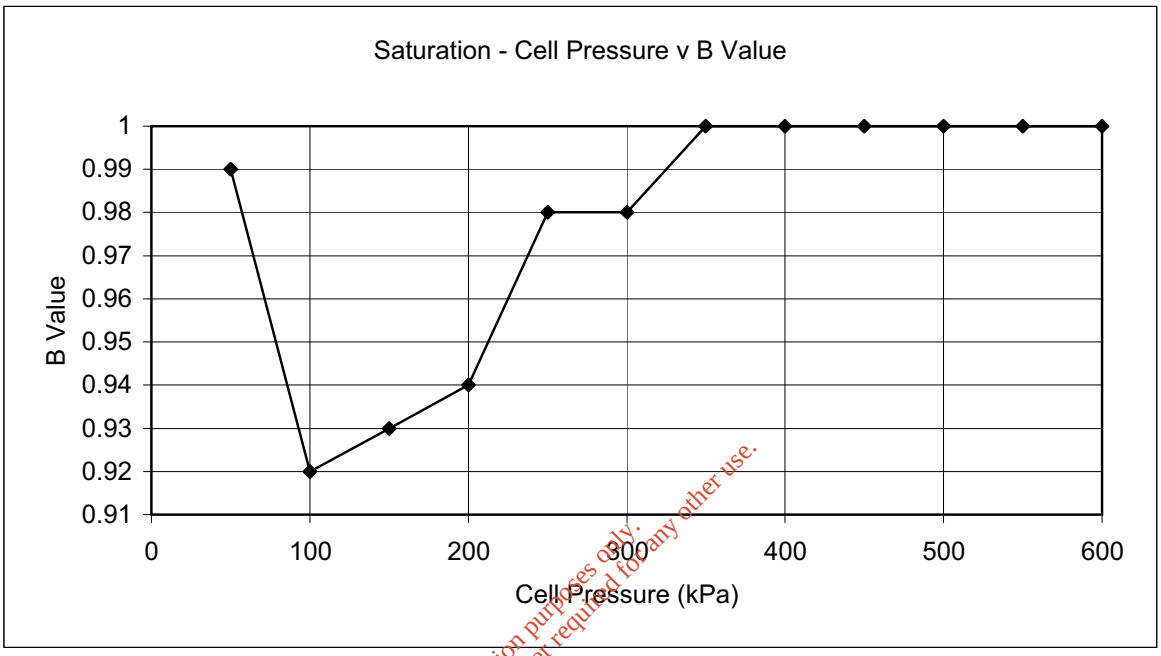


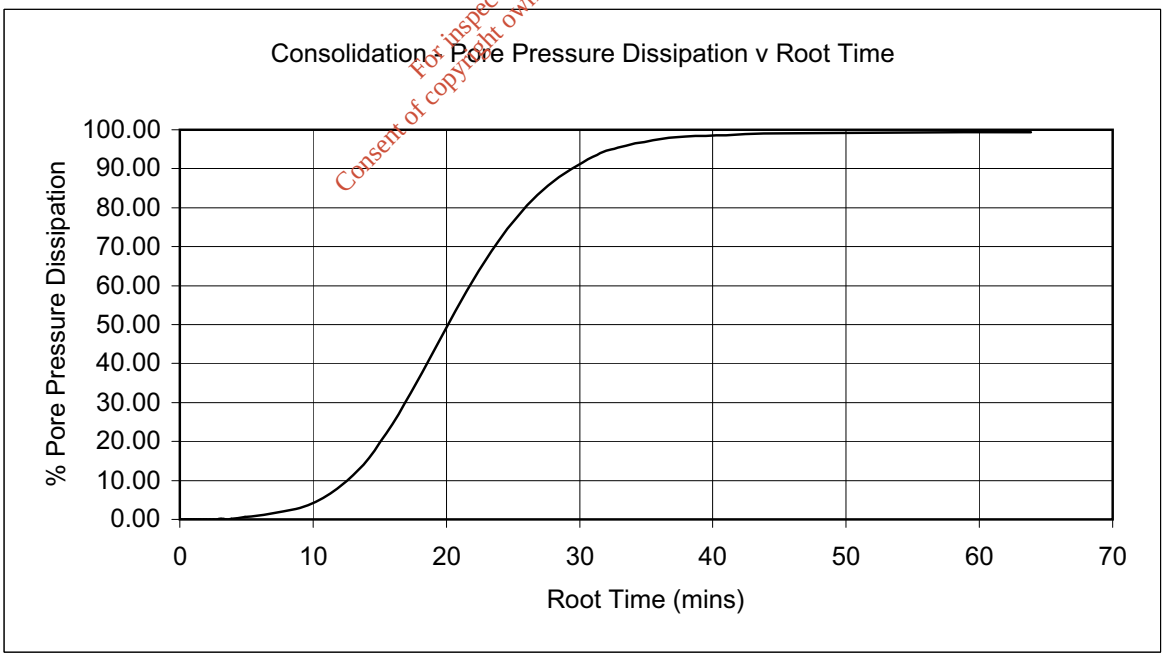
Total duration of test (days) 9

Determination of Permeability in a Triaxial Cell

BS1377:Part 6:1990, Clause 6

Location: BSA6 @ 12.5m Sample No. L1699





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