

Waste Futures – Green Island Landfill Extension







2022 Geotechnical Investigation Factual Report

Dunedin City Council

20 February 2023

→ **The Power of Commitment**



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1. Introduction

1.1 Project overview

As part of Dunedin's wider commitment to reducing carbon emissions and reducing waste going to landfill, the Dunedin City Council (Council) has embarked on the Waste Futures Programme to develop an improved comprehensive waste management and diverted material system for Ōtepoti Dunedin. The Waste Futures Programme includes the roll out of an enhanced kerbside recycling and waste collection service for the city from July 2024. The new service will include collection of food and green waste.

To support the implementation of the new kerbside collection service, the DCC are planning to make changes to the use of Green Island landfill site (Figure 1) in coming years.

The proposed changes include:

- planning for the closure of the Green Island landfill, which is coming to the end of its operational life
- developing an improved Resource Recovery Park (RRPP) to process recycling, and food and green waste
- providing new waste transfer facilities to service a new Class 1 landfill currently planned for a site south of Dunedin, at Smooth Hill.

The resource consents for the new Smooth Hill landfill are subject to appeal. Depending on the outcome of this appeal process, and the time needed to undertake baseline monitoring, preparation of management plans, landfill and supporting infrastructure design and construction, DCC anticipate that the new Class I landfill facility, won't be able to accept waste until 2027/2028 at the earliest.

In the interim, DCC therefore plans to continue to use Green Island landfill for waste disposal. Based on Dunedin's current waste disposal rates, it is likely that that the Green Island landfill can keep accepting waste for another six years (until about 2029). Between now and then, and as it continues to fill up, the landfill will be closed and capped in stages. When the landfill closes completely, there will be opportunities for environmental enhancements and public recreational use around the edge of the site. Examples could be planting restoration projects and new walking and biking tracks beside the Kaikorai Estuary. Long term use and public access to the landfill site post closure will be determined in consultation with Te Rūnanga o Ōtākou, the local community and key stakeholders.

As current Otago Regional Council resource consents needed to operate a landfill at Green Island expire in October 2023, the DCC are now applying to ORC for replacement resource consents to continue to use the landfill until it closes completely, and waste disposal can be transferred to a new landfill facility. The replacement consents relate to ground disturbance, flood defence and discharges to land, water, and air. The site is subject to an operative designation (D658) in the Proposed Second-Generation Dunedin City District Plan (2GP) for the purpose of Landfilling and Associated Refuse Processing Operations and Activities.

The development of the new RRPP and waste transfer facilities at Green Island does not form part of the replacement consent applications. Resource consents for the development and operation of the RRPP will be applied for following the completion of design work and technical assessments later in 2023.

A geotechnical investigation was undertaken to collect data to support the assessment of liquefaction, and long-term slope stability assessments and potential deformations estimation of the landfill post closure.

1.2 Scope of work

Geotechnical investigations were undertaken by GHD and Speight Drilling from 17 October 2022 until 11 November 2022, to assess the ground conditions of the site.

The scope of this investigation included:

- An initial walkover of site by an engineering geologist and ecologist
- Location of underground services across the site and clearance of site investigation locations
- Seven Cone Penetration Tests (CPTs) to depths of 15 m or refusal
- Six boreholes with accompanying piezometer install to depths of 15 m or 1 m into the underlying mudstone
- Six boreholes to depths of 20 m

- Geotechnical laboratory testing

1.3 Purpose of this report

This report provides a factual record of the investigations undertaken by GHD in 2022.

2. Site Setting

2.1 Site Description

The site comprises a section of land in Green Island Landfill, Green Island, Dunedin and includes buildings, roads and landfill operations associated with the working waste disposal facility. It is located approximately 8.8km by road from central Dunedin. The site is accessed via Brighton Road. Residential properties are located to the east of the site with industrial properties to the northeast and open spaces to the north and west. The Kaikorai Stream that flows into the nearby Kaikorai Estuary is located directly north and west of the site. The site is currently being managed and operated by Waste Management Ltd, on behalf of DCC.

Several activities are currently being undertaken within the boundaries of the landfill including municipal waste disposal, compost production, liquid waste and sludge disposal alongside the operation of a waste transfer station and a recycling centre. The location of the site is shown below in Figure 1.



Figure 1 Broad location.

2.2 Regional Geology

Local geology is described in "Miscellaneous map of New Zealand – southwest Dunedin urban 1:25 000 (Mckellar, 1990)". An excerpt of the geological map is included in Figure 12. This map shows the site consists predominantly of fill, surrounded by alluvial deposits and areas of "Abbotsford Mudstone".

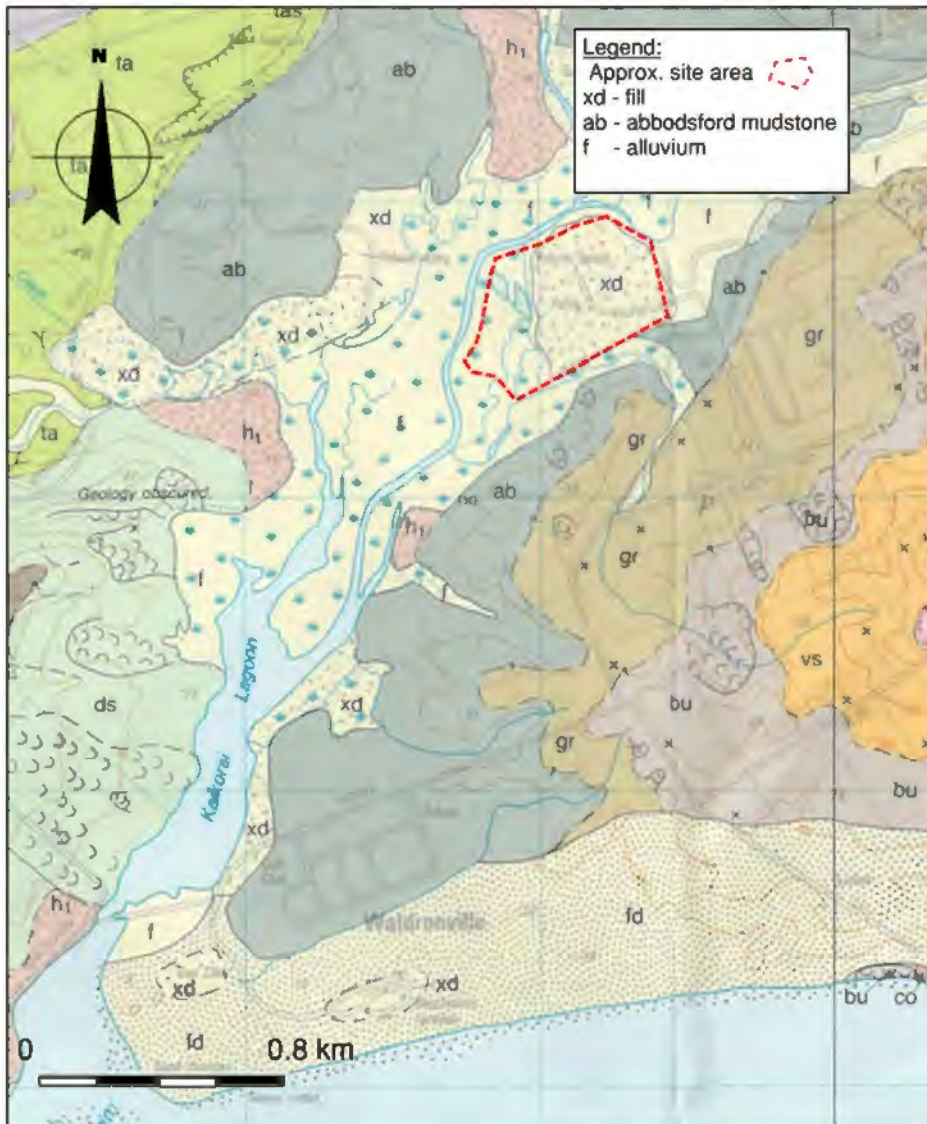


Figure 2 Geological map of Green Island Area (Mckellar, 1990).

Local geology is described in accordance with the geological map "Geology of the Dunedin Area, Scale 1:250,000. Institute of Geological & Nuclear Sciences, Geological Map 21, 1996" (Bishop & Turnbull, 1996). An excerpt of the 1:250,000 geological map is included below in Figure including an indication of the site location.



Figure 3 Geological map excerpt (Bishop & Turnbull, 1996).

Figure 3 shows the Green Island Landfill site is located nearby to two primary geological formations. A quick summary of these geological formations has been included in Table 1.

Table 1 Summary of geological information (Bishop & Turnbull, 1996).

Legend	Group	Description
Q1a	Terrestrial and fluvial deposits	"Well sorted gravel and sand from sandstone, schist, and/or volcanic rocks. Commonly quartzose. Minor mud and peat." (Q1a)
Pom	Onekakara Group	"Marine quartzose and glauconitic sandstone, siltstone, shell beds and minor limestone." (Pom)

A 1992 site investigation completed by Beca Steven described the near surface alluvial soils as overlying the Abbotsford Formation Mudstones (Beca Steven, 1992).

A previous site investigation carried out by Barry J Douglas Geological Consultants found most of the near surface geology consists of Kaikora Estuarine Formation which are Terrestrial and Fluvial deposits (Q1a). These are overlying Abbotsford formation mudstones which are part of the Onekakara Group (Douglas, 2002). The report further separated the Kaikora Estuarine Formation into the Upper Kaikora Estuarine Member (UKEM) with 2 sub members and the Lower Kaikora Estuarine Member (LKEM). These definitions were further adopted in a 2019 Tonkin and Taylor report.

Barry J Douglas Geological Consultants also encountered landfill refuse or earthfill in 54% of investigation locations, with a maximum recorded thickness of 2.6 m (Douglas, 2002).

Table 2 below presents a summary of the geological units used in this investigation, along with a brief description based on previous site investigations at Green Island Landfill.

Table 2 *Geological units used for analysis*

Geological Unit	Description
Fill	Mixed source fill material including municipal solid waste (MSW) and soil waste (Douglas, 2002).
Upper Kaikorai Estuary Member (UKEM)	Variable thin beds of sand, silty sand, sand silt, silt, clayey silt and silty clay (Douglas, 2002)
Lower Kaikorai Estuary Member (LKEM)	Massive homogeneous beds of clayey silt, silty clay and silt, and minor (possibly localised) beds of clay, very fine sandy silt and silty very fine sand (Douglas, 2002).
Abbotsford Mudstone (AM)	Greyish brown mudstone, extremely weak rock strength (Beca Steven, 1992).

Based on our investigations, we could not distinguish the previously identified subunits for UKEM and have therefore simplified the geological description.

3. Geotechnical Investigation

3.1 General

GHD carried out a geotechnical investigation between 17 October 2022 until 11 November 2022, comprising:

- 7 x Cone Penetration Tests (CPTs) to depths of 15 m or refusal,
- 6 x sonic cored boreholes, with standpipe piezometer installation, to depths of 15 m or 1 m into the underlying mudstone, and
- 6 x sonic cored boreholes to depths of 20 m

All investigation works were carried out under the supervision of a GHD Geotechnical Engineer.

Materials recovered from the investigation were logged following the methods and procedures in the New Zealand Geotechnical Society's (NZGS) "Guideline for the Field Description of Soil and Rock for Engineering Purposes" (NZGS, 2005).

A location plans showing the borehole and CPT locations is included in Appendix A. Figure A1 shows the 2022 GHD site investigation reported in this document and Figure A2 shows all known historical investigations completed at the site including the 2022 GHD site investigation.

Borehole logs and photographs are presented in Appendix B and CPT results in Appendix C.

3.2 Boreholes

Speight Drilling Ltd were engaged to drill twelve boreholes and to install standpipe piezometers at six of the borehole locations. Details of borehole depths and locations are presented in Table 3 below.

3.2.1 Drilling methods

All boreholes were drilled with vertical inclination from ground surface using sonic wireline. The holes were carried out using PQTT coring (83 mm diameter core).

3.2.2 In-situ testing

Standard Penetration Testing (SPTs) were performed at 1 m intervals in accordance with NZS 4402: 1988 Test 6.5.1 "*Determination of the penetration resistance of a soil*" (Standards New Zealand, 1986). Results of all SPTs are recorded on the borehole logs in Appendix B and the hammer calibration sheet is attached in Appendix D.

3.2.3 Handheld shear vane

Hand shear vanes were attempted in the end of each core barrel. All shear strengths shown on the appended machine borehole and hand auger logs are corrected vane shear strengths derived in accordance with the NZGS "*Guideline for Hand Held Shear Vanes Test*" (NZGS, 2001). The peak and remoulded vane readings represent hand-held dial readings from a 19 mm blade, adjusted using the calibration sheet attached in Appendix D. These are reported on the logs as undrained shear strength.

3.3 Cone penetration testing

Speight Drilling was engaged to complete 7 no. CPT investigations, to depths of 15 m or refusal. Details of CPT depths and locations are included in Table 3 below. Raw data from the CPTs along with prepared investigation reports have been included in Appendix C.

3.4 Services

Speight Drilling was engaged to assess available service plans and locate any known or buried services in the area of the site. No other services not shown on plans were located in proximity to the investigation locations. All obtained service plans are attached as Appendix F.

3.5 Investigation locations

Coordinates of investigation locations are presented in Table 3 are reported in New Zealand Transverse Mercator system (NZTM2000) and the elevations reported are based on the New Zealand Vertical Datum 2016 (NZVD2016).

Most of the geotechnical investigation locations were surveyed following the completion of the investigation using a RTK GPS system. Three geotechnical investigation locations (BH105, BH110, CPT102) were unable to be surveyed accurately during the site survey.

The locations for these three points were estimated using a handheld GPS unit during drilling. The handheld GPS unit used to measure these locations have a nominal accuracy of ± 3 m. However, the elevation of these three sites are accurate to to ± 20 mm.

Table 3 Investigation location information

Location ID	Termination Depth (m)	Easting (NZTM)	Northing (NZTM)	Elevation (m RL) (NZVD2016)
BH100	12.95	1399158.816	4913183.433	2.204
BH101	12.95	1399044.931	4913066.667	2.264
BH102	14.95	1399010.249	4912854.359	2.184
BH103	13.15	1399102.737	4912602.702	1.583
BH104	9.95	1399552.195	4912898.548	6.473
BH105	19.95	1399518	4913038	6.421
BH106	19.95	1399558.840	4913069.214	6.603
BH107	19.95	1399344.222	4913220.511	6.872
BH108	20.85	1399316.458	4912715.655	12.12
BH109	19.95	1399509.727	4913116.175	7.024
BH110	19.95	1399332	4913121	7.607
BH111	19.95	1399278.558	4913200.680	6.263
CPT100	14.80	1399159.014	4913182.968	2.192
CPT101	15.04	1399043.933	4913073.240	2.087
CPT102	13.84	1399038	4912947	1.717
CPT103	16.53	1399010.080	4912853.932	2.202
CPT104	11.81	1399019.672	4912656.718	1.768
CPT105	13.17	1399103.313	4912602.679	1.606
CPT108	15.00	1399264.575	4913232.765	1.663

3.6 Groundwater level monitoring

Standpipe piezometers have been installed in selected boreholes to allow for long-term groundwater level monitoring.

Groundwater levels encountered during drilling and immediately post-development are noted in the borehole logs (Appendix B). The piezometer ground elevations and screen details are summarised below in Table 4.

Groundwater Technical Assessment Report, dated 20 December 2022 (GHD, 2022) shall be referred to for measured ground water levels.

Table 4 Piezometer installation details

Location ID	Ground Elevation (m RL)	Screen Interval (m bgl)	Screen Interval (m RL)	Geological unit screened
BH100	2.204	6.1 - 8.1	-3.61 to -5.61	LKEM
BH101	2.264	6.0 - 8.0	-3.79 to -5.79	LKEM
BH102	2.184	3.7 - 4.7	-1.97 to -2.97	UKEM & LKEM
BH103	1.583	8.1 - 10.1	-6.65 to -8.65	LKEM
BH104	6.473	6.2 - 9.2	1.22 to -1.78	A M
BH108	12.12	14.4 - 15.4	-2.28 to -3.28	LKEM

4. Geotechnical Testing

Geotechnical laboratory testing was carried out by Central Testing Services, in accordance with New Zealand Standards' NZS4402:1998 "Methods of testing soils for civil engineering purposes" (NZS, 1998). Laboratory tests complete along with relevant standards are included in Table 5.

Table 5 Laboratory tests and standards.

Test	Standard
Atterberg limits	NZS4402 Test 2.2, 2.3 & 2.4 (a)
Particle size distribution (PSD – wet sieve)	NZS4402 Test 2.8.1

Particle size distribution (PSD) and Atterberg Limit (AL) testing were carried out on samples chosen from a range of borehole locations and depths. The schedule of all geotechnical laboratory tests undertaken for this investigation is included in Table 6. The laboratory test results are presented in Appendix F.

Table 6 Lab testing schedule from 2022 ground investigations

Investigation ID	Depth From (m)	Depth To (m)	Unit	Atterberg Limits (PL, LL, PI)	Particle Size Distribution (2.8.1)
BH100	2.75	3.25	UKEM	1	1
BH100	4.10	4.50	LKEM	1	1
BH100	6.10	6.50	LKEM	1	1
BH100	7.95	8.40	LKEM	1	1
BH100	10.10	10.50	LKEM	1	1
BH101	2.50	2.90	UKEM	1	1
BH101	4.95	5.40	LKEM	1	1
BH101	6.50	6.95	LKEM	1	1
BH101	7.95	8.25	LKEM	1	1
BH101	9.95	10.30	LKEM	1	1
BH102	1.95	2.40	UKEM	1	1
BH102	3.95	4.30	LKEM	1	1

Investigation ID	Depth From (m)	Depth To (m)	Unit	Atterberg Limits (PL, LL, PI)	Particle Size Distribution (2.8.1)
BH102	5.95	6.50	LKEM	1	1
BH102	7.95	8.35	LKEM	1	1
BH102	11.5	11.95	LKEM	1	1
BH103	2.10	2.50	UKEM	1	1
BH103	4.50	5.15	LKEM	1	1
BH103	5.95	6.30	LKEM	1	1
BH103	7.95	8.30	LKEM	1	1
BH103	11.00	11.40	LKEM	1	1
BH105	5.50	6.00	FILL	1	1
BH105	6.80	7.20	LKEM	1	1
BH105	8.10	8.50	LKEM	1	1
BH105	10.50	10.95	A M	1	1
BH106	7.50	7.95	LKEM	1	1
BH106	9.50	9.95	LKEM	1	1
BH108	13.50	13.95	LKEM	1	1
BH108	15.50	15.95	LKEM	1	1
BH108	17.10	17.50	A M	1	1
BH109	6.80	7.20	LKEM	1	1
BH109	7.95	8.35	LKEM	1	1
BH109	9.50	9.95	A M	1	1
BH109	11.10	11.50	A M	1	1
BH109	12.2	12.5	A M	1	1
BH110	8.50	8.85	LKEM	1	1
BH110	9.95	10.5	LKEM	1	1
BH110	11.50	11.95	LKEM	1	1
BH110	12.5	12.95	A M	1	1

5. References

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6. Limitations

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Investigations undertaken in respect of this report are constrained by the particular site conditions, such as the location of buildings, services and vegetation. As a result, not all relevant site features and conditions may have been identified in this report.

Site conditions (including the presence of hazardous substances and/or site contamination) may change after the date of this Report. GHD does not accept responsibility arising from, or in connection with, any change to the site conditions. GHD is also not responsible for updating.

Appendices

Appendix A

2022 Geotech Investigation Location Plan





Appendix B

Geotechnical Investigation Borehole Logs and Photographs



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH100

Sheet : 1 of 2
 Hole Length : 12.95
 Scale @ A4 : 1:40

Commenced: 1/11/2022

Completed: 1/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399158.816
 RL: 2.204 m

Northing: 4913183.433
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD (%)	Defect Spacing (mm)	Instrumentation Installation	Water level	
							Number / Type	Result										
0.2	0.2		FILL: Silty, fine to coarse sand, minor gravel; light brown. Dry, gravel, fine, subangular.	FILL	D													
1.0	1.0		FILL: MSW and wood fragments; dark brown. MSW containing plastics.															
1.7	1.7		CORE LOSS															
2.5	2.5		FILL: Wood fragments in silty, sand matrix; brown to dark brown. Moist.	M														
2.75	2.75		Sandy SILT, some clay, trace rootlets; dark brown. 'Very soft', moist, high plasticity, sand; fine to medium.			'VS'		SPT 6/3 2/2 1/1 N = 6		HA								
3.25	3.25		CORE LOSS															
3.5	3.5		Sandy SILT, some organic material, minor clay, minor sand, trace rootlets; dark brown. Very soft, moist, low plasticity, sand, fine to medium.	LKEM														
3.75	3.75		CORE LOSS					SPT 3/3 2/1 1/2 N = 6		SNC								
4.1	4.1		ORGANIC SILT, some clay, trace shell fragments; dark brown. Firm, moist, high plasticity. Sulphurous smell.															
4.5	4.5																	
4.75	4.75																	
5.35	5.35		Silty CLAY, minor sand, trace organic; greenish grey with black streaking. Stiff, moist, moderate to high plasticity.	LKEM														
6.10	6.10							SPT 0/0 0/0 0/1 N = 1		SNC								
6.50	6.50																	
7.95	7.95																	
8.47	8.47																	

FINAL

Notes and Comments:
 End of Hole @ 12.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical
 Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic
 SPT ETR: 64%

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
01/11/22	16:15	0.93	12.95
14/11/22	11:06	0.975	11



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH100
 Sheet : 2 of 2
 Hole Length : 12.95
 Scale @ A4 : 1:40

Commenced: 1/11/2022 Completed: 1/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399158.816 Northing: 4913183.433 System: NZTM2000
 RL: 2.204 m Datum: NZVD2016 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Cooling	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RCR SCR % 3	Defect Spacing (mm)	Instrumentation Installation	Water level		
							Number / Type	Result											
4			Sandy SILT, some clay, greenish gray. Soft, moist, low plasticity, sand, fine. (continued from layer starting at 7.8m)	LCEM			C	8.90		SNC				TCR: 100					
6			8.50 Becomes some sand, minor clay, colour becomes orangish grey.								SPT	0.0 0.2 2/2 N = 6				TCR: 100			
10			Silty, fine to medium SAND trace organic, dark brown. Very loose, moist, uniformly graded.				VL			C	10.10		SNC				TCR: 100		
11			10.90 Sand becomes fine to medium					10.50		SPT	0.0 0.0 0.2 N = 2			TCR: 100					
12			Fine to coarse GRAVEL, minor sand; black. Medium dense, gravel, angular, slightly weathered, weak; sand, coarse. Unweathered to slightly weathered, dark grey to black MUDSTONE, extremely weak. Soil description: Clayey silt, minor sand, dark brown to black. Very stiff, moist, low plasticity, sand, fine.	ABBOTSFORD MUDSTONE		MSW VSY		10.90		SPT	0.0 0.0 0.1 N = 1			TCR: 100					
13			End of Hole @ 12.95m, TD					11.7		SPT	0.0 0.4 0.7 N = 25			TCR: 100					
14								11.5		SPT	3/5 6/7 10/11 N = 34			TCR: 100					

Notes and Comments: End of Hole @ 12.95m Shear Vene: GEO937, 'MSW' - Municipal Solid Waste	Inclination: Vertical	Orientation:	Ground Water Level			
	Contractor: Speight Drilling Equipment: HD 900 Sonic		Date	Time	Reading (mbgl)	Hole depth (mbgl)
Refer to explanation sheets for abbreviation and symbols. Shear Vene values are corrected.			01/11/22	16:15	0.95	12.65
			14/11/22	11:06	0.875	11
SPT ETR: 64%						

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023



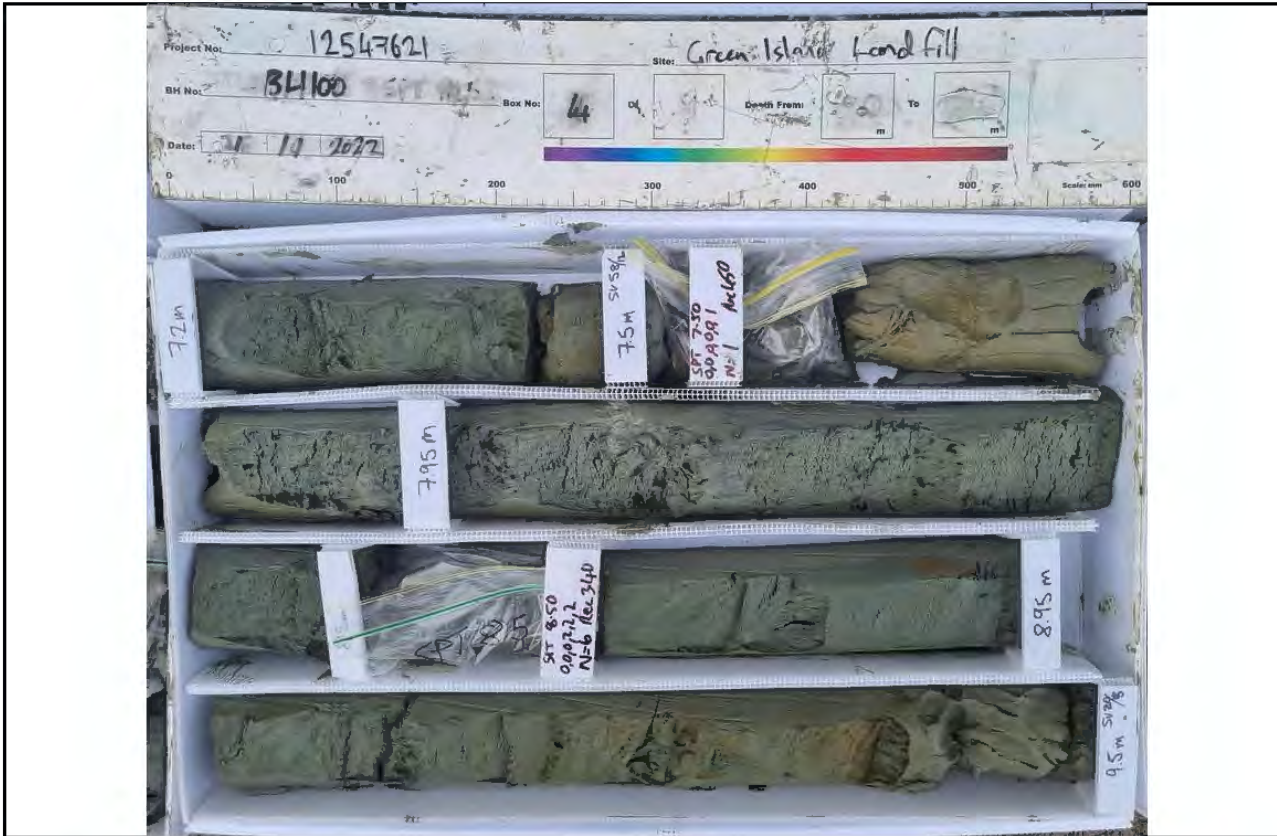
Core Box 1, Depth: 0.0 to 2.4 m



Core Box 2, Depth: 2.4 to 4.8 m



Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 5, Depth: 9.6 to 12.0 m



Core Box 6, Depth: 12.0 to 12.95 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH101

Sheet : 1 of 2
 Hole Length : 12.95
 Scale @ A4 : 1:40

Commenced: 1/11/2022

Completed: 1/11/2022

Logged : NP

Easting: 1399044.931

Northing: 4913066.667

System: NZTM2000

Processed : NP

RL: 2.264 m

Datum: NZVD2016

Method: SURVEY

Checked : DB

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
2.26	0.0		TOPSOIL: Sandy organic silt, minor rootlets; dark brown. Moist, low plasticity.	TOPSOIL	M												
0.4	0.4		FILL: Sandy, clayey, silt, some organic material (rootlets) and MSW (15%); orangish brown with grey and black mottling. Moist, sand, fine; MSW contains plastics, low to moderate plasticity.	FILL					SNC				TCR: 100				
1.3	1.3		Fibrous PEAT, minor rootlets; black. Very soft, moist.			'VS'											
1.95	1.95		Sandy ORGANIC SILT, minor clay, trace rootlets; dark brown. Very soft, moist, low plasticity, sand, fine.				SPT 0/0 0/0 1/1 N = 2		SPT				TCR: 100				
1.95	1.95		Silty fine to medium SAND, some clay, trace gravel; dark grey. Very loose, wet, gravel, fine, subrounded.		W	VL			SNC				TCR: 100				
2.50	2.50			UKEM			SPT 0/0 0/0 0/1 N = 1 SV@2.5m 9/6 kPa		SPT				TCR: 100				
2.90	2.90		3.25 - 3.30 Thin fine to coarse SAND lens						SNC				TCR: 100				
3.70	3.70		3.70 Becomes fine to coarse SAND, minor gravel.				SPT 0/0 0/0 1/1 N = 2 SV@3.5m 27/9 kPa		SPT				TCR: 100				
3.95	3.95		CORE LOSS						SNC				TCR: 0				
4.5	4.5		Clayey ORGANIC SILT; dark brown. Firm, moist, high plasticity. Sulphurous smell.		M	F	SPT 0/0 0/0 0/1 N = 1		SPT				TCR: 100				
4.95	4.95						SPT 0/0 0/0 0/1 N = 1 SV@4.5m 29/13 kPa		SPT				TCR: 100				
5.40	5.40						SPT 0/0 0/0 0/1 N = 1 SV@5.5m 29/13 kPa		SPT				TCR: 100				
6.05	6.05		CORE LOSS	LKEM	M	F			SNC				TCR: 18				
6.5	6.5		Silty CLAY, trace sand and organic, material and shells; greenish grey with black streaks. Firm, moist, high plasticity, sand, fine.				SPT 0/0 0/0 0/1 N = 1 SV@6.5m 43/13 kPa		SPT				TCR: 100				
6.95	6.95						SPT 0/0 0/0 0/1 N = 1		SNC				TCR: 100				
7.95	7.95						SPT 0/0 0/0 0/1 N = 1		SPT				TCR: 100				

FINAL

Notes and Comments:
 End of Hole @ 12.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
01/11/22	11:30	1.4	12.95
14/11/22	11:15	1.96	

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023



Core Box 1, Depth: 0.0 to 2.4 m



Core Box 2, Depth: 2.4 to 4.8 m



Project	GILF Closure Consents	
Client	DCC	
Job Number	12547621	Page 2 of 3
Borehole ID	BH101	



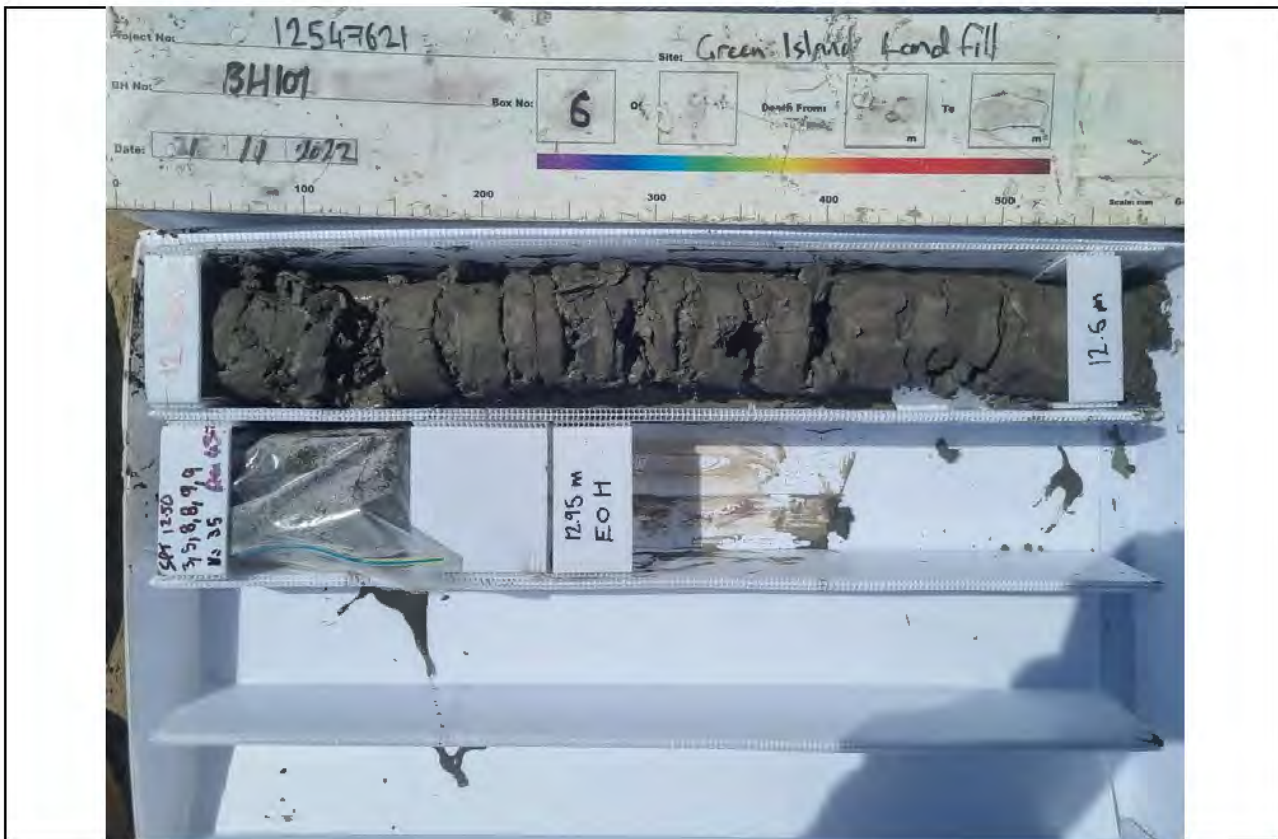
Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 5, Depth: 9.6 to 12.0 m



Core Box 6, Depth: 12.0 to 12.95 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH102

Sheet : 1 of 3
 Hole Length : 14.95
 Scale @ A4 : 1:25

Commenced: 31/10/2022

Completed: 31/10/2022

Logged : NP

Easting: 1399010.249

Northing: 4912854.359

System: NZTM2000

Processed : NP

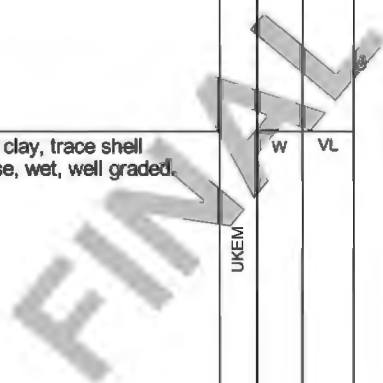
RL: 2.184 m

Datum: NZVD2016

Method: SURVEY

Checked : DB

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR ROD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
2.184	0.00		<p>TOPSOIL: organic silt, some sand and grass/rootlets; light brown. Dry, low plasticity.</p> <p>FILL: Gravelly, fine sand with MSW (20%), minor silt, trace rootlets; brown with light brown streaking. Dry, gravel, fine to coarse, angular; MSW containing plastics.</p>	TS	D												
	0.15			FILL	M				SNC								
	1.00		<p>FILL: Fibrous peat with MSW (20%), minor sand and silt; black. Moist, MSW containing plastic; sand, fine.</p>														
	1.80		<p>Silty CLAY, some sand, minor organics (rootlets, wood fragments), trace shell fragments; greenish grey with orange mottling. 'Very soft', moist, high plasticity. Sand, fine to medium. No dilatant behaviour.</p>			'VS'			SPT								
	2.40		<p>Fine to medium SAND, some silt, minor clay, trace shell fragments; light greenish grey. Very loose, wet, well graded.</p>	UKEM	W	VL			SPT								
	3.85		<p>Clayey ORGANIC SILT, trace shell fragments; dark brown. Firm, wet, high plasticity. Sulphurous smell</p>	UKEM	M	F			SPT								



Notes and Comments:
 End of Hole @ 14.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
31/10/22	00:00	0	12.95
14/11/22	11:20	1.29	5.2



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH102

Sheet : 3 of 3
 Hole Length : 14.95
 Scale @ A4 : 1:25

Commenced: 31/10/2022

Completed: 31/10/2022

Logged : NP

Processed : NP

Checked : DB

Easting: 1399010.249

Northing: 4912854.359

System: NZTM2000

RL: 2.184 m

Datum: NZVD2016

Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR	Defect Spacing (mm)	Instrumentation Installation	Water level	
							Number / Type	Result										
-9			Silty CLAY, trace sand, trace organics; greenish gray with black streaking. Firm, moist, high plasticity, sand, fine. (continued from layer starting at 7.0m)	LKEM														
	10.85		SILT, some clay and minor sand and organic material; grey with orange mottling. Very soft, moist, moderate plasticity. Dilatant behaviour, slight sulphurous smell.					SPT 0/0 1/1 2/1 N=5 10/7 IP+		SNC				TCR: 100				
	11		11.20 Contains some sand, minor clay. Low plasticity							SNC				TCR: 100				
	11.4		Sandy SILT, some clay, minor organic material; dark grey to orange. Firm, wet, high plasticity. Sand, fine to medium.	W	F	C												
	12		12.10 Contains minor clay and organic materials; colour becomes grey							SPT 0/0 1/1 1/2 N=5		SNC				TCR: 100		
	12.5		Gravelly, fine to coarse SAND, some silt; dark brown to black. Loose, moist, gravel, fine, subangular, well graded. 12.85 Contains trace gravel	M	VSt													
	12.85								SPT 0/1 2/2 2/2 N=8 10/7 IP+		SNC				TCR: 100			
	13		Unweathered to slightly weathered, dark gray to black MUDSTONE, extremely weak. Soil description: Clayey silt, minor sand, dark brown to black. Very stiff, moist, low plasticity, sand, fine.								SNC				TCR: 100			
	14			ABBOTSFORD MUDSTONE														

Notes and Comments:
 End of Hole @ 14.95m, TD
 End of Hole @ 14.95m
 Shear Vene: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vene values are corrected.

Inclination: Vertical
 Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic

Ground Water Level			
Date	Time	Reading (mug)	Hole depth (mug)
31/10/22	00:00	0	12.85
14/11/22	11:20	1.29	3.2



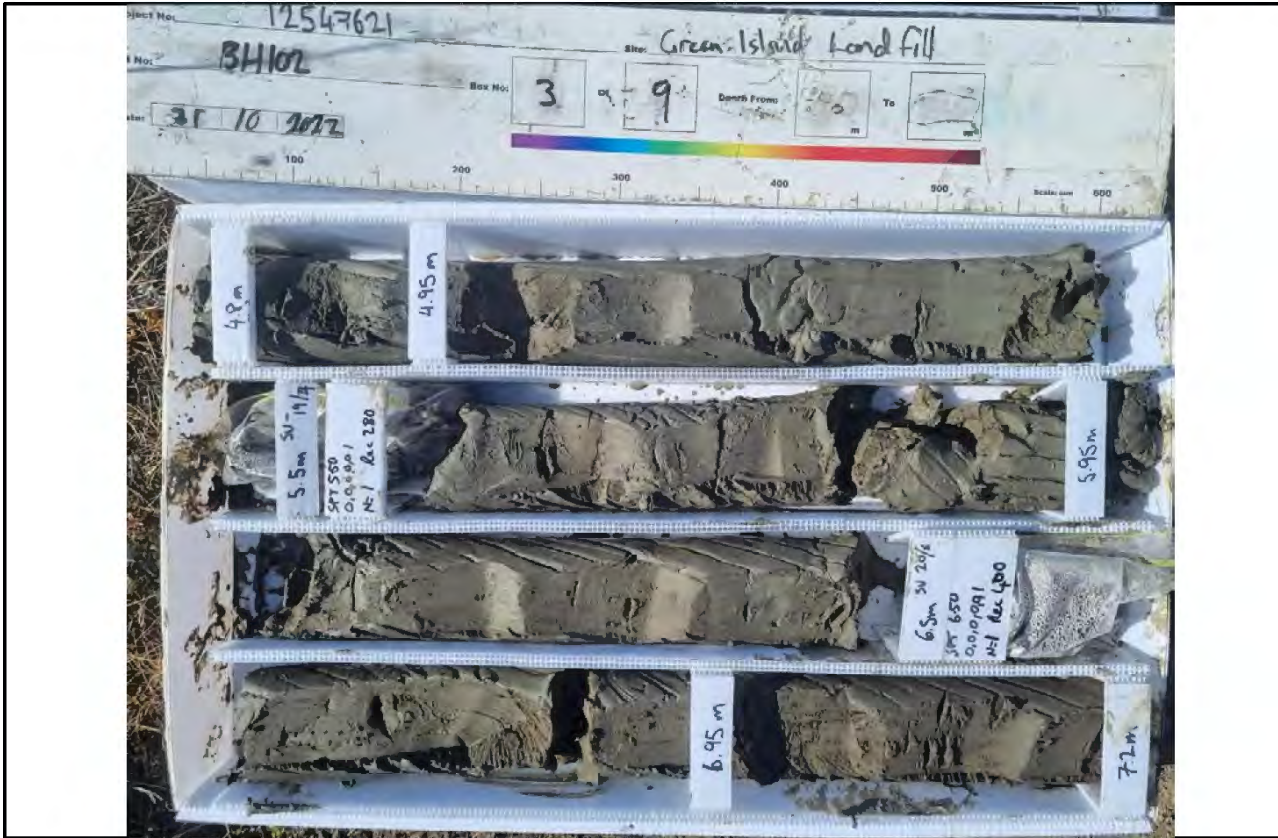
Project	GILF Closure Consents	
Client	DCC	
Job Number	12547621	Page 1 of 4
Borehole ID	BH102	



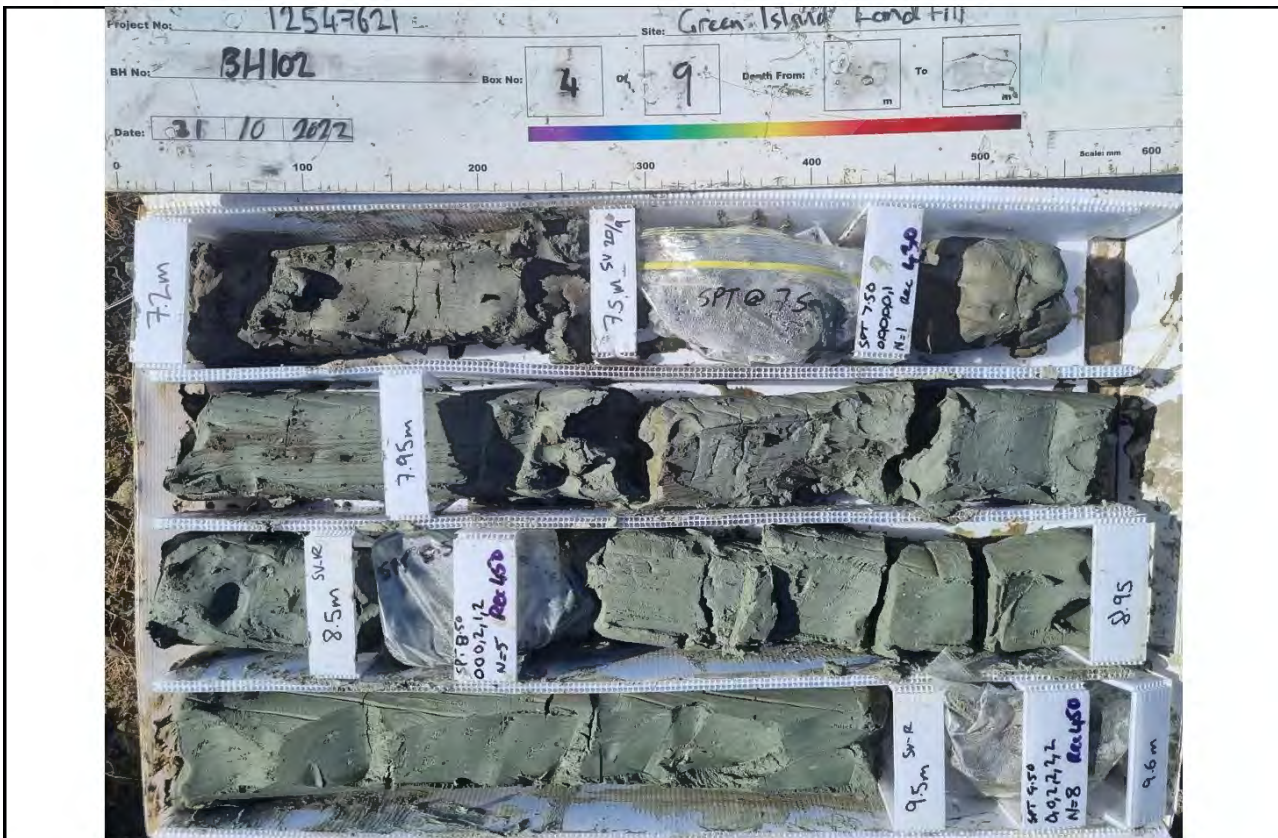
Core Box 1, Depth: 0.0 to 2.4 m



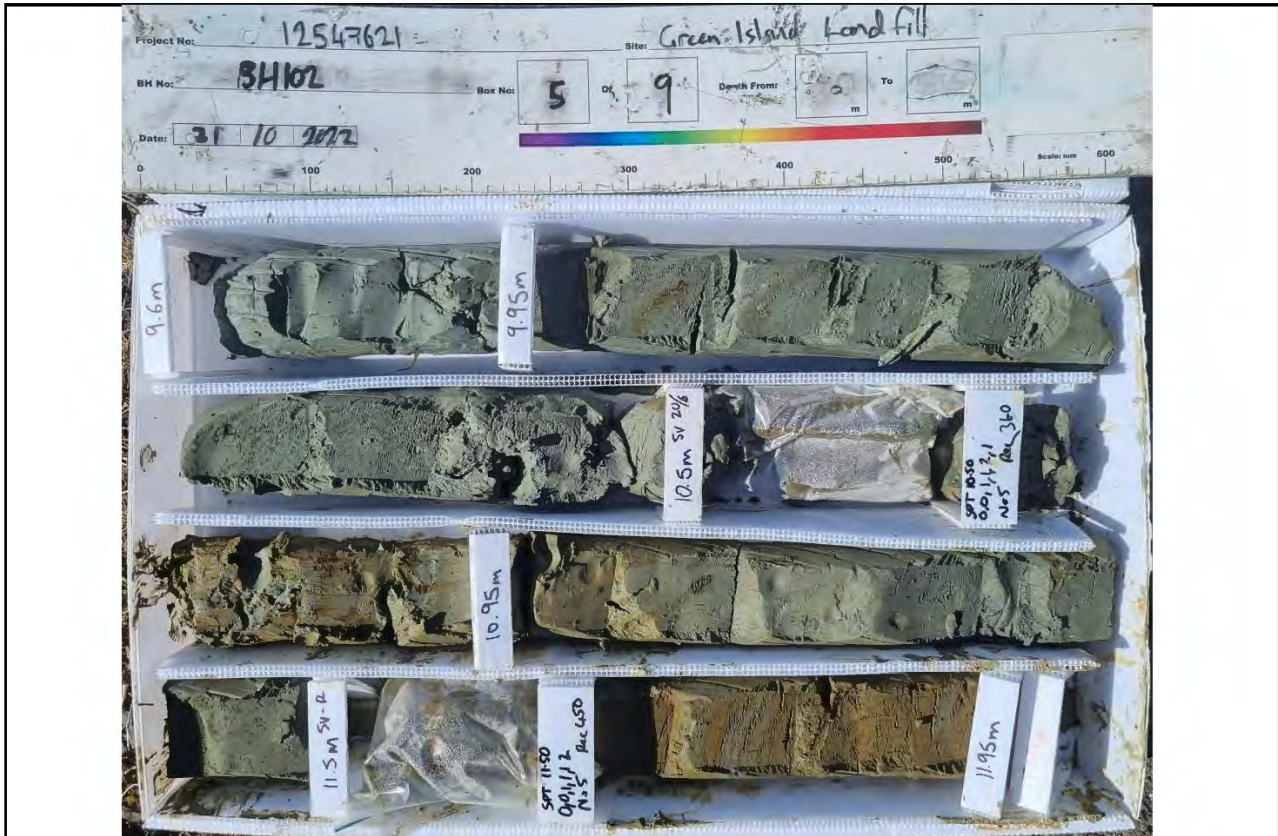
Core Box 2, Depth: 2.4 to 4.8 m



Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 5, Depth: 9.6 to 12.0 m



Core Box 6, Depth: 12.0 to 14.4 m



Project	GILF Closure Consents	
Client	DCC	
Job Number	12547621	Page 4 of 4
Borehole ID	BH102	



Core Box 7, Depth: 14.4 to 14.95 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH103

Sheet : 1 of 3
 Hole Length : 13.15
 Scale @ A4 : 1:25

Commenced: 25/10/2022

Completed: 25/10/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399102.737
 RL: 1.583 m

Northing: 4912602.702
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
0	0		TOPSOIL: Sandy, organic silt; minor organics (rootlets, plant materials, wood fragments) and shells orangish brown. 'Very soft', moist, low plasticity, sand, fine. 0.10 - 0.15 Plant material	TOPSOIL	M												
0.45	0.45		FILL: Sandy organic silt, some clay, trace rootlets; greyish brown with black mottling. Moist, sand, fine to medium. 0.45 Sand becomes fine to medium	FILL					SNC				TCR: 100				
1.2	1.2		CORE LOSS														
1.5	1.5		Sandy SILT, some clay, trace rootlets; light grey with orange mottling. Firm, moist, low plasticity, sand, fine.		M	F			SPT				TCR: 100				
2.45	2.45		Clayey SILT, some sand minor shell fragments; grey. Soft, moist, low to moderate plasticity, sand, fine.	LUKEM		S			SNC				TCR: 100				
3.85	3.85		CORE LOSS						SPT				TCR: 67				
4.5	4.5		ORGANIC SILT, some sand and clay, trace organics; grey. 'Firm', moist, moderate to high plasticity sulphurous smell.	LUKEM		T			SPT				TCR: 100				

FINAL

Notes and Comments:
 End of Hole @ 13.15m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
25/10/22	17:00	0	2.15
26/10/22	11:00	0	11
14/11/22	10:27	1.027	10.8

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Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH103

Sheet : 2 of 3
 Hole Length : 13.15
 Scale @ A4 : 1:25

Commenced: 25/10/2022

Completed: 25/10/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399102.737
 RL: 1.583 m

Northing: 4912602.702
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR ROD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
	5.15	X	CORE LOSS				C	5.15		SNC							
	5.5	X	ORGANIC SILT, some clay; grey. 'Firm', moist, high plasticity. Sulphurous smell.					SPT 0/0 0/0 0/1 N = 1		SPT							
	6	X						5.95		SNC							
	6.30	X						6.30		SNC							
	6.95	X	6.95 Becomes wet		W			SPT 0/0 0/0 0/1 N = 1		SPT							
	7.25	X	CORE LOSS					7.25		SNC							
	7.5	X	ORGANIC SILT, some clay; grey. 'Firm', wet, high plasticity sulphurous smell.					SPT 0/0 0/0 0/1 N = 1		SPT							
	7.95	X						7.95		SNC							
	8.30	X						8.30		SNC							
	8.95	X						SPT 0/0 0/0 0/0 N = 1		SPT							
	9	X	Silty CLAY, minor sand and organic material, trace rootlets and shell fragments; greenish grey with black mottling. 'Firm', moist, high plasticity, sand, fine. Sulphurous smell		M			9		SNC							
	9.3	X	CORE LOSS					9.3		SNC							
	9.5	X	Silty CLAY, minor sand and organic material, trace rootlets and shell fragments; greenish grey with black mottling. Firm, moist, high plasticity, sand, fine. Sulphurous smell					SPT 0/0 0/0 0/0 N = 1		SPT							

FINAL

Notes and Comments:
 End of Hole @ 13.15m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
25/10/22	17:00	0	2.15
26/10/22	11:00	0	11
14/11/22	10:27	1.027	10.8



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH103
 Sheet : 3 of 3
 Hole Length : 13.15
 Scale @ A4 : 1:25

Commenced: 25/10/2022

Completed: 25/10/2022

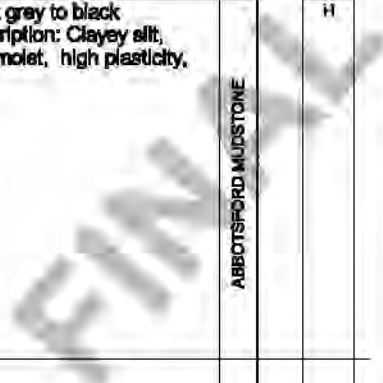
Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399102.737
 RL: 1.583 m

Northing: 4912602.702
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphical	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Coiling	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
	10.3		Silty CLAY, minor sand and organic material, trace rootlets and shell fragments; greenish grey with black mottling. Firm, moist, high plasticity, sand, fine. Sulphurous smell (continued from layer starting at 9.5m)	LKEM		F ¹		29/10									
	10.5		CORE LOSS														
	11.5		Silty CLAY, minor sand and organic material, trace rootlets and shell fragments; greenish grey with black mottling. 'Firm', moist, high plasticity, sand, fine. Sulphurous smell	LKEM		G		10.65									
	11.5																
	11.5		Sandy ORGANIC SILT, minor organic material (wood fragments); brown. 'Soft', moist,	ABBOTSFORD MUDSTONE		G ⁶		11.50									
	11.5																
	12.5		Unweathered to slightly weathered, dark grey to black MUDSTONE, extremely weak. Soil description: Clayey silt, minor sand, dark brown to black. Hard, moist, high plasticity, sand, fine.	ABBOTSFORD MUDSTONE		H		13/12									
	12.5																
	13.15		End of Hole @ 13.15m, TD														



Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023

Notes and Comments: End of Hole @ 13.15m Shear Vene: GEO937, 'MSW' - Municipal Solid Waste Refer to explanation sheets for abbreviation and symbols. Shear Vene values are corrected.	Inclination: Vertical		Orientation:		Ground Water Level			
	Contractor: Speight Drilling		Equipment: HD 800 Sonic		Date	Time	Reading (mgl)	Hole depth (mgl)
					25/10/22	17:00	0	2.15
				29/10/22	11:00	0	11	
				14/1/22	10:27	1.027	10.8	



Core Box 1, Depth: 0.0 to 2.4 m



Core Box 2, Depth: 2.4 to 4.8 m



Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 5, Depth: 9.6 to 12.0 m



Core Box 6, Depth: 12.0 to 14.4 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH104

Sheet : 1 of 2
 Hole Length : 9.95
 Scale @ A4 : 1:25

Commenced: 9/11/2022

Completed: 9/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399552.195
 RL: 6.473 m

Northing: 4912898.548
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
6.473	0.0		FILL: Clayey, fine to coarse gravel, some sand and silt; dark grey. Saturated, gravel, angular; sand, fine to coarse.		W												
	0.8		FILL: Silty clay, some silt and sand, trace gravel; orange. Wet, moderate to high plasticity.						SNC					TCR: 100			
	1.06		FILL: Fine to coarse sand, some silt, minor gravel; grey. Wet, gravel, fine to medium, angular; well graded.														
	1.8		CORE LOSS											TCR: 67			
	2.0													TCR: 100			
	2.5													TCR: 0			
	3.0													TCR: 0			
	3.5		FILL: MSW (60%), some wood fragments, minor sand and silt; dark grey. Wet, MSW containing metal pieces, soft/hard fragments, glass, paper materials.											TCR: 100			
	3.85		CORE LOSS											TCR: 0			
	4.0													TCR: 0			
	4.5		Slightly to unweathered, dark grey, MUDSTONE, extremely weak. Soil description: silty clay, minor sand. Very stiff, moist, high plasticity, sand, fine.	M		VSI								TCR: 100			

Notes and Comments:
 End of Hole @ 9.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical
 Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic
 SPT ETR: 64%

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mugl)
09/11/22	15:15	0.78	3.8
14/11/22	10:59	7.09	9.95

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 19 February 2023



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH104

Sheet : 2 of 2
 Hole Length : 9.95
 Scale @ A4 : 1:25

Commenced: 9/11/2022

Completed: 9/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399552.195
 RL: 6.473 m

Northing: 4912898.548
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR	Defect Spacing (mm)	Instrumentation Installation	Water level	
							Number / Type	Result										
			Slightly to unweathered, dark grey, MUDSTONE, extremely weak. Soil description: silty clay, minor sand. Very stiff, moist, high plasticity, sand, fine. (continued from layer starting at 4.5m)	ABBOTSFORD MUDSTONE					SNC		UW-SW		TCR: 100					
			Unweathered, dark brownish grey with black speckling, SILTSTONE, very weak.							SPT				TCR: 100				
											SNC				TCR: 100			
											SPT				TCR: 100			
										SNC				TCR: 100				
										SPT				TCR: 100				
										SNC				TCR: 100				
										SPT				TCR: 100				
										SNC				TCR: 100				
										SPT				TCR: 100				
									SNC				TCR: 100					

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 19 February 2023

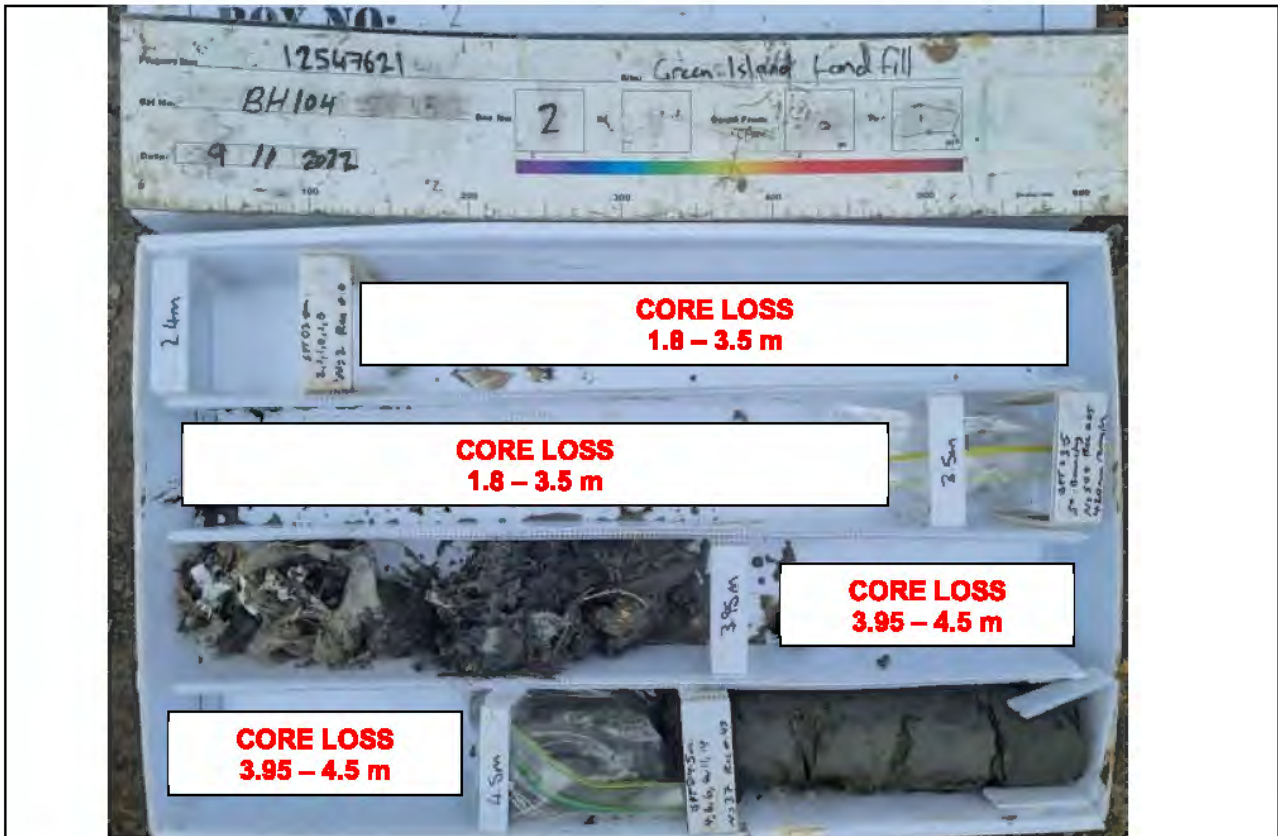
Notes and Comments:
 End of Hole @ 9.95m, TD
 End of Hole @ 9.95m
 Shear Vene: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vene values are corrected.

Inclination: Vertical
 Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic
 SPT ETR: 64%

Ground Water Level			
Date	Time	Reading (mug)	Hole depth (mug)
09/11/22	15:15	0.78	3.8
14/11/22	10:59	7.09	9.95



Core Box 1, Depth: 0.0 to 2.4 m



Core Box 2, Depth: 2.4 to 4.8 m



Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.95 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH105

Sheet : 1 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 3/11/2022

Completed: 3/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399518
 RL: 6.421 m

Northing: 4913038
 Datum: NZVD2016

System: NZTM2000
 Method: GPSH

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
6.421	0		TOPSOIL: Fibrous peat, some clay, minor rootlets; black with brown mottling. Moist.	TS	M												
	0.35		FILL: clay, some brick fragments, MSW (10%); light brown with red fragments. Wet; high plasticity.		W					SNC							
	0.8		FILL: Medium to coarse sand, some brick fragments, minor silt; dark grey. Wet. 0.75 Becomes trace brick fragments											TCR: 100			
	1.3		FILL: Clayey, medium to coarse gravel, some silt and sand, MSW (10%); dark blueish grey. Moist, gravel, angular; sand, fine; MSW containing glass, plastics; gap graded. 1.40 Colour becomes grey with light orangish brown matrix		M					SPT				TCR: 44			
	1.7		CORE LOSS											TCR: 0			
	2.5		FILL: wood fragments, some soil waste, MSW (10%); dark brown to black. Wet, MSW containing metals (aluminium, steel, copper), soft/hard plastics.		W					SPT				TCR: 100			
	3		FILL: Silty, fine to coarse gravel, some MSW; dark blue. Moist to wet; gravel, angular to subangular; MSW containing glass, metals, plastics; gap graded.		M-W					SNC				TCR: 100			
	3.55		CORE LOSS	FILL						SPT				TCR: 11			
	4.65		FILL: Fine to coarse gravel, some MSW, minor sand; dark blue to black. Wet, gravel, fine to coarse, angular; MSW containing plastic, glass, paper/cardboard; petrol smell.		W					SPT				TCR: 33			
	5.5		FILL: Silty clay, some sand, minor MSW; dark brown to black. Moist, moderate to high plasticity, MSW, plastic, glass, clothing materials; gravel, coarse, angular.		M					SPT				TCR: 100			
	6		CORE LOSS							SNC				TCR: 9			
	6.5		Sandy ORGANIC SILT, minor clay; dark to light brownish grey. 'Soft', moist, low moderate plasticity, sand, fine.			'S'				SPT				TCR: 100			
	6.8		Silty, fine SAND with MSW (10%), minor clay, trace organic material; orangish grey with black streaking. Very loose, moist.			VL				SNC				TCR: 100			
	7.20		7.20 Becomes some organic material, colour becomes orangish grey with black mottling	LKEM		F				SPT				TCR: 100			
	7.35		ORGANIC SILT, some sand, minor clay; dark brown. Firm, moist, low plasticity, sand, fine. Slight sulphurous smell							SPT				TCR: 100			

Notes and Comments:
 End of Hole @ 19.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical
 Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic
 SPT ETR: 64%

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
03/11/22	13:00	3.7	

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023

3-11-2022



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH105
 Sheet : 2 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 3/11/2022 Completed: 3/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399518 Northing: 4913038 System: NZTM2000
 RL: 6.421 m Datum: NZVD2016 Method: GPSH

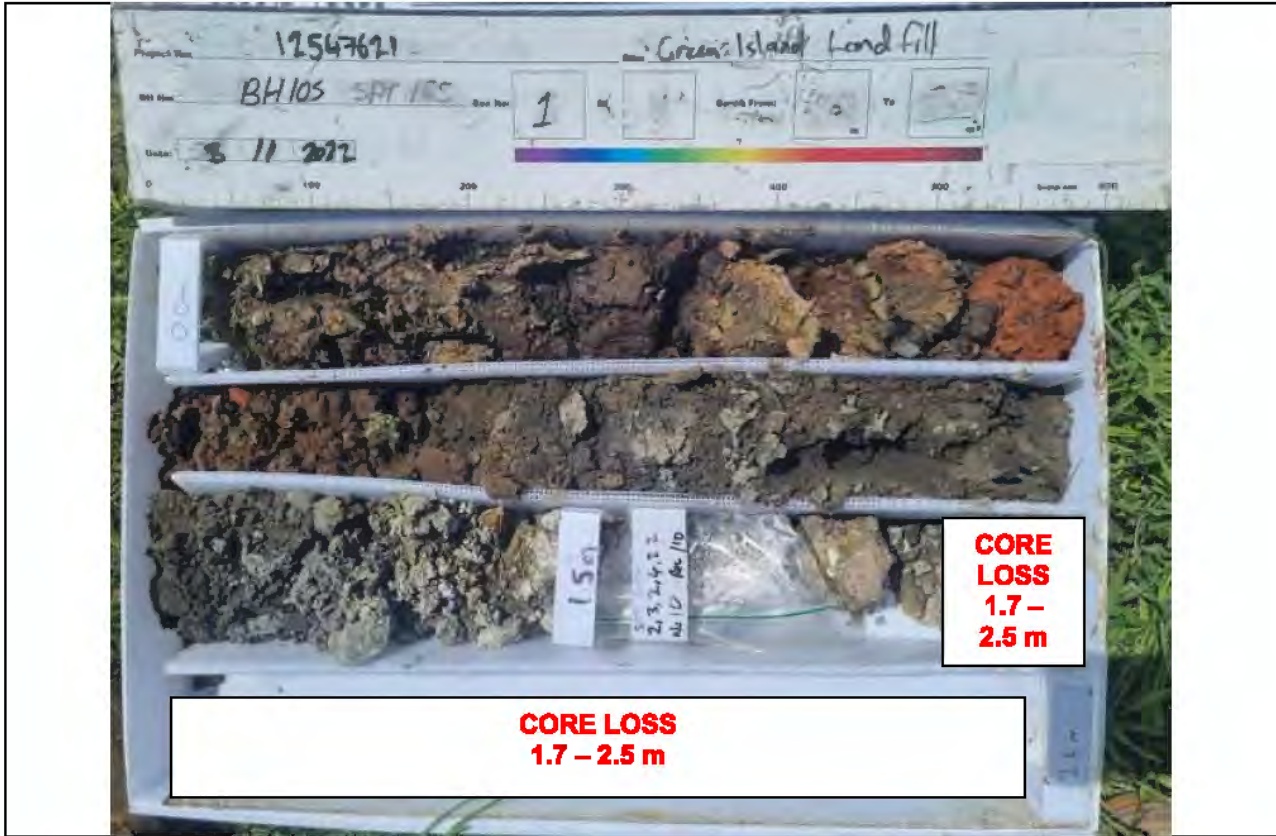
RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
-2	0.4	X X X X	SILT, some clay, minor sand; grey. 'Firm', dry to moist, high plasticity, sand, fine. (continued from layer starting at 6.0m)	LKEM	D-M	F	8.10	SPT	SNC				TCR: 100				
0	6.0	X X X X	Moderately weathered, orangish grey MUDSTONE, extremely weak. Soil description: Silty clay, minor sand; orangish grey. Very stiff, moist, high plasticity, sand, fine.		M	VSt	8.50	SPT 1/1 1/2 3/5 N=9	SPT			MW		TCR: 100			
3	9.5	X X X X	CORE LOSS						SNC				TCR: 46				
5	9.60	X X X X	Moderately weathered, orangish grey MUDSTONE, extremely weak. Soil description: Silty clay, minor sand; orangish grey. 'Stiff', moist, high plasticity, sand, fine. 9.60 Soil becomes some sand.			St	10.50	SPT 0/1 1/2 3/6 N=11	SPT				TCR: 100				
10	10.50	X X X X	10.50 Soft			S	10.50	SPT 0/1 1/3 0/1 N=2	SPT			MW	TCR: 100				
11	11.1	X X X X	CORE LOSS				10.55		SNC				TCR: 27				
12	11.5	X X X X	Slightly to unweathered, dark grey, MUDSTONE, extremely weak. Soil description: silty clay, minor sand. 'Hard', high plasticity, sand, fine.		M	H		SPT 1/3 6/4 5/7 N=21	SPT				TCR: 100				
13	13.5	X X X X	Unweathered, dark brownish grey with black glauconitic speckles, SILTSTONE, very weak.	ABBOTSFORD MUDSTONE				SPT 2/4 5/7 2/12 N=34	SPT			UW-SW	TCR: 100				
14	13.5	X X X X						SPT 2/4 6/11 19/19 N>50	SPT				TCR: 100				
15	13.5	X X X X						SPT 2/5 4/8 13/18 N=43	SPT			UW	TCR: 100				
16	13.5	X X X X						SPT 3/8 40/10 for 75mm N>50	SPT				TCR: 100				

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023

Notes and Comments:
 End of Hole @ 19.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic
 SPT ETR: 64%

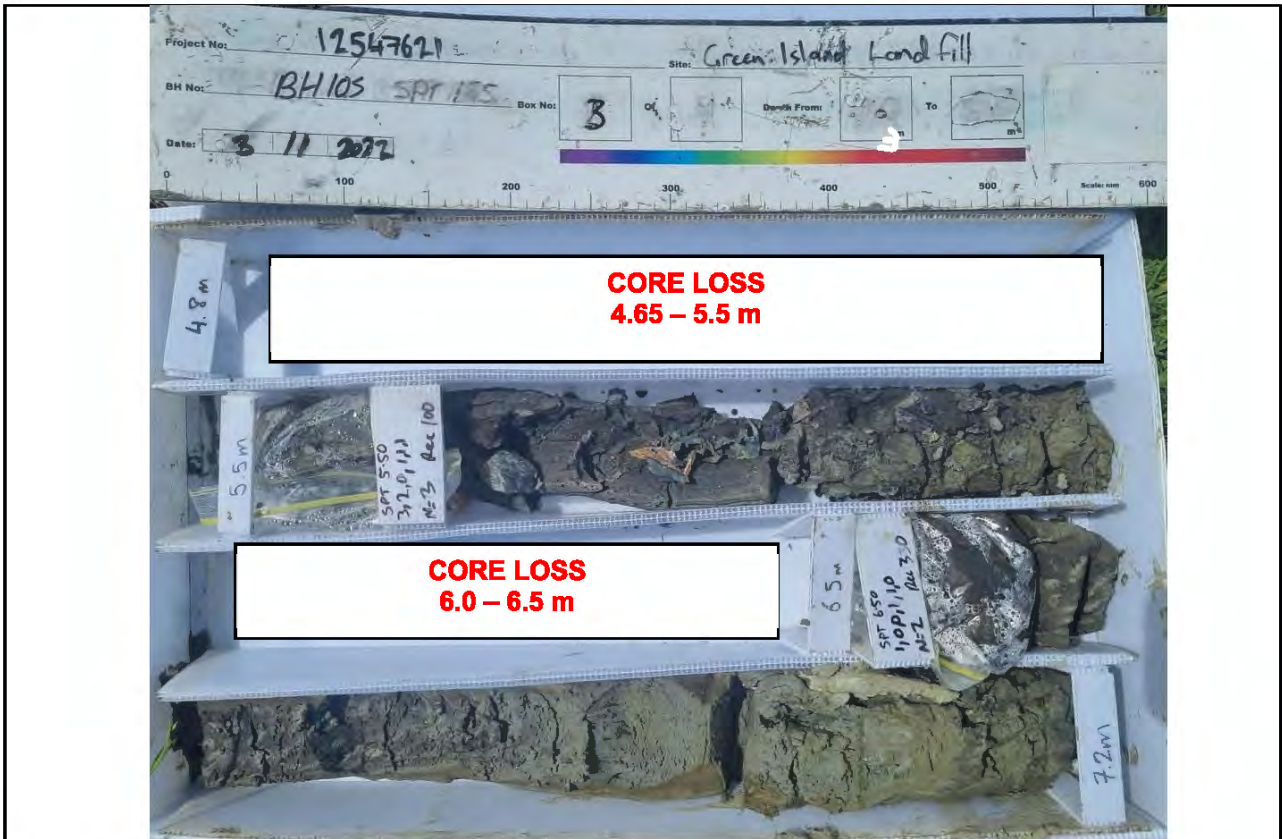
Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mgl)
03/11/22	13:00	3.7	



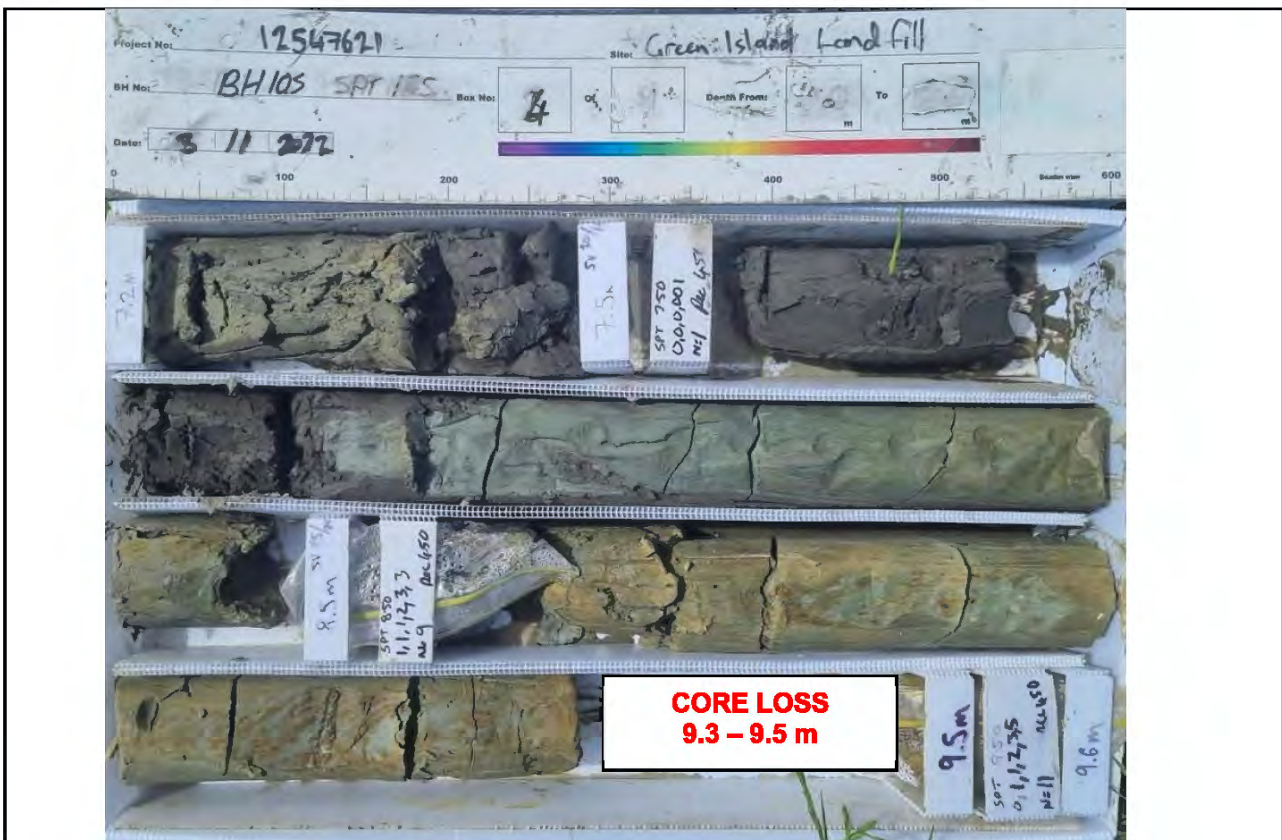
Core Box 1, Depth: 0.0 to 2.4 m



Core Box 2, Depth: 2.4 to 4.8 m



Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 5, Depth: 9.6 to 12.0 m



Core Box 6, Depth: 12.0 to 14.4 m



Core Box 7, Depth: 14.4 to 16.8 m



Core Box 8, Depth: 16.8 to 19.2 m



Core Box 9, Depth: 19.2 to 21.0



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH106

Sheet : 1 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 8/11/2022

Completed: 8/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399558.84
 RL: 6.603 m

Northing: 4913069.214
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
6.603	0		FILL: Fine to coarse gravel, minor sand and MSW (10%); dark grey to black. Wet, gravel, angular; sand, coarse; MSW contains metal, plastic, glass well graded. Slicked in oil like liquid.		W												
	0.9		CORE LOSS							SNC							
	1.5		FILL: Clayey, wood fragments, some soil waste, MSW (10%), trace gravel and rootlets; dark brown. Wet, MSW contains paper/cardboard, metal, glass.														
	1.8		CORE LOSS					SPT 5/4 8/2 1/1 N = 12		SPT				TCR: 67			
	2.5		FILL: Clayey, fine to coarse gravel, some soil waste, silt and wood fragments, minor sand and MSW (10%), trace organics; dark brown. Moist, gravel, angular to subangular; MSW contains organic waste, soft plastics; sand, fine to coarse; gap graded.		M												
	2.5		CORE LOSS					SPT 1/1 2/8 5/5 N = 21		SPT				TCR: 100			
	3.5		FILL: Fine to coarse gravel, minor wood fragments and soil waste, trace sand, blueish grey. Gravel, angular; sand, coarse.														
	3.95		CORE LOSS					SPT 4/4 3/2 2/2 N = 9		SPT				TCR: 100			
	4.5		FILL: Fine to coarse gravel, minor wood fragments and soil waste, trace sand, blueish grey. Gravel, angular; sand, coarse.														
	4.95		FILL: Clayey, fine to coarse gravel, some soil waste, silt and wood fragments, minor sand and MSW (10%), trace organics; dark brown. Moist, gravel, angular to subangular; MSW contains soft plastics; sand, fine to coarse.														
	4.95		CORE LOSS					SPT 3/6 5/2 2/2 N = 11		SPT				TCR: 100			
	5.5		FILL: Clayey, fine to coarse gravel, some soil waste, silt, minor sand and MSW (10%); dark brown. Moist, gravel, angular to subangular; MSW contains organic soft plastics; sand, fine to coarse; gap graded.														
	5.95		CORE LOSS					SPT 1/2 1/2 2/3 N = 8		SPT				TCR: 100			
	6.5		FILL: Clayey, fibrous peat, some silt and soil waste, minor gravel, sand and MSW (10%); black with grey matrix. Moist, moderate to high plasticity, MSW contains plastic; gravel, medium, angular; sand, fine to coarse.														
	6.95		CORE LOSS					SPT 1/0 1/0 1/1 N = 3		SPT				TCR: 100			
	7.5		Clayey ORGANIC SILT; dark brown. 'Very soft', moist, high plasticity. Sulphurous smell.	LKEM		'vs'											
								SPT 0/0 0/0 0/0 N = 0		SPT				TCR: 100			

Notes and Comments:
 End of Hole @ 19.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical
 Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic
 SPT ETR: 64%

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
08/11/22	12:32	2.41	19.95

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023

6-11-2022



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH106

Sheet : 2 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 8/11/2022

Completed: 8/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399558.84
 RL: 6.803 m

Northing: 4913069.214
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR	Defect Spacing (mm)	Instrumentation Installation	Water level		
							Number / Type	Result											
			Clayey ORGANIC SILT; dark brown. 'Very soft', moist, high plasticity. Sulphurous smell. (continued from layer starting at 7.5m)	LKEM		St	7.85			SNC				TCR: 100					
			8.50 Becomes stiff greenish grey silt									SPT				TCR: 100			
			9.50 Becomes sandy									SPT				TCR: 100			
			Moderately weathered, orangish grey MUDSTONE, extremely weak, soil description: Silty clay, minor sand; orangish grey. 'Very stiff', moist, high plasticity, sand, fine.	M		VSH	8.86			SNC		MW		TCR: 100					
			CORE LOSS																
			Slightly to unweathered, dark grey, MUDSTONE, extremely weak. Soil description: silty clay, minor sand. 'Hard', moist, high plasticity, sand, fine.	M		H				SPT		LW-SW		TCR: 100					
			Unweathered, dark brownish grey with black glauconitic speckles, SILTSTONE, very weak.	ABBOTSFORD MUDSTONE						SNC			TCR: 100						
												SPT				TCR: 100			
												SNC				TCR: 100			
												SPT				TCR: 100			
												SNC				TCR: 100			
												SPT				TCR: 100			
												SNC				TCR: 100			
									SPT				TCR: 100						
									SNC				TCR: 100						
									SPT				TCR: 100						
									SNC				TCR: 100						
									SPT				TCR: 100						
									SNC				TCR: 100						
									SPT				TCR: 100						

FINAL

Notes and Comments:

End of Hole @ 19.95m
 Shear Vane: GEC937, 'MSW' - Municipal Solid Waste

Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical

Orientation:

Ground Water Level

Contractor: Speight Drilling
 Equipment: HD 900 Sonic

Date	Time	Reading (mbgl)	Hole depth (mgl)
08/11/22	12:32	2.41	19.86

SPT ETR: 64%



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

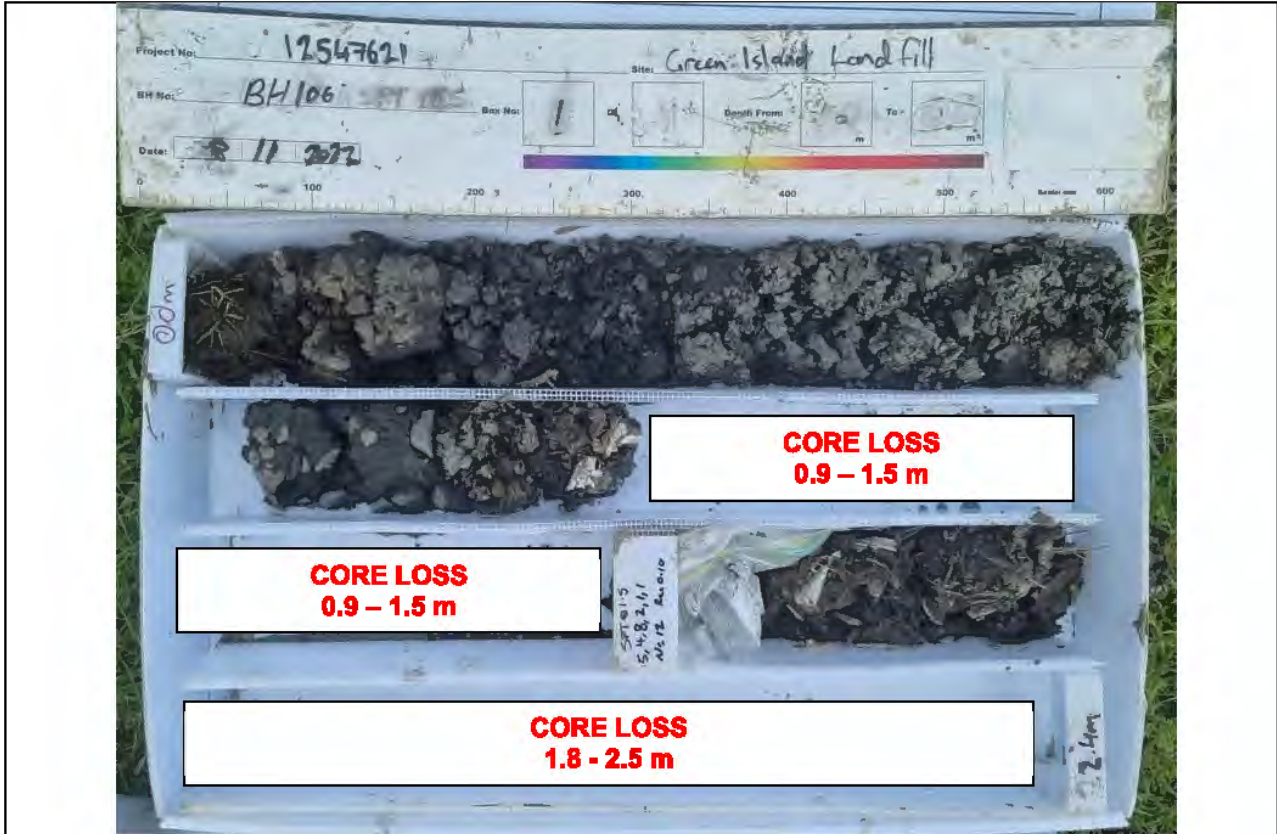
Hole No. : BH106
 Sheet : 3 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 8/11/2022 Completed: 8/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399558.84 Northing: 4913069.214 System: NZTM2000
 RL: 6.803 m Datum: NZVD2016 Method: SURVEY

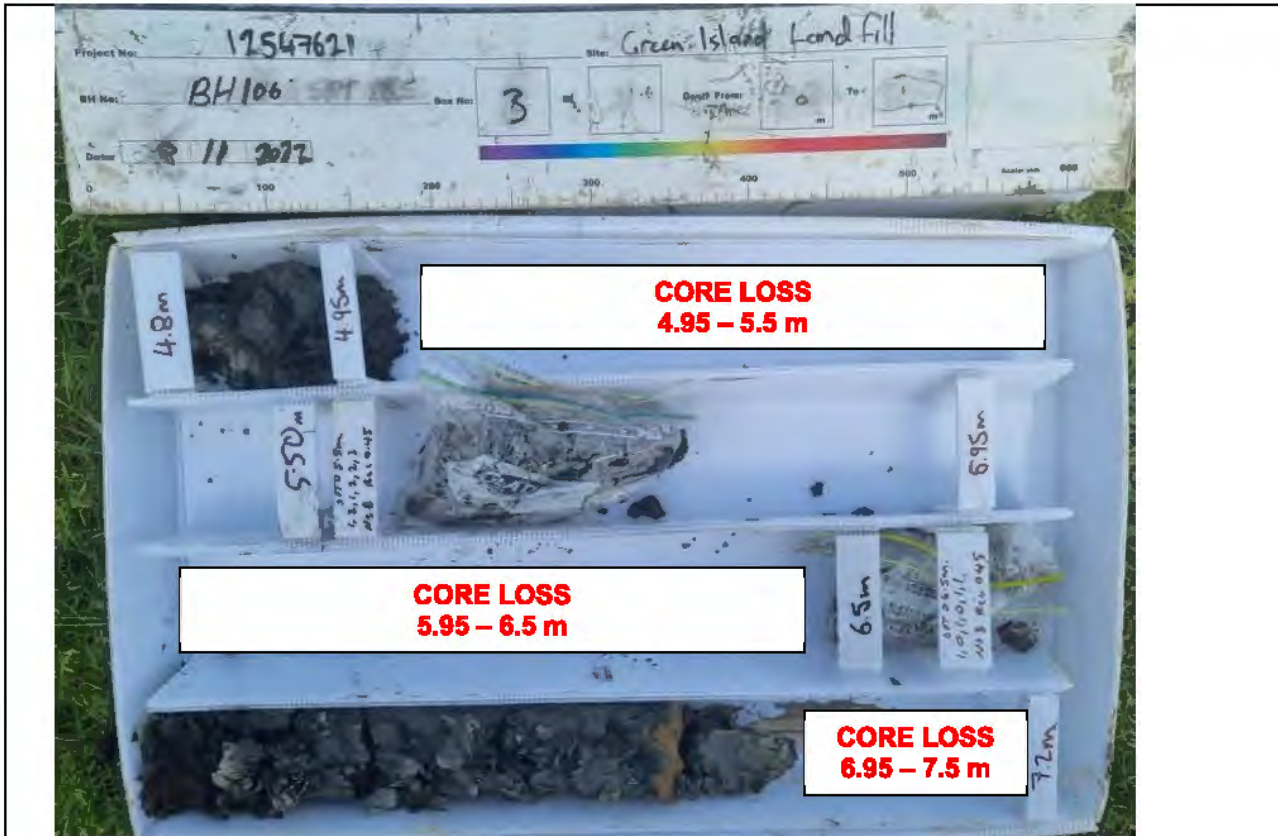
RL (m)	Depth (m)	Graphite	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Coiling	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RCD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level											
							Number / Type	Result																				
-10	10		Unweathered, dark brownish grey with black glauconitic speckles, SILTSTONE, very weak. (continued from layer starting at 11.5m)	ABBOTSFORD MUDSTONE			SPT 6/14	28/24 for 25mm N > 50		SNC		LW		TCR: 100														
-11	11	SPT 7/8					17/18 for 25mm N > 50											SNC	SPT	TCR: 100								
-12	12	SPT 8/10																			16/21 for 25mm N > 50	SNC	SPT	TCR: 100				
-13	13	SPT 9/10																							16/21 for 25mm N > 50	SNC	SPT	TCR: 100
-14	14	SPT 10/10																										
-15	15	SPT 11/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-16	16	SPT 12/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-17	17	SPT 13/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-18	18	SPT 14/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-19	19	SPT 15/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-20	20	SPT 16/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-21	21	SPT 17/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-22	22	SPT 18/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-23	23	SPT 19/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-24	24	SPT 20/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-25	25	SPT 21/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-26	26	SPT 22/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-27	27	SPT 23/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-28	28	SPT 24/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-29	29	SPT 25/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-30	30	SPT 26/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-31	31	SPT 27/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-32	32	SPT 28/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-33	33	SPT 29/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-34	34	SPT 30/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-35	35	SPT 31/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-36	36	SPT 32/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-37	37	SPT 33/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-38	38	SPT 34/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-39	39	SPT 35/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-40	40	SPT 36/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-41	41	SPT 37/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-42	42	SPT 38/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-43	43	SPT 39/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-44	44	SPT 40/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-45	45	SPT 41/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-46	46	SPT 42/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-47	47	SPT 43/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-48	48	SPT 44/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-49	49	SPT 45/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-50	50	SPT 46/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-51	51	SPT 47/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-52	52	SPT 48/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-53	53	SPT 49/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-54	54	SPT 50/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-55	55	SPT 51/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-56	56	SPT 52/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-57	57	SPT 53/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-58	58	SPT 54/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-59	59	SPT 55/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-60	60	SPT 56/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-61	61	SPT 57/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-62	62	SPT 58/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-63	63	SPT 59/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-64	64	SPT 60/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-65	65	SPT 61/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-66	66	SPT 62/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-67	67	SPT 63/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-68	68	SPT 64/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-69	69	SPT 65/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-70	70	SPT 66/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-71	71	SPT 67/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-72	72	SPT 68/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-73	73	SPT 69/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-74	74	SPT 70/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-75	75	SPT 71/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-76	76	SPT 72/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-77	77	SPT 73/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-78	78	SPT 74/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-79	79	SPT 75/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-80	80	SPT 76/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-81	81	SPT 77/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-82	82	SPT 78/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-83	83	SPT 79/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-84	84	SPT 80/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-85	85	SPT 81/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-86	86	SPT 82/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-87	87	SPT 83/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-88	88	SPT 84/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-89	89	SPT 85/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-90	90	SPT 86/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-91	91	SPT 87/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-92	92	SPT 88/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-93	93	SPT 89/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-94	94	SPT 90/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-95	95	SPT 91/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-96	96	SPT 92/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-97	97	SPT 93/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-98	98	SPT 94/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-99	99	SPT 95/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-100	100	SPT 96/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-101	101	SPT 97/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-102	102	SPT 98/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-103	103	SPT 99/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-104	104	SPT 100/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-105	105	SPT 101/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-106	106	SPT 102/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-107	107	SPT 103/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-108	108	SPT 104/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-109	109	SPT 105/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-110	110	SPT 106/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-111	111	SPT 107/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-112	112	SPT 108/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-113	113	SPT 109/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-114	114	SPT 110/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-115	115	SPT 111/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-116	116	SPT 112/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-117	117	SPT 113/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-118	118	SPT 114/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-119	119	SPT 115/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						
-120	120	SPT 116/10	16/21 for 25mm N > 50	SNC	SPT	TCR: 100																						
-121	121	SPT 117/10					16/21 for 25mm N > 50	SNC	SPT	TCR: 100																		
-122	122	SPT 118/10									16/21 for 25mm N > 50	SNC	SPT	TCR: 100														
-123	123	SPT 119/10													16/21 for 25mm N > 50	SNC	SPT	TCR: 100										
-124	124	SPT 120/10																	16/21 for 25mm N > 50	SNC	SPT	TCR: 100						



Core Box 1, Depth: 0.0 to 2.4 m



Core Box 2, Depth: 2.4 to 4.8 m



Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 5, Depth: 9.6 to 12.0 m



Core Box 6, Depth: 12.0 to 14.4 m



Core Box 7, Depth: 14.4 to 16.8 m



Core Box 8, Depth: 16.8 to 19.2 m



Core Box 9, Depth: 19.2 to 19.95 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH107

Sheet : 1 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 26/10/2022

Completed: 26/10/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399344.222

Northing: 4913220.511

System: NZTM2000

RL: 6.872 m

Datum: NZVD2016

Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
6.872	0.15		FILL: Gravely silt, some grass and rootlets, dark brown. Moist, low plasticity.	M													
	0.45		FILL: Fine to coarse gravel, minor silt and sand, grey to dark grey. Moist to wet, gravel, angular; sand, fine to coarse.	M-W													
	0.95		FILL: Clayey silt, minor organics and MSW (10%); brown with black and orange mottling. Moist, low plasticity.	M													
	1.15		FILL: Gravely silt, minor soil waste grey to brown. Moist, gravel, medium to coarse, angular.														
	1.95		FILL: Silt, some sand, trace gravel; grey with light brown streaking. Moist, sand, fine; gravel, fine, angular; MSW contains glass, organics.	M			SPT 0/0 1/6 N=7							TCR: 100			
	3.1		FILL: Fine to coarse sand, minor gravel; dark bluish grey. Wet, gravel, fine to medium, rounded.														
	3.3		FILL: Sandy, fine to coarse gravel, minor silt; dark grey. Wet, gravel, fine, rounded; sand, fine to coarse.														
	3.95		FILL: Clayey silt; some plastic waste; light brown. Wet, high plasticity.														
	4.2		FILL: MSW (80%) with gravel, some silt, minor sand; dark brownish grey. Loose, moist to wet, MSW contains soft/hard plastic, metal pieces, wood fragments; gravel, fine to coarse, angular; sand, fine to coarse.	M-W			SPT 0/0 3/2 2/2 N=9										
	6.05		Gravely SILT with MSW (20%), some organic material; dark bluish grey to grey. Moist; gravel, fine to medium, angular; MSW contains glass and plastic.	M			SPT 0/0 0/2 2/2 N=6										
	7.5		Clayey ORGANIC SILT, minor sand; brown. 'Very soft', wet, high plasticity, sand, fine.	LKEM		VS'	SPT 0/0 0/1 0/1 N=2										

Notes and Comments: End of Hole @ 19.95m Shear Vane: GEO937, 'MSW' - Municipal Solid Waste	Inclination: Vertical	Orientation:	Ground Water Level		
	Contractor: Speight Drilling	Equipment: HD 800 Sonic	Date: 26/10/22	Time: 17:00	Reading (mbgl): 0
Refer to explanation sheets for abbreviation and symbols. Shear Vane values are corrected.	SPT ETR: 64%				

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH107

Sheet : 2 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 26/10/2022

Completed: 26/10/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399344.222
 RL: 6.872 m

Northing: 4913220.511
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR (MPa)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
	0.15		CORE LOSS														
	0.5		Clayey ORGANIC SILT, minor sand; brown. 'Very soft', wet, high plasticity, sand, fine.				SPT 0/0 0/1 N=1			SNC				TCR: 27			
	4.0						SPT 0/0 0/1 N=3			SPT				TCR: 100			
	10.5		Sandy SILT, trace organics and shell fragments; grey with orange mottling. 'Very soft', moist, low plasticity, sand, fine to medium	M	VS'		SPT 0/0 0/1 N=1			SPT				TCR: 100			
	10.5						SPT 0/0 0/1 N=1			SNC				TCR: 100			
	12.0						SPT 0/0 0/1 N=1			SPT				TCR: 68			
	12.0						SPT 0/0 0/1 N=4			SNC				TCR: 100			
	13.0						SPT 0/0 0/1 N=4			SPT				TCR: 73			
	13.0						SPT 0/0 0/1 N=4			SNC				TCR: 100			
	14.0		Clayey ORGANIC SILT, minor sand; brown. 'Very soft', wet, high plasticity, sand, fine.	W	VS'		SPT 0/0 0/1 N=4			SPT				TCR: 100			
	14.0		Silty, fine to medium SAND, grey to brownish grey. 'Loose', moist.	M	L		SPT 0/0 0/1 N=4			SNC				TCR: 100			
	14.0		14.40 Sand becomes fine to coarse				SPT 0/0 0/1 N=4			SNC				TCR: 100			
	14.75		COBBLE, some gravel; black with white flecks. Very dense, moist, cobble, angular; gravel, medium to coarse, angular.		VD		SPT 15/50 for Drm bouncing @ 50 mm			SNC				TCR: 100			
	15.0		Moderately weathered SILTSTONE, extremely weak. Soil description: silt, minor sand; greenish grey with orange mottling. Hard, wet, low plasticity, sand, fine.	W	H'		SPT 5/8 7/12 19/15 N>50			SPT				TCR: 100			

FINAL

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023

Notes and Comments: End of Hole @ 19.95m Shear Vene: GEO937, 'MSW' - Municipal Solid Waste Refer to explanation sheets for abbreviation and symbols. Shear Vene values are corrected.	Inclination: Vertical	Orientation:	Ground Water Level		
	Contractor: Speight Drilling Equipment: HD 900 Sonic		Date: 26/10/22	Time: 17:00	Reading (mbgl): 0 Hole depth (mbgl): 20
SPT ETR: 64%					



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH107
 Sheet : 3 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 26/10/2022

Completed: 26/10/2022

Logged : NP

Easting: 1399344.222

Northing: 4913220.511

System: NZTM2000

Processed : NP

RL: 6.872 m

Datum: NZVD2016

Method: SURVEY

Checked : DB

RL (m)	Depth (m)	Graphical	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level	
							Number / Type	Result										
			Moderately weathered SILTSTONE, extremely weak. Soil description: silt, minor sand; greenish gray with orange mottling. Hard, wet, low plasticity, sand, fine. (continued from layer starting at 14.8m)	ABBOTSFORD MUDSTONE			SPT 3/6 8/10 10/12 N= 38		SNC				TCR: 100					
							SPT 3/4 3/9 11/12 N= 40							TCR: 100				
							SPT 5/7 11/12 14/12 for 85mm N> 50						SW					
							SPT 4/5 2/16 16/11 for 85mm N> 60											
			End of Hole @ 19.95m, TD															

FINAL

Notes and Comments:

End of Hole @ 19.95m

Shear Vane: GEO937, 'MSW' - Municipal Solid Waste

Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical

Orientation:

Ground Water Level

Contractor: Speight Drilling

Equipment: HD 900 Sonic

SPT ETR: 64%

Date	Time	Reading (mbgl)	Hole depth (mbgl)
29/10/22	17:00	0	20



Core Box 1, Depth: 0.0 to 2.4 m



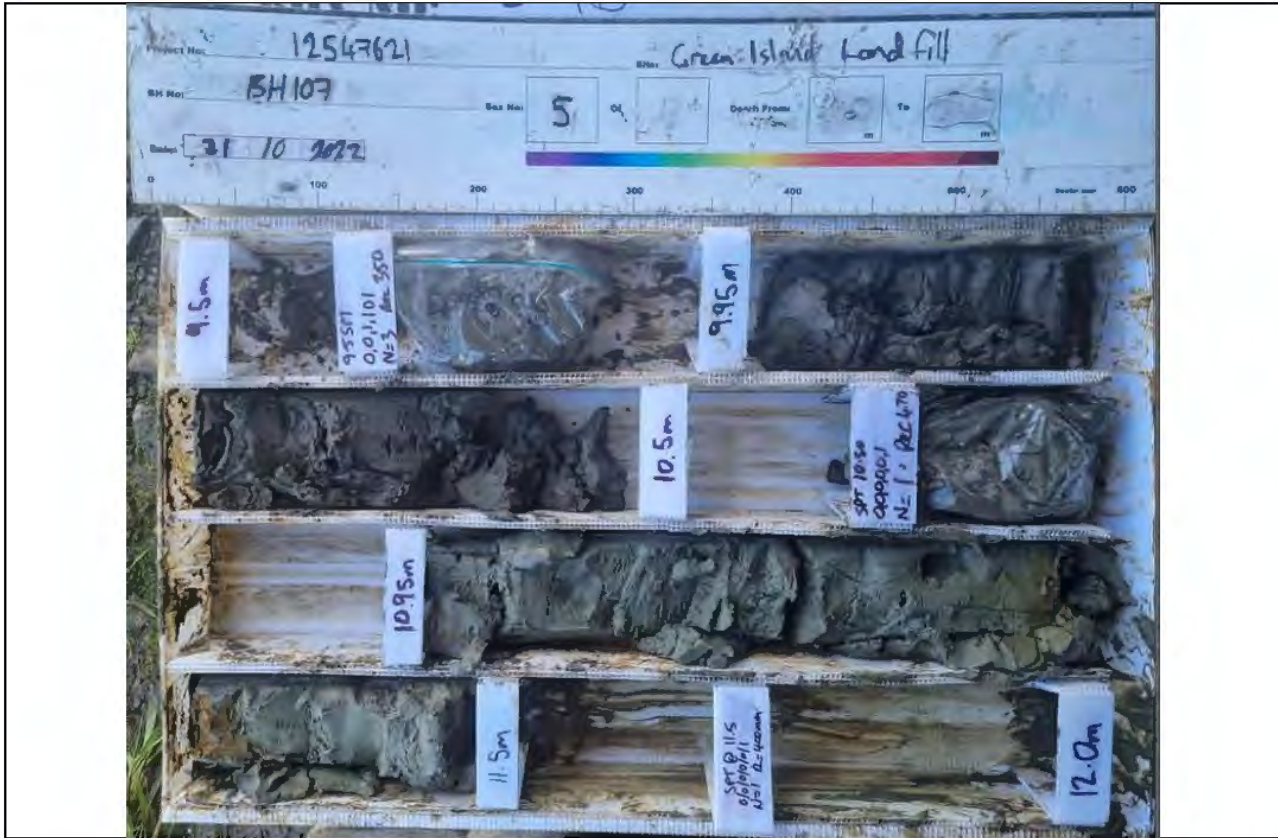
Core Box 2, Depth: 2.4 to 4.8 m



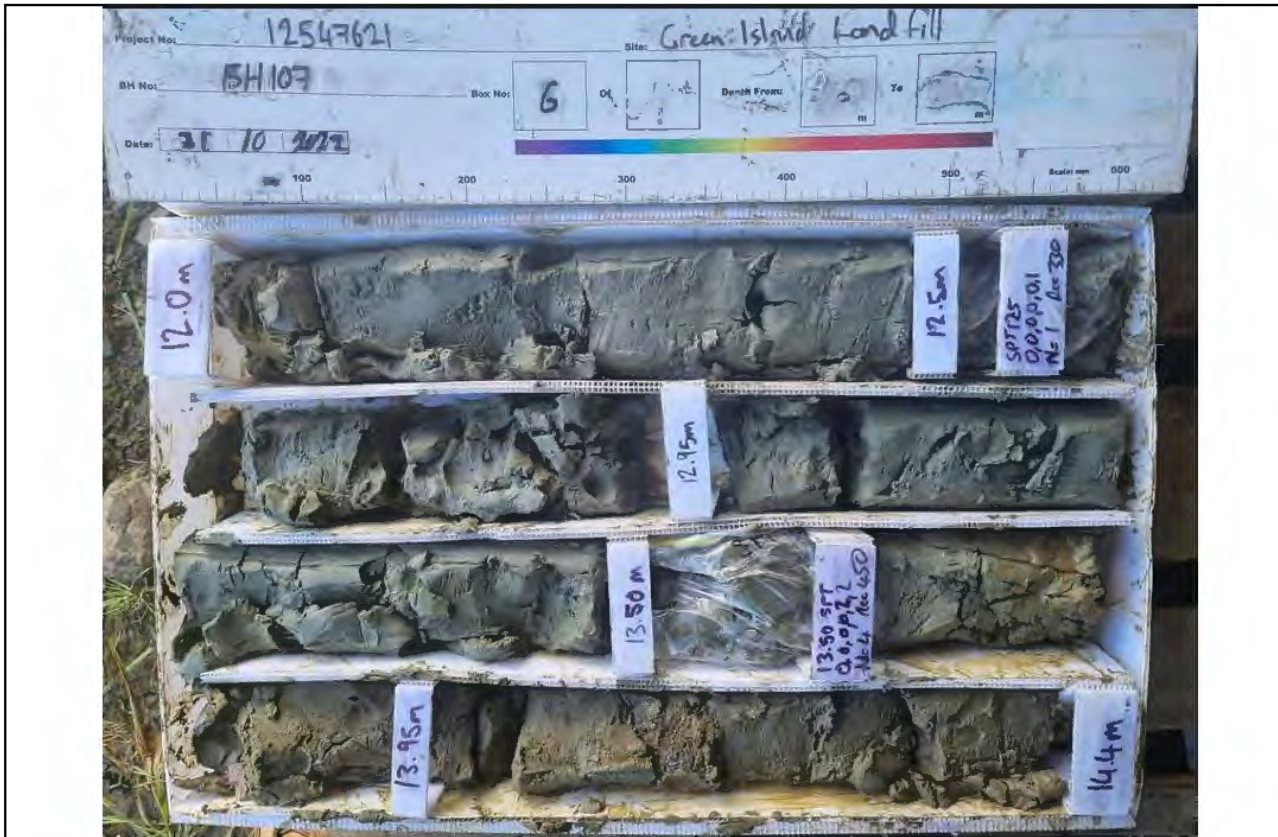
Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 8.8 m



Core Box 5, Depth: 9.8 to 12.0 m



Core Box 6, Depth: 12.0 to 14.4 m



Core Box 7, Depth: 14.4 to 16.8 m



Core Box 8, Depth: 16.8 to 19.2 m



Core Box 9, Depth: 19.2 to 20 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Land Fill Dunedin
 Job Number: 12547621

Hole No. : BH107A

Sheet : 1 of 1
 Hole Length : 4.5 m
 Scale @ A4 : 1:40

Commenced: 10/26/2022

Completed: 10/26/2022

Logged : NP

Processed : NP

Checked : DB

Easting: Northing:
 RL: m Datum:

System: NZTM2000
 Method:

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
0.15	0.15		TOPSOIL: clayey silt, some sand; brown. Wet, low to moderate plasticity.	M													
0.6	0.6		FILL: Sandy fine to medium gravel, brown. Wet, sand, fine to coarse; gravel, angular.														
1.0	1.0		FILL: Sandy clay, some silt, minor gravel; dark grey. Wet, sand, fine to coarse; gravel, fine to coarse, subangular to subrounded.														
1.5	1.5		FILL: Soil waste with MSW, some sand (20%); dark blueish grey. Wet, MSW contains plastic, glass, metal; sand, medium to coarse.				SPT 3/3 3/2 3/5 N=11										
2.0	2.0			FILL													
3.0	3.0		2.95 - 3.50 Some fine to coarse gravel present	W			SPT 0/1 1/1 1/5 N=6										
4.0	4.0						SPT 3/2 6/4 5/7 N=21										
4.5	4.5		Refusal on metals in waste End of Hole @ 4.5m, R														
5.0	5.0																
6.0	6.0																
7.0	7.0																
8.0	8.0																

FINAL

Notes and Comments:

End of Hole @ 4.5m
 Shear Vene: GEC837

Refer to explanation sheets for abbreviation and symbols.
 Shear Vene values are corrected.

Inclination: Vertical

Orientation:

Ground Water Level

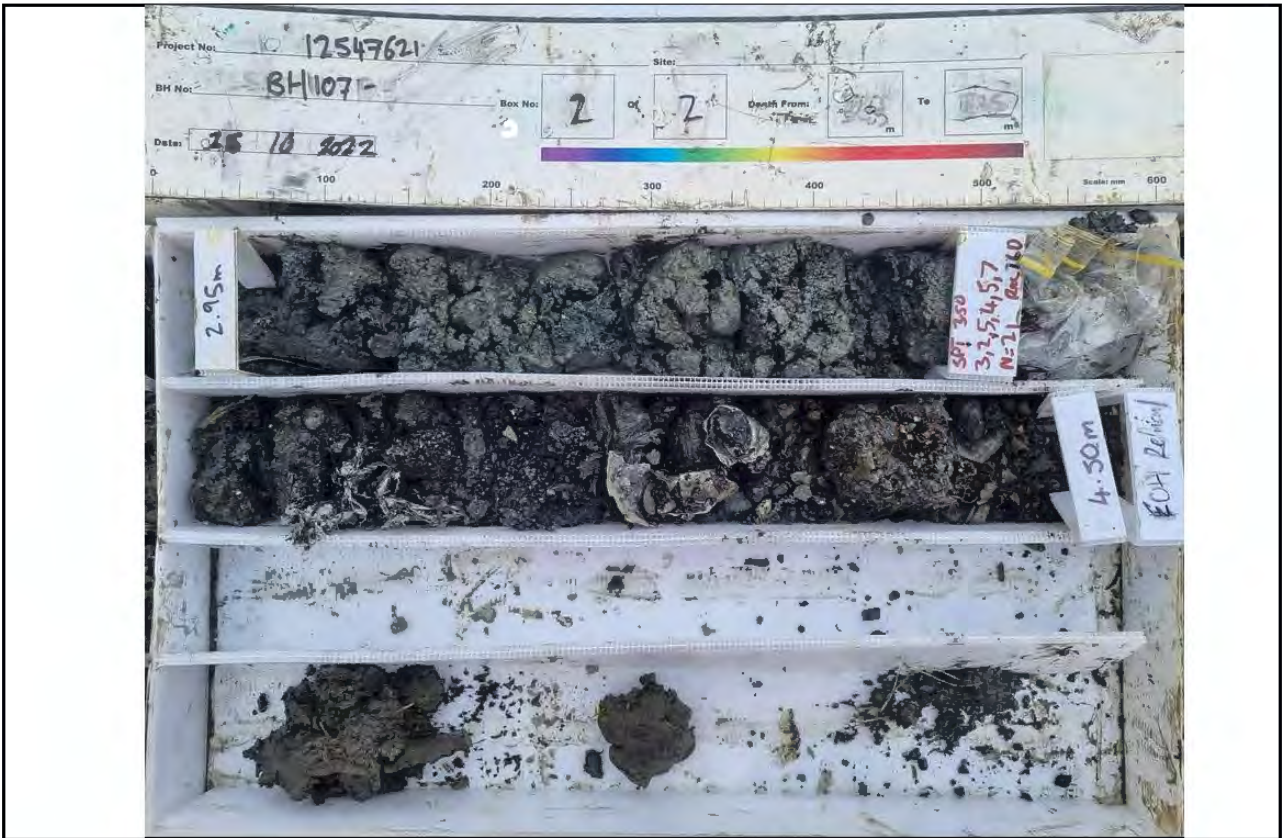
Contractor: Spelght Drilling
 Equipment: HD 900 Sonic

Date	Time	Reading (mbgl)	Hole depth (mbgl)

SPT ETR: 64%



Core Box 1, Depth: 0.0 to 2.95 m



Core Box 2, Depth: 2.95 to 4.5 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH108

Sheet : 1 of 3
 Hole Length : 20.85
 Scale @ A4 : 1:40

Commenced: 8/11/2022

Completed: 8/11/2022

Logged : NP

Easting: 1399316.458

Northing: 4912713.655

System: NZTM2000

Processed : NP

RL: 12.344 m

Datum: NZVD2016

Method: SURVEY

Checked : DB

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
12.0	0		FILL: clay, some silt, minor sand, trace gravel, light orangish grey. Moist, moderate to high plasticity, sand, fine to medium; gravel, fine to medium, angular.	M													
11.5	0.5								SNC				TCR: 100				
11.0	1.0								SPT				TCR: 100				
10.5	1.5								SNC				TCR: 100				
10.0	2.0		FILL: soil waste, some clay, MSW (10%), trace gravel; dark grey to black. Moist; MSW contains rubber, plastic, glass, metal, paper/cardboard, gravel, fine to medium, angular.						SPT				TCR: 100				
9.5	2.5								SNC				TCR: 100				
9.0	3.0								SPT				TCR: 100				
8.5	3.5		CORE LOSS						SPT				TCR: 0				
8.0	4.0								SNC				TCR: 0				
7.5	4.5		FILL: soil waste, some clay, MSW (10%), trace gravel; dark grey to black. Moist, MSW contains rubber, brick fragments, plastic, glass, metal, paper/cardboard, gravel, fine to medium, angular.						SPT				TCR: 100				
7.0	5.0								SNC				TCR: 64				
6.5	5.5		CORE LOSS						SPT				TCR: 100				
6.0	6.0		FILL: MSW (60%) with some soil waste, trace gravel; dark grey to black. Moist, MSW contains rubber, brick fragments, plastic, glass, metal, paper/cardboard; gravel, fine to medium, angular. [FILL]						SNC				TCR: 9				
5.5	6.5								SPT				TCR: 33				
5.0	7.0		FILL: MSW (60%) with some soil waste, trace gravel; dark grey to black. Moist, MSW contains rubber, brick fragments, plastic, glass, metal, paper/cardboard; gravel, fine to medium, angular. [FILL]						SNC				TCR: 0				
4.5	7.5								SPT				TCR: 67				
4.0	8.0		FILL: MSW (60%) with some soil waste, trace gravel; dark grey to black. Moist, MSW contains rubber, brick fragments, plastic, glass, metal, paper/cardboard; gravel, fine to medium, angular. [FILL]														

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023

Notes and Comments:
 End of Hole @ 20.85m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste

Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic

SPT ETR: 64%

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
09/11/22	09:15	3.82	20.85
14/11/22	11:35	5.27	20.85



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH108

Sheet : 2 of 3
 Hole Length : 20.85
 Scale @ A4 : 1:40

Commenced: 8/11/2022

Completed: 8/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399316.458
 RL: 12.344 m

Northing: 4912713.655
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
8.5	7.50		7.50 Gravel becomes fine to coarse CORE LOSS (continued from layer starting at 7.8m)						SNC				TCR: 0				
8.5	8.5		FILL: soil waste, some clay, MSW (10%), trace gravel; dark grey to black. Moist, MSW contains rubber, brick fragments, plastic, glass, metal, paper/cardboard, gravel, fine to medium, angular.				SPT 3/6 7/3 3/4 N = 17		SPT				TCR: 100				
9.5	9.5		CORE LOSS				SPT 3/3 4/3 4/3 N = 14		SPT				TCR: 100				
9.5	10.5		CORE LOSS				SPT 5/5 7/5 8/6 N = 26		SPT				TCR: 100				
10.5	11.2		FILL: MSW (60%) with some soil waste, trace gravel; dark grey to black. Moist, MSW contains rubber, brick fragments, plastic, glass, metal, paper/cardboard; gravel, fine to medium, angular. [FILL]	FILL			SPT 50 for 10min bouncing @ 10 min		SNC				TCR: 45				
11.2	11.2		CORE LOSS - pushing tyre				SPT 30/20 for 15min bouncing @ 90 min		SPT				TCR: 0				
11.2	13.5		CORE LOSS				SPT 9/8 3/2 2/2 N = 9		SNC				TCR: 0				
13.5	13.5		Clayey ORGANIC SILT, trace sand; dark brown. 'Very soft', wet, high plasticity.		W	'VS'			SPT				TCR: 100				
13.5	13.95		CORE LOSS						SNC				TCR: 0				
13.95	14.5		Sandy SILT, some organics, minor clay; dark brown. 'Very soft', wet, high plasticity.	LKEM			SPT 0/0 0/0 0/0 N = 0		SNC				TCR: 100				
14.5	15.15		CORE LOSS						SNC				TCR: 63				
15.15	15.5		ORGANIC SILT, minor clay, minor sand; dark brown. 'Very soft', wet, high plasticity.				SPT 0/0 0/0 0/0 N = 0		SPT				TCR: 100				

FINAL

Notes and Comments:

End of Hole @ 20.85m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste

Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical

Orientation:

Contractor: Speight Drilling
 Equipment: HD 900 Sonic

Ground Water Level

Date	Time	Reading (mbgl)	Hole depth (mbgl)
09/11/22	09:15	3.82	20.85
14/11/22	11:35	5.27	20.85

SPT ETR: 64%



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH108

Sheet : 3 of 3
 Hole Length : 20.85
 Scale @ A4 : 1:40

Commenced: 8/11/2022

Completed: 8/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399316.458
 RL: 12.344 m

Northing: 4912713.855
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Coiling	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
16.2	16.2		Moderately weathered, orangish grey MUDSTONE, extremely weak. Soil description: Silty clay, trace sand; orangish grey. Very stiff, moist, high plasticity, sand, fine.	LKEM	M	VSR	15.85	SPT 0/1	SNC					TCR: 100			
17	17	17.10					SPT 2/2	SPT									TCR: 100
17.50	17.50	17.70					SPT 3/2	SNC									TCR: 100
18	18		Slightly weathered, grey with orange mottling, MUDSTONE, extremely weak. Soil description: Silty clay, minor sand; grey with orange mottling. Hard, moist, moderate to high plasticity, sand, fine. 18.50 Becomes unweathered, colour becomes dark brownish grey. Soil description: CLAY, some silt, minor sand; dark brownish grey. Stiff, moist, moderate to high plasticity, sand, fine.	ABBOTSFORD MUDSTONE	M	H	18.50	SPT 3/3	SNC				TCR: 100				
19	19	19.77					SPT 6/6	SPT								TCR: 100	
20	20		Unweathered, dark brownish grey with black glauconitic speckles, SILTSTONE, very weak.	M			20.00	SPT 3/3	SNC				TCR: 100				
21	21	21.11					SPT 17/11	SPT								TCR: 100	
21	21		End of Hole @ 20.85m, TD				20.85	SPT for 35mm N > 50					TCR: 100				

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023

Notes and Comments:
 End of Hole @ 20.85m
 Shear Vene: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vene values are corrected.

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic
 SPT ETR: 64%

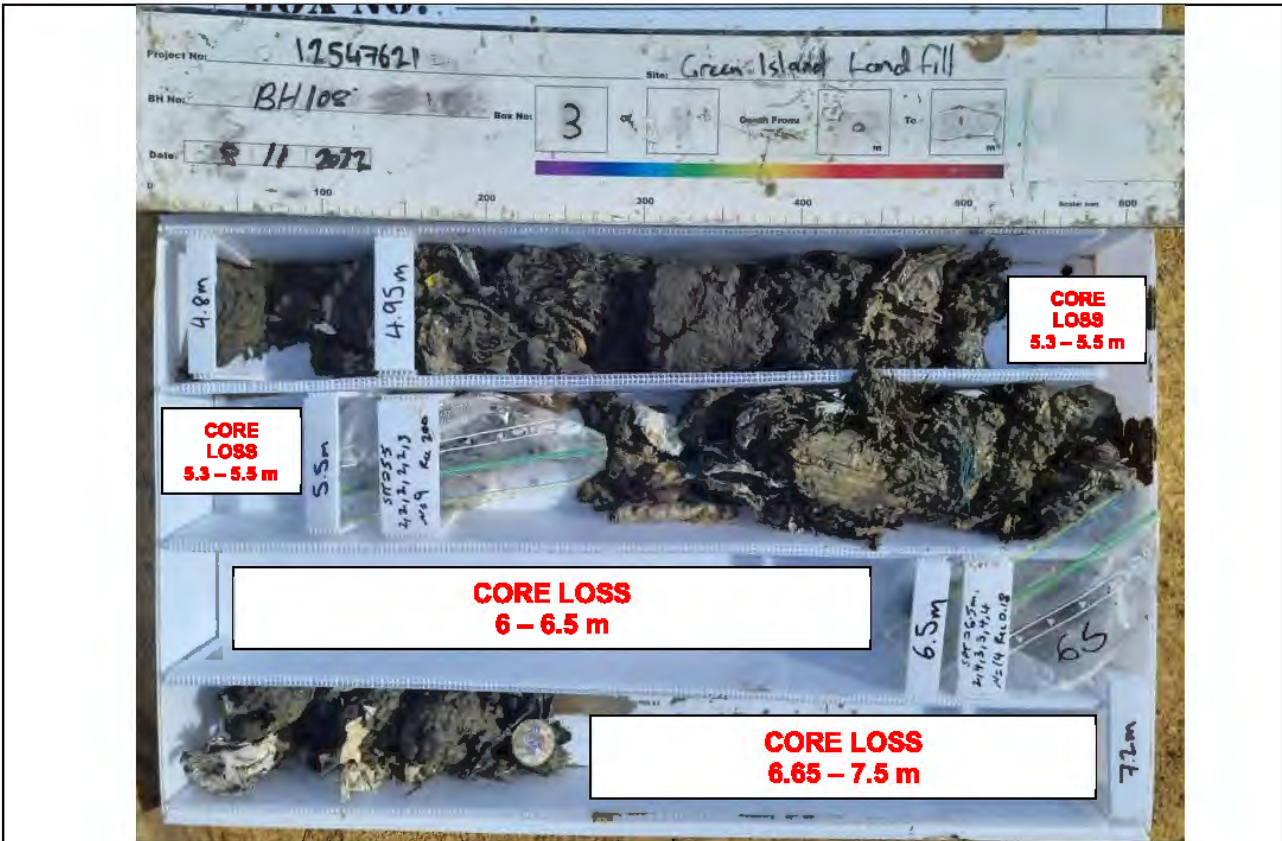
Ground Water Level			
Date	Time	Reading (mug)	Hole depth (mug)
09/11/22	09:15	3.82	20.85
14/11/22	11:35	5.27	20.85



Core Box 1, Depth: 0.0 to 2.4 m



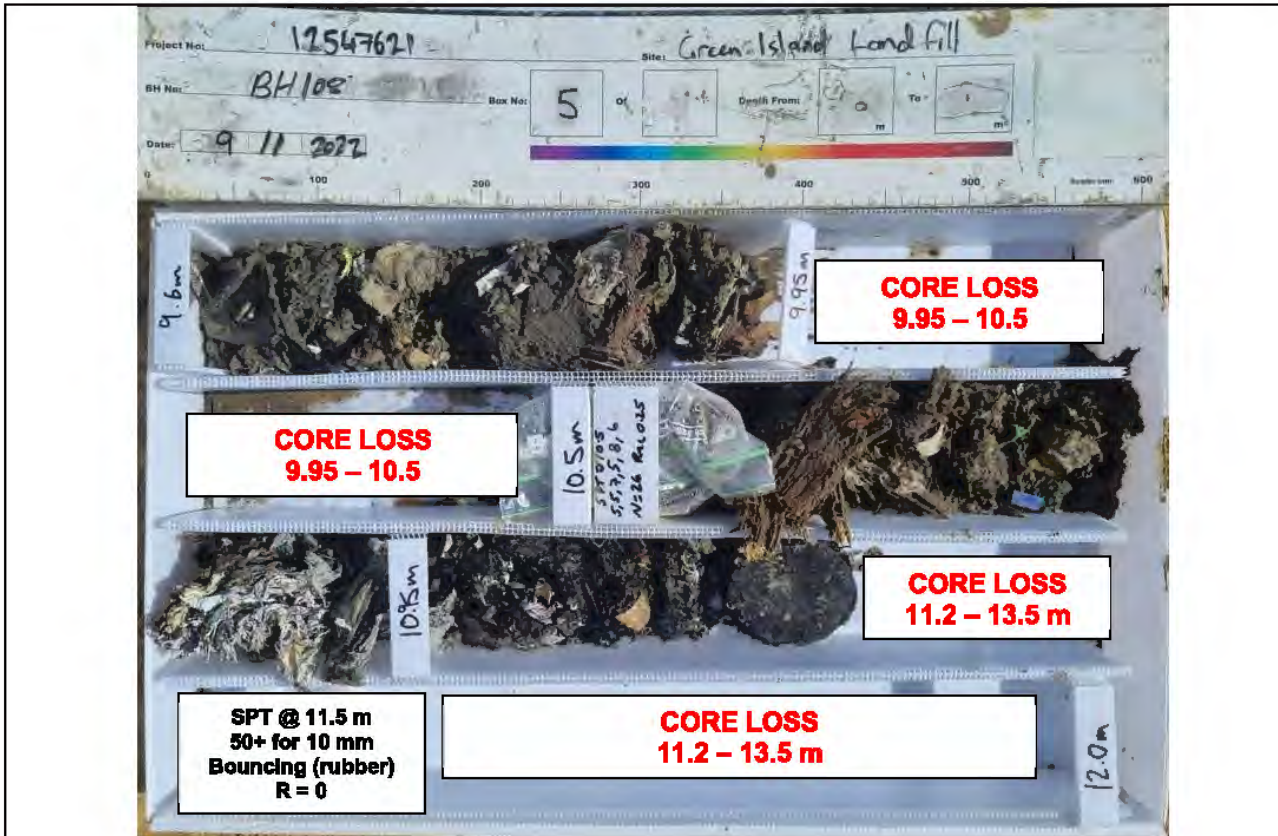
Core Box 2, Depth: 2.4 to 4.8 m



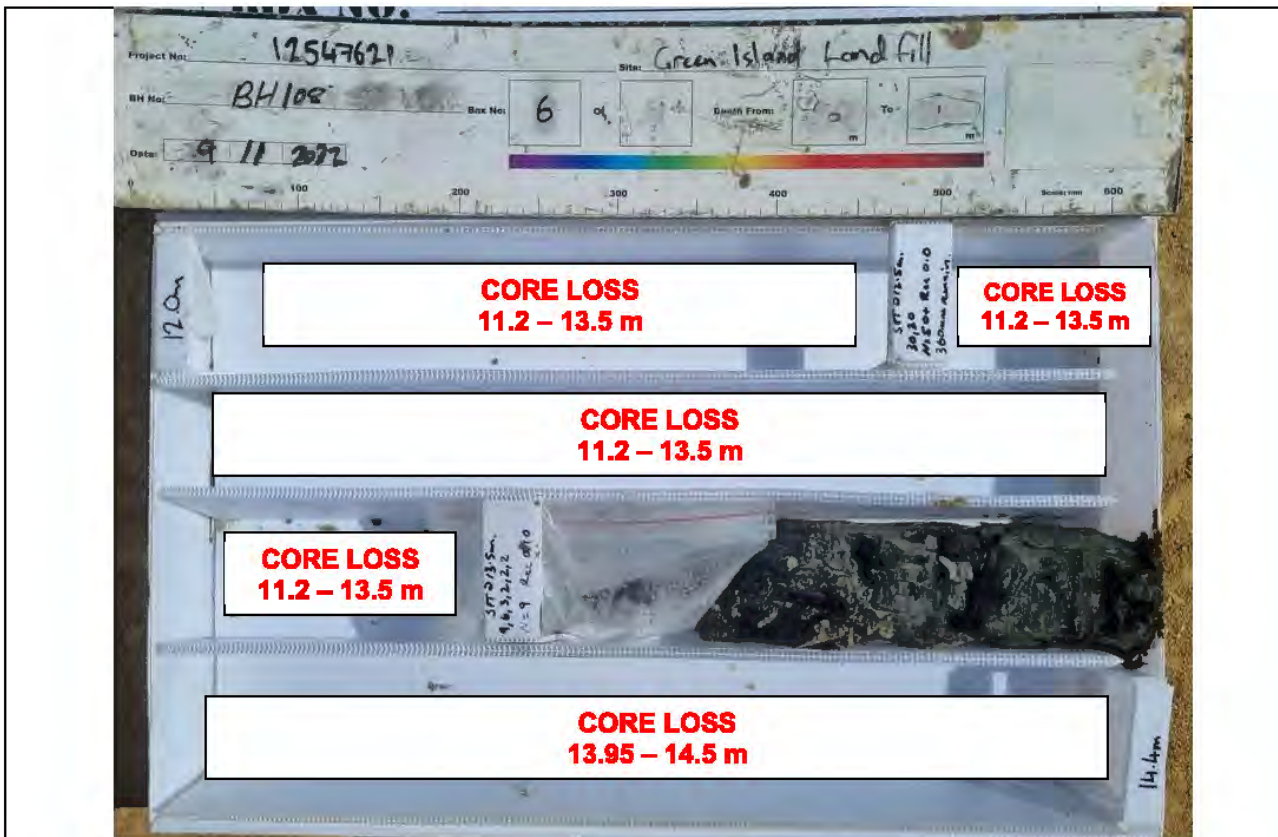
Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 5, Depth: 9.6 to 12.0 m



Core Box 6, Depth: 12.0 to 14.4 m



Core Box 7, Depth: 14.4 to 16.8 m



Core Box 8, Depth: 16.8 to 19.2 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH109

Sheet : 1 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 2/11/2022

Completed: 2/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399509.727
 RL: 7.024 m

Northing: 4913116.175
 Datum: NZVD2016

System: NZTM2000
 Method: SURVEY

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
0.15	0		TOPSOIL: Silty clay, minor sand and organic material (rootlets); dark brown. Wet, high plasticity.	TS	W												
0.75	0.6		FILL: Sandy, clayey, fine to coarse gravel, minor silt and organic material; dark grey to dark brown. Wet, gravel, angular; sand, fine to coarse.		M												
0.75	0.8		FILL: wood fragments with MSW (20%), trace gravel; brownish grey. Moist, MSW containing soft plastic.														
			CORE LOSS														
1.5			FILL: Soil waste with gravel, MSW (20%). Moist, MSW contains soft/hard plastics, cardboard/paper products, brick fragments, wood fragments; gravel, fine to coarse, angular to subangular.				SPT 1/2 2/3 4/5 N = 14			SNC							
			CORE LOSS														
3.25			FILL: Soil waste with MSW (20%), minor gravel and silt; dark brown to black. Moist, MSW contains soft/hard plastic, glass; gravel, fine to medium, angular to subangular.				SPT 3/3 4/4 7/7 N = 22			SNC							
			CORE LOSS														
4.5			FILL: Soil waste with MSW (20%), minor gravel and silt; dark brown to black. Moist, MSW contains soft/hard plastic, glass; gravel, fine to medium, angular to subangular.				SPT 3/2 1/2 1/3 N = 7			SNC							
5.35			FILL: Clayey silt, some organic material, minor sand; grey to orange with black mottling. Moist. low plasticity.							SNC							
5.8			FILL: Soil waste with MSW (20%), clay and silt, minor sand; light brown to black. Moist, MSW contains cardboard/paper material, wood material, soft/hard plastics; sand, fine.				SPT 0/3 3/2 2/1 N = 8			SNC							
6.8			FILL: Fibrous peat with MSW (10%); black. Moist, MSW contains glass.				SPT 0/0 0/0 0/1 N = 1			SNC							
6.8			FILL: Clayey silt with MSW (10%), minor organic material; dark grey with black mottling. Moist, high plasticity, MSW contains glass.							SNC							
7.6			Sandy SILT, some clay; grey with orange mottling. 'Soft', moist, high plasticity, sand, fine.	LKEM		S'				SNC							
			Sandy ORGANIC SILT, dark brownish grey. Firm, moist, low plasticity, sand, fine.			F				SPT							

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023

Notes and Comments:
 End of Hole @ 19.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
02/11/22	16:00	3.9	19.95

Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

SPT ETR: 64%



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH109

Sheet : 2 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 2/11/2022

Completed: 2/11/2022

Logged : NP

Processed : NP

Checked : DB

Easting: 1399509.727

Northing: 4913116.175

System: NZTM2000

RL: 7.024 m

Datum: NZVD2016

Method: SURVEY

RL (m)	Depth (m)	Graphical	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
			Sandy ORGANIC SILT, dark brownish grey. Firm, moist, low plasticity, sand, fine. (continued from layer starting at 7.6m) 8.00 Becomes ORGANIC SILT, minor sand	LAKEM			C	9.35	SPT 0/0 0/0 0/2 N=2 Average 30/12 MPa	SNC			TCR: 100				
			Silty, fine to medium SAND; dark grey. 'Loose', wet						8.50	SPT 0/0 0/0 1/2 N=3	SPT			TCR: 100			
			CORE LOSS											TCR: 36			
			Moderately weathered, grey with orange mottling MUDSTONE, extremely weak. Soil description: silty clay, minor sand. Very stiff, moist, high plasticity, sand, fine.	ABBOTSFORD MUDSTONE	VSP		C	8.66	SPT 0/0 0/0 1/2 N=3	SPT			TCR: 100				
			10.95 Soil becomes sandy SILT, some organic material						11.10	SPT 0/1 2/2 3/3 N=10	SPT			TCR: 100			
			MUDSTONE recovered as: Fines to coarse GRAVEL minor sand; black. Gravel, angular to subrounded, weak, slightly weathered; sand, coarse; poorly graded.			VSP	C	11.50	SPT 9/5 2/1 1/4 N=8	SPT			TCR: 100				
			Unweathered to slightly weathered, dark grey, MUDSTONE, extremely weak. Soil description: Silty clay, minor sand. Very stiff, moist, high plasticity, sand, fine.			VSP	C	12.20	SPT 14/8 6/10 7/10 N=33	SNC			TCR: 100				
			Slightly weathered, dark grey to black MUDSTONE, extremely weak. Soil description: Sandy SILT, minor sand, dark brown to black. Very stiff, high plasticity, sand, fine.			VSP	C	12.50	SPT 2/3 5/5 7/8 N=27	SPT			TCR: 100				
									SPT 3/6 6/6 8/10 N=28	SNC			TCR: 100				
									SPT 1/3 4/7 8/12 N=31	SPT			TCR: 100				

Notes and Comments:
 End of Hole @ 19.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic
 SPT ETR: 64%

Ground Water Level			
Date	Time	Reading (mug)	Hole depth (mug)
02/11/22	16:00	3.9	19.65

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH109

Sheet : 3 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 2/11/2022

Completed: 2/11/2022

Logged : NP

Processed : NP

Checked : DB

Easting: 1399509.727

Northing: 4913116.175

System: NZTM2000

RL: 7.024 m

Datum: NZVD2016

Method: SURVEY

RL (m)	Depth (m)	Graphite	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level	
							Number / Type	Result										
-10			Slightly weathered, dark gray to black MUDSTONE, extremely weak. Soil description: Sandy SILT, minor sand, dark brown to black. Very stiff, high plasticity, sand, fine. (continued from layer starting at 12.2m)	ABBOTSFORD MUDSTONE			SPT 2/3		SNC					TCR: 100				
-11							SPT 3/5							SPT				TCR: 100
-12							SPT 8/10							SNC				TCR: 100
-13			Unweathered, dark brownish gray with black glauconitic speckles, SILTSTONE, very weak. 17.50 Becomes hard	ABBOTSFORD MUDSTONE			SPT 2/4		SPT					TCR: 100				
-14							SPT 7/10							SNC				TCR: 100
-15							SPT 13/20							SPT				TCR: 100
-16			End of Hole @ 19.95m, TD				SPT 3/6		SNC					TCR: 100				
-17							SPT 9/8							SPT				TCR: 100
-18							SPT 11/20							SNC				TCR: 100
-19							SPT		SPT				TCR: 100					
-20													TCR: 100					
-21																		
-22																		
-23																		
-24																		

FINAL

Notes and Comments:

End of Hole @ 19.95m

Shear Vene: GEO937, 'MSW' - Municipal Solid Waste

Refer to explanation sheets for abbreviation and symbols.
 Shear Vene values are corrected.

Inclination: Vertical

Orientation:

Ground Water Level

Contractor: Speight Drilling

Equipment: HD 900 Sonic

SPT ETR: 64%

Date	Time	Reading (mbgl)	Hole depth (m)
02/11/22	16:00	3.9	19.85



Core Box 1, Depth: 0.0 to 2.4 m



Core Box 2, Depth: 2.4 to 4.8 m



Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 5, Depth: 9.6 to 12.0 m



Core Box 6, Depth: 12.0 to 14.4 m



Core Box 7, Depth: 14.4 to 16.8 m



Core Box 8, Depth: 16.8 to 19.2 m



Project	GILF Closure Consents	
Client	DCC	
Job Number	12547621	Page 5 of 5
Borehole ID	BH109	



Core Box 9, Depth: 19.2 to 21.6 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH110

Sheet : 1 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 10/11/2022

Completed: 10/11/2022

Logged : NP

Easting: 1399332

Northing: 4913121

System: NZTM2000

Processed : NP

RL: 7.607 m

Datum: NZVD2016

Method: GPSH

Checked : DB

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
0	0		FILL: Sandy, fine to coarse gravel with MSW (10%), minor silt and cobble; grey with dark grey matrix. Moist, gravel, angular to subangular; sand, fine to coarse; MSW containing metal, glass; cobble, angular to subangular.		M												
1.2	1.2		FILL: Gravelly, silty, fine to coarse sand; dark grey. Moist, gravel, fine to medium; angular.				SPT 3/3 3/3 3/4 N = 13			SNC				TCR: 100			
2.3	2.3		2.10 - 2.20 Sandy ORGANIC SILT, present [buried topsoil]											TCR: 100			
2.9	2.9		FILL: MSW (80%), some wood fragments, dark brown to dark grey. MSW contains metal, plastic, glass.				SPT 9/8 9/18 19/4 for 15min N > 50			SPT				TCR: 100			
3.5	3.5		CORE LOSS							SNC				TCR: 0			
3.5	3.5		FILL: Sandy, fine to coarse gravel with MSW (10%), some silt; grey with dark grey matrix. Moist, gravel, angular to subangular; sand, fine to coarse; MSW contains metal, glass.	FILL			SPT 5/3 3/2 2/10 N = 17			SPT				TCR: 100			
4.75	4.75		4.75 Drill washed gravel, some wood fragments.				SPT 6/2 1/3 2/6 N = 12			SNC				TCR: 100			
5.5	5.5		CORE LOSS							SNC				TCR: 9			
5.5	5.5		FILL: Fine to medium gravel with MSW (20%), minor sand; dark grey. Moist, gravel, angular; MSW contains metal, organic waste; sand, coarse.				SPT 18/4 4/5 5/8 N = 22			SPT				TCR: 33			
6.5	6.5		CORE LOSS							SNC				TCR: 0			
6.5	6.5		FILL: Fine to medium gravel with MSW (20%), minor sand; dark grey. Moist, gravel, angular; MSW contains metal, organic waste; sand, coarse.				SPT 5/4 2/1 1/2 N = 6			SPT				TCR: 44			
7.5	7.5		CORE LOSS							SNC				TCR: 0			
7.5	7.5		CLAY, some silt and organic material, minor sand; grey to dark grey. 'Very soft', moist, high plasticity, sand, fine.	LKEM		'vs'	SPT 6/19 3/3 2/2 N = 10			SPT				TCR: 44			

Notes and Comments:

End of Hole @ 19.95m

Shear Vane: GEO937, 'MSW' - Municipal Solid Waste

Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical

Orientation:

Contractor: Speight Drilling

Equipment: HD 900 Sonic

SPT ETR: 64%

Ground Water Level

Date	Time	Reading (mbgl)	Hole depth (mbgl)
10/11/22	15:30	1.05	19.95



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH110

Sheet : 2 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 10/11/2022

Completed: 10/11/2022

Logged : NP

Easting: 1399332

Northing: 4913121

System: NZTM2000

Processed : NP

RL: 7.607 m

Datum: NZVD2016

Method: GPSH

Checked : DB

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
			CORE LOSS (continued from layer starting at 7.7m)										TCR: 0				
			Sandy SILT, trace organic material; grey with orange mottling. 'Very soft', moist, low plasticity, sand, fine.				8.50	SPT 1/2 4/2 2/1 N = 7		SNC				TCR: 100			
			Sandy SILT, some organics, minor clay; dark brown. 'Very soft', moist, high plasticity, sand, fine. Sulphurous smell				8.85			SPT				TCR: 100			
			CORE LOSS							SNC				TCR: 100			
			ORGANIC SILT, some clay, trace sand; dark brown. 'Very soft', moist, moderate to high plasticity, sand, fine. Sulphurous smell				9.95	SPT 0/0 0/0 1/1 N = 2		SPT				TCR: 100			
			Silty CLAY, minor sand, trace organic material; greenish grey with black streaking. 'Very soft', moist, moderate to high plasticity, sand, fine.				10.50	SPT 0/0 0/0 0/1 N = 1		SNC				TCR: 100			
			CORE LOSS							SNC				TCR: 82			
			Silty CLAY, trace sand, trace organic material; greenish grey with black streaking. 'Very soft', moist, high plasticity, sand, fine.				11.50	SPT 0/0 0/0 0/1 N = 1		SPT				TCR: 100			
			CORE LOSS							SNC				TCR: 36			
			Moderately weathered, grey with orange mottling, MUDSTONE, extremely weak. Soil description: Silty clay, minor sand. 'Very stiff', high plasticity, sand, fine.	LKEM	M	'VS'	12.50	SPT 1/2 2/3 3/3 N = 11		SPT				TCR: 100			
			13.10 - 13.60 Highly weathered, becomes some fine sand, colour becomes orangeish brown.				12.95			SNC				TCR: 100			
			MUDSTONE recovered as: Silty, fine to coarse GRAVEL, minor sand and clay; dark grey with orange mottling. Very dense, moist, gravel, medium to coarse, angular; sand, fine to medium.	ABBOTSFORD MUDSTONE	M	VD	13.60	SPT 2/6 13/17 20 for 70mm N > 50		SPT				TCR: 100			
			Slightly to unweathered, dark grey, MUDSTONE, extremely weak, soil description: silty clay, minor sand. 'Hard', high plasticity, sand, fine.		M	'H'				SNC				TCR: 100			
										SNC				TCR: 100			
										SPT				TCR: 100			

Notes and Comments:

End of Hole @ 19.95m

Shear Vane: GEO937, 'MSW' - Municipal Solid Waste

Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical

Orientation:

Contractor: Speight Drilling

Equipment: HD 900 Sonic

SPT ETR: 64%

Ground Water Level

Date	Time	Reading (mbgl)	Hole depth (mbgl)
10/11/22	15:30	1.05	19.95



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH110
 Sheet : 3 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 10/11/2022

Completed: 10/11/2022

Logged : NP
 Processed : NP
 Checked : DB

Easting: 1399332
 RL: 7.807 m

Northing: 4913121
 Datum: NZVD2016

System: NZTM2000
 Method: GPSH

RL (m)	Depth (m)	Graphite	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RSD (%)	Defect Spacing (mm)	Instrumentation Installation	Water level		
							Number / Type	Result											
			Slightly to unweathered, dark grey, MUDSTONE, extremely weak, soil description: silty clay, minor sand. 'Hard', high plasticity, sand, fine. (continued from layer starting at 14.0m)	ABBOTSFORD MUDSTONE			SPT 3/4 8/7 8/10 N = 33		SNC					TCR: 100					
					SPT 3/4 3/3 4/6 N = 16		SPT			TCR: 100									
					SPT 2/4 5/8 5/8 N = 24		SNC			TCR: 100									
					SPT 2/3 4/6 6/7 N = 22		SPT			TCR: 100									
			End of Hole @ 19.95m, TD																

FINAL

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023

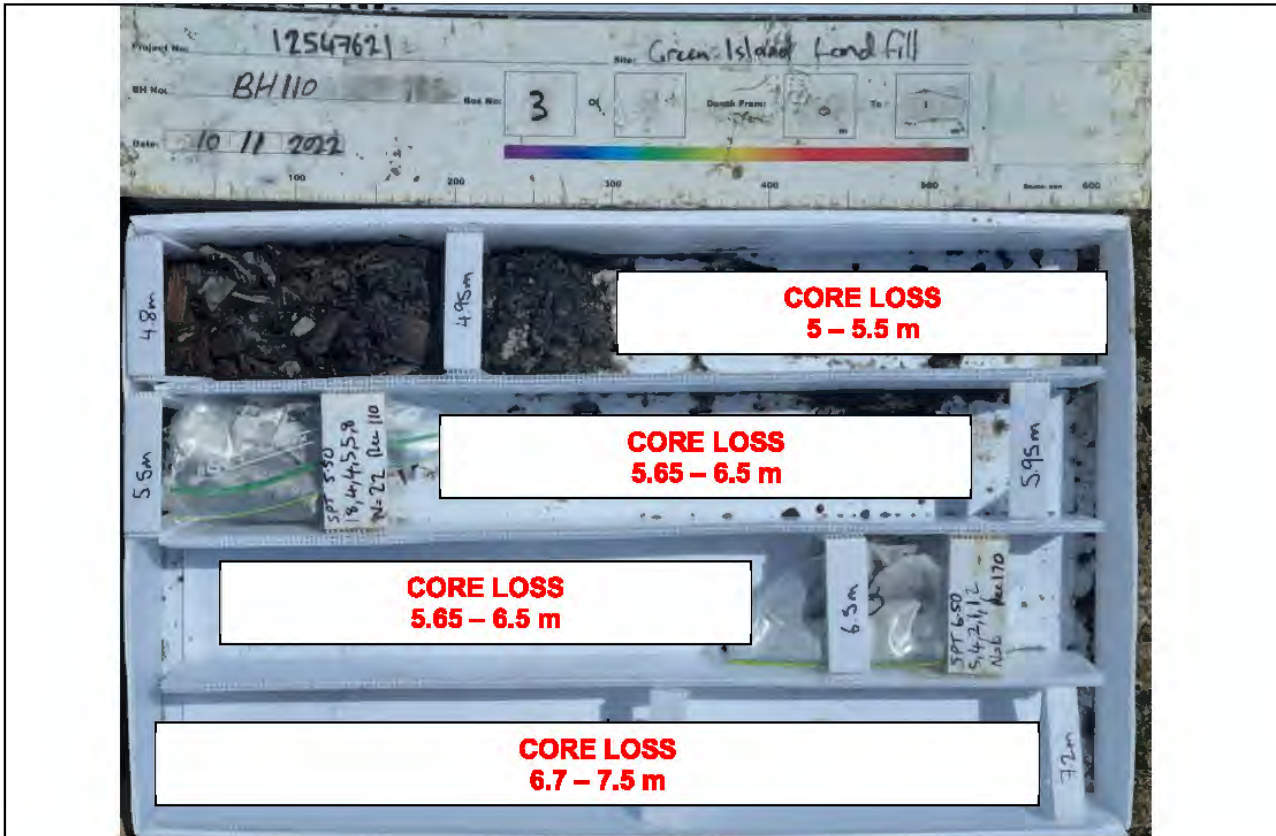
Notes and Comments: End of Hole @ 19.95m Shear Vene: GEO937, 'MSW' - Municipal Solid Waste	Inclination: Vertical	Orientation:	Ground Water Level			
	Contractor: Speight Drilling Equipment: HD 800 Sonic		Date	Time	Reading (mbgl)	Hole depth (mbgl)
Refer to explanation sheets for abbreviation and symbols. Shear Vene values are corrected.	SPT ETR: 64%		10/1/22	15:30	1.06	19.85



Core Box 1, Depth: 0.0 to 2.4 m



Core Box 2, Depth: 2.4 to 4.8 m



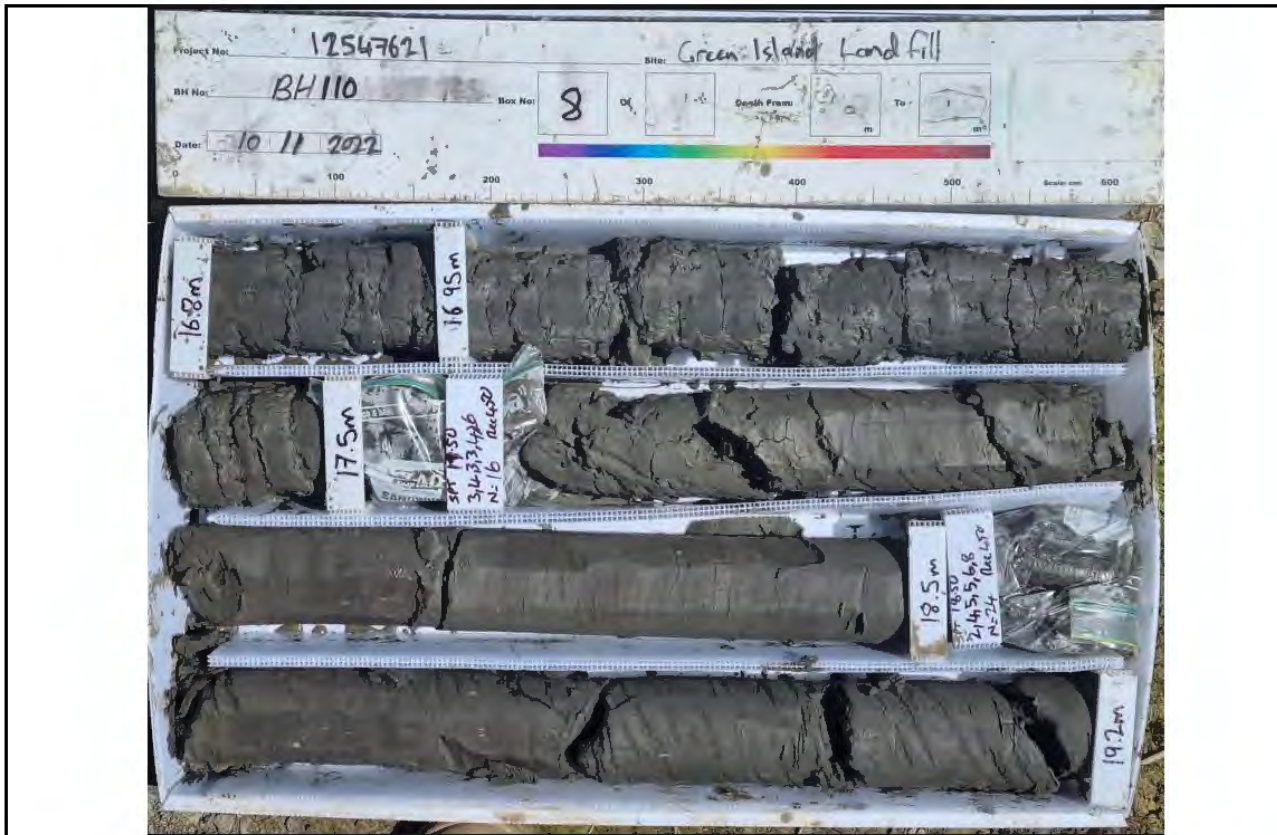
Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 7, Depth: 14.4 to 16.8 m



Core Box 8, Depth: 16.8 to 19.2 m



Project	GILF Closure Consents	
Client	DCC	
Job Number	12547621	Page 5 of 5
Borehole ID	BH110	



Core Box 9, Depth: 19.2 to 19.95 m



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Land Fill Dunedin
 Job Number: 12547821

Hole No. : BH110A

Sheet : 1 of 1
 Hole Length : 6.0 m
 Scale @ A4 : 1:40

Commenced: 11/7/2022

Completed: 11/7/2022

Logged : NP

Processed : NP

Checked : DB

Easting: Northing:
 RL: m Datum:

System: NZTM2000
 Method:

RL (m)	Depth (m)	Graphs	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	SPT	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
0	0		FILL: Sandy, fine to coarse gravel with MSW (10%), minor silt and cobble; grey with dark grey matrix. Moist, gravel, angular to subangular; sand, fine to coarse; MSW containing metal, glass; cobble, angular to subangular.														
1.2	1.2		FILL: Gravelly, silty, fine to coarse sand; dark grey. Moist, gravel, fine to medium; angular.														
2.3	2.3		FILL: MSW (80%), some wood fragments, dark brown to dark grey. MSW contains metal, plastic, glass.														
3.5	3.5		FILL: Sandy, fine to coarse gravel with MSW (10%), some silt; grey with dark grey matrix. Moist, gravel, angular to subangular; sand, fine to coarse; MSW contains metal, glass.														
5.5	5.5		FILL: Fine to medium gravel with MSW (20%), minor sand; dark grey. Moist, gravel, angular; MSW contains metal, organic waste; sand, coarse.														
6	6		End of Hole @ 6m, R														

FINAL

Notes and Comments:

End of Hole @ 6m
 Shear Vene: GEC837

Refer to explanation sheets for abbreviation and symbols.
 Shear Vene values are corrected.

Inclination: Vertical

Orientation:

Ground Water Level

Contractor: Spelght Drilling
 Equipment: HD900 Sonic

Date	Time	Reading (mug)	Hole depth (mug)



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Land Fill Dunedin
 Job Number: 12547821

Hole No. : BH110B

Sheet : 1 of 1
 Hole Length : 4.8 m
 Scale @ A4 : 1:40

Commenced: 11/7/2022

Completed: 11/7/2022

Logged : NP

Processed : NP

Checked : DB

Easting: Northing:
 RL: m Datum:

System: NZTM2000
 Method:

RL (m)	Depth (m)	Graphite	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Coiling	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	SPT	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
	0		FILL: Sandy, fine to coarse gravel with MSW (10%), minor silt and cobble; grey with dark grey matrix. Moist, gravel, angular to subangular; sand, fine to coarse; MSW containing metal, glass; cobble, angular to subangular.														
	1.2		FILL: Gravelly, silty, fine to coarse sand; dark grey. Moist, gravel, fine to medium; angular.														
	2.3		FILL: MSW (80%), some wood fragments, dark brown to dark grey. MSW contains metal, plastic, glass.														
	3.5		FILL: Sandy, fine to coarse gravel with MSW (10%), some silt; grey with dark grey matrix. Moist, gravel, angular to subangular; sand, fine to coarse; MSW contains metal, glass.														
	5		End of Hole @ 4.8m, R														

FINAL

Notes and Comments:

End of Hole @ 4.8m
 Shear Vane: GEC837

Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical

Orientation:

Ground Water Level

Contractor: Spelght Drilling
 Equipment: HD800 Sonic

Date	Time	Reading (mugl)	Hole depth (mugl)



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH111

Sheet : 1 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 7/11/2022

Completed: 8/11/2022

Logged : NP

Easting: 1399278.558

Northing: 4913200.68

System: NZTM2000

Processed : NP

RL: 6.263 m

Datum: NZVD2016

Method: SURVEY

Checked : DB

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level			
							Number / Type	Result												
6.263	0		FILL: Silty, fine to coarse gravel with MSW (20%), minor sand and clay, grey gravel in dark grey matrix. Moist; gravel, subangular; MSW contains soft plastics, cardboard; sand, fine to coarse.	FILL	M					SNC				TCR: 80			7-11-2022			
	1.2		CORE LOSS																	
	1.5		FILL: Soil waste, some organic material and MSW (10%), minor gravel. Moist, gravel, fine to medium, angular; MSW contains, plastic, metal.							SPT 11/6 3/1 2/4 N = 10			SPT					TCR: 100		
	1.95		CORE LOSS															TCR: 0		
	2.5		FILL: Soil waste, some fibrous peat and MSW (15%), minor silt, dark brown with coloured waste. Moist, MSW contains plastic, metals, wood fragments.							SPT 5/3 3/3 5/6 N = 18			SPT					TCR: 100		
	2.95		FILL: Silt, some clay and sand, minor gravel; dark grey with orange mottling. Moist, low to moderate plasticity; sand, fine; gravel, fine, subangular.										SNC					TCR: 100		
	3.05		CORE LOSS				SPT 1/2 1/2 1/1 N = 5			SPT				TCR: 33						
	3.65		CORE LOSS							SNC				TCR: 0						
	4.64.5		FILL: Medium to coarse gravel with MSW (20%); grey, Gravel, subangular; MSW contains plastic, metal, wood fragments.				SPT 18/32 for 65mm N > 50			SPT				TCR: 22						
	4.64.5		CORE LOSS							SNC				TCR: 0						
	5.5		CLAY, some silt, minor organic material; trace sand; dark grey with black streaks. 'Soft', moist, high plasticity, sand, fine.	LUKEM			SPT 6/5 3/1 1/1 N = 5			SPT				TCR: 44						
	5.7		CORE LOSS										SNC			TCR: 0				
	6.5		Silty CLAY, minor sand and organic material; grey with orange mottling. 'Soft', moist, high plasticity, sand, fine,				SPT 0/0 0/0 0/1 N = 1			SPT				TCR: 100						
	6.90		Becomes silty CLAY, colour becomes dark grey with black streaks.							SNC				TCR: 100						
	7.35		Clayey ORGANIC SILT, minor sand, trace rootlets; dark brown. 'Very soft', moist, moderate to high plasticity.	LUKEM			SPT 0/0 0/0 0/1 N = 1			SPT				TCR: 100						

Notes and Comments:

End of Hole @ 19.95m

Shear Vane: GEO937, 'MSW' - Municipal Solid Waste

Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical

Orientation:

Contractor: Speight Drilling

Equipment: HD 900 Sonic

SPT ETR: 64%

Ground Water Level

Date	Time	Reading (mbgl)	Hole depth (mbgl)
07/11/22	17:00	0.78	



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH111

Sheet : 2 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 7/11/2022

Completed: 8/11/2022

Logged : NP

Easting: 1399278.558

Northing: 4913200.68

System: NZTM2000

Processed : NP

RL: 6.263 m

Datum: NZVD2016

Method: SURVEY

Checked : DB

RL (m)	Depth (m)	Graphic	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Casing	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RQD SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level
							Number / Type	Result									
-2			Clayey ORGANIC SILT, minor sand, trace rootlets; dark brown. 'Very soft', moist, moderate to high plasticity. (continued from layer starting at 7.4m)					SPT 0/0 0/0 0/1 N = 1		SNC				TCR: 100			
9	9.05		Clayey SILT, minor sand and organic material; grey with orange mottling. 'Very soft', moist, low to moderate plasticity.			S		SPT 0/0 0/0 0/1 N = 1		SNC				TCR: 100			
10								SPT 0/0 0/0 0/1 N = 1		SNC				TCR: 100			
11								SPT 0/0 0/0 0/1 N = 1		SNC				TCR: 100			
12				LKEM				SPT 0/0 0/0 0/1 N = 1		SNC				TCR: 100			
13			13.00 - 13.50 Becomes, silty CLAY, moderate to high plasticity.					SPT 0/0 0/0 0/1 N = 1		SNC				TCR: 100			
14	13.95		Silty, fine to medium SAND, some clay; orangish grey. Very loose, moist, well graded.			VL		SPT 0/0 0/0 0/1 N = 1		SNC				TCR: 100			
15	14.34.6		Moderately weathered, orangish grey MUDSTONE, extremely weak. Soil description: Silty clay, minor sand; orangish grey. 'Very stiff', moist, high plasticity, sand, fine.			'VS'		SPT 30/20 N = 50		SNC				TCR: 100			
			Slightly to unweathered, grey to dark grey, MUDSTONE, extremely weak. Soil description: Silt, minor sand; light grey with orange mottling. 'Hard', wet, low plasticity, sand, fine.	ABBOTSFORD MUDSTONE	W	'H'		SPT 6/6 6/9 10/12 N = 37		SNC				TCR: 100			

FINAL

Notes and Comments:
 End of Hole @ 19.95m
 Shear Vane: GEO937, 'MSW' - Municipal Solid Waste
 Refer to explanation sheets for abbreviation and symbols.
 Shear Vane values are corrected.

Inclination: Vertical Orientation:
 Contractor: Speight Drilling
 Equipment: HD 900 Sonic
 SPT ETR: 64%

Ground Water Level			
Date	Time	Reading (mbgl)	Hole depth (mbgl)
07/11/22	17:00	0.78	

Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023



Project : GILF Closure Consents
 Client : Dunedin City Council
 Site : Green Island Landfill Dunedin,
 Job Number: 12547621

Hole No. : BH111
 Sheet : 3 of 3
 Hole Length : 19.95
 Scale @ A4 : 1:40

Commenced: 7/11/2022 Completed: 8/11/2022

Logged : NP
 Processed : NP
 Checked : DB

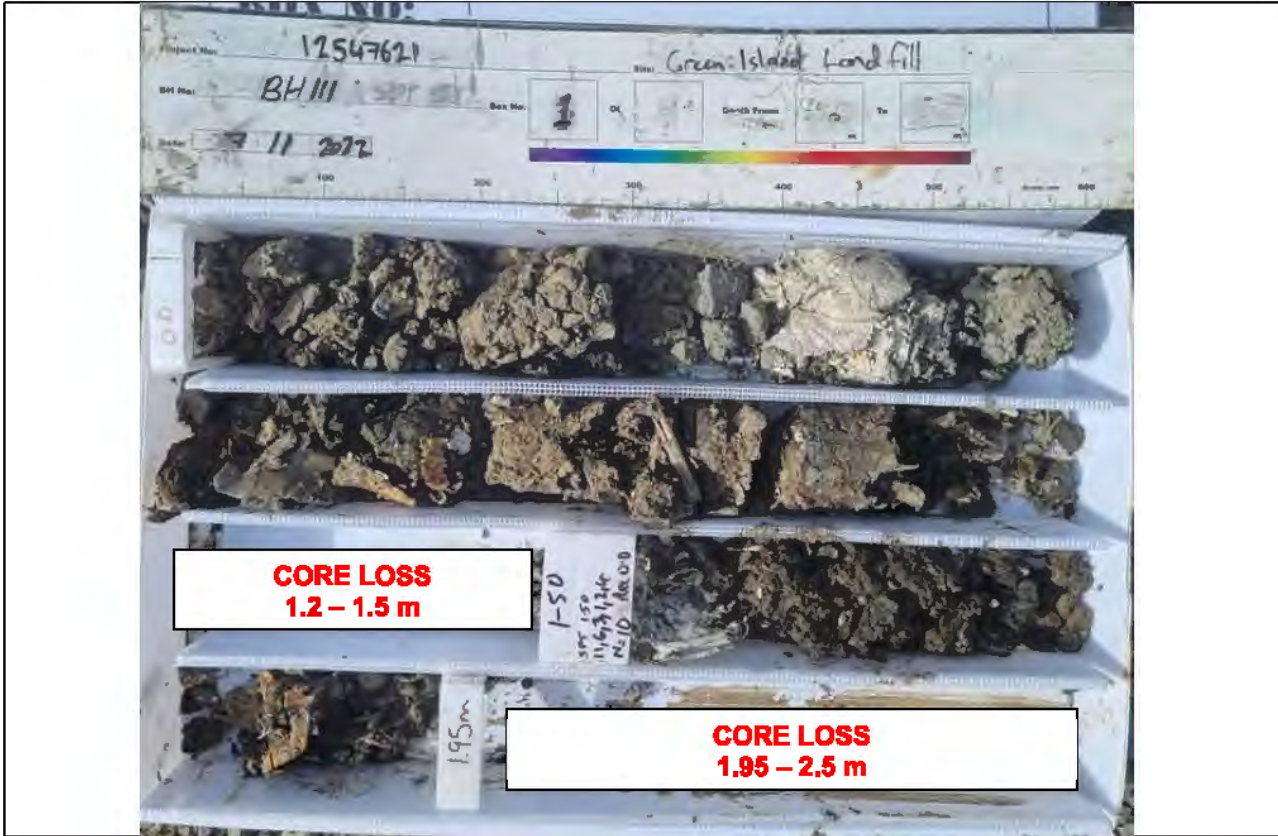
Easting: 1399278.558 Northing: 4913200.68 System: NZTM2000
 RL: 6.263 m Datum: NZVD2016 Method: SURVEY

RL (m)	Depth (m)	Graphite	Material Description	Geological Unit	Moisture condition	Consistency / Relative Density	Sample		Coiling	Method	Flush Return (%)	Weathering	Estimated Strength (MPa)	TCR RCR SCR (%)	Defect Spacing (mm)	Instrumentation Installation	Water level		
							Number / Type	Result											
-10			Slightly to unweathered, gray to dark gray, MUDSTONE, extremely weak. Soil description: Silt, minor sand; light gray with orange mottling. 'Hard', wet, low plasticity, sand, fine. (continued from layer starting at 14.7m)	ABBOTSFORD MUDSTONE			SPT 4/6	SNC						TCR: 100					
							SPT 7/8											SPT	TCR: 100
							SPT 8/12											SNC	TCR: 100
							SPT 10/9											BPT	TCR: 100
							SPT 13/15											SNC	TCR: 100
						SPT 4/5	SPT						TCR: 100						
			End of Hole @ 19.95m, TD																

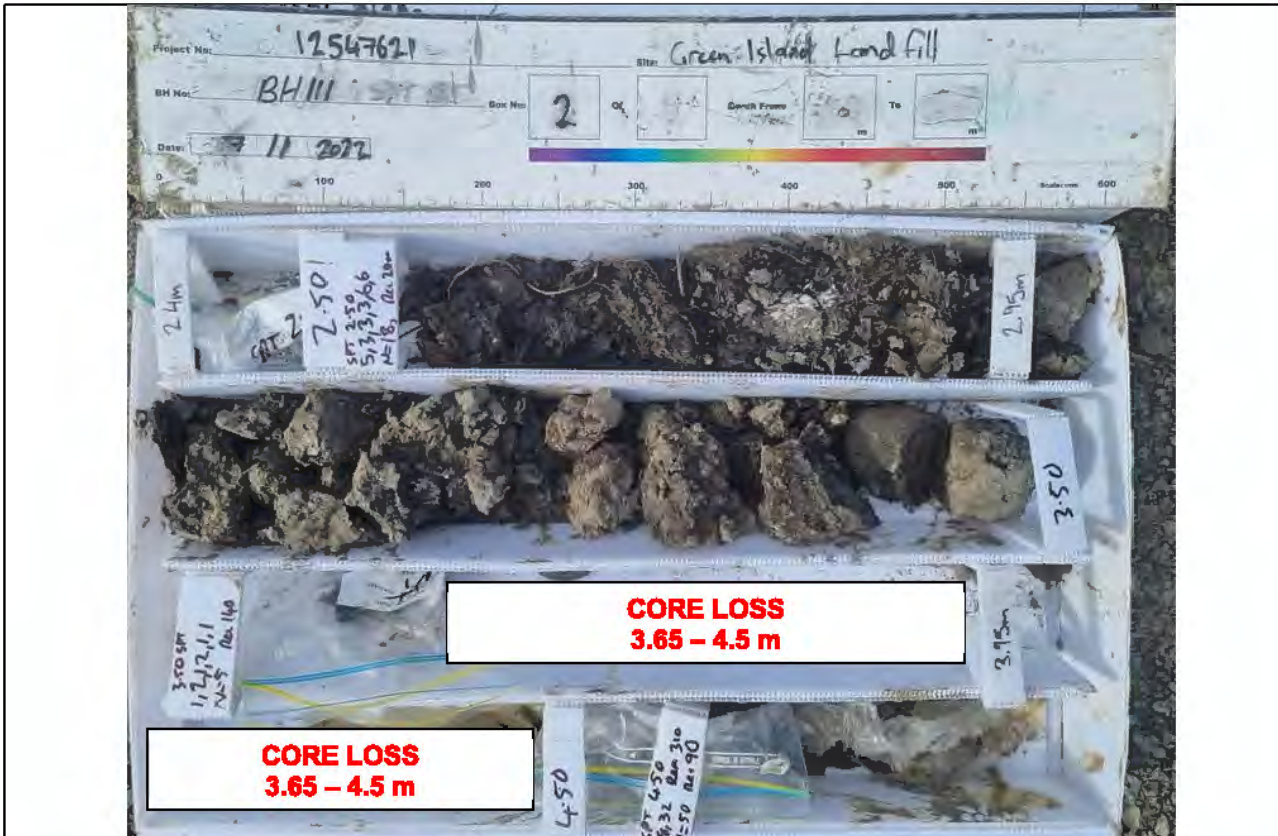
FINAL

Notes and Comments: End of Hole @ 19.95m Shear Vene: GEO937, 'MSW' - Municipal Solid Waste Refer to explanation sheets for abbreviation and symbols. Shear Vene values are corrected.	Inclination: Vertical		Orientation:		Ground Water Level			
	Contractor: Speight Drilling		Equipment: HD 800 Sonic		Date	Time	Reading (mbgl)	Hole depth (mugl)
					07/11/22	17:00	0.78	
		SPT ETR: 64%						

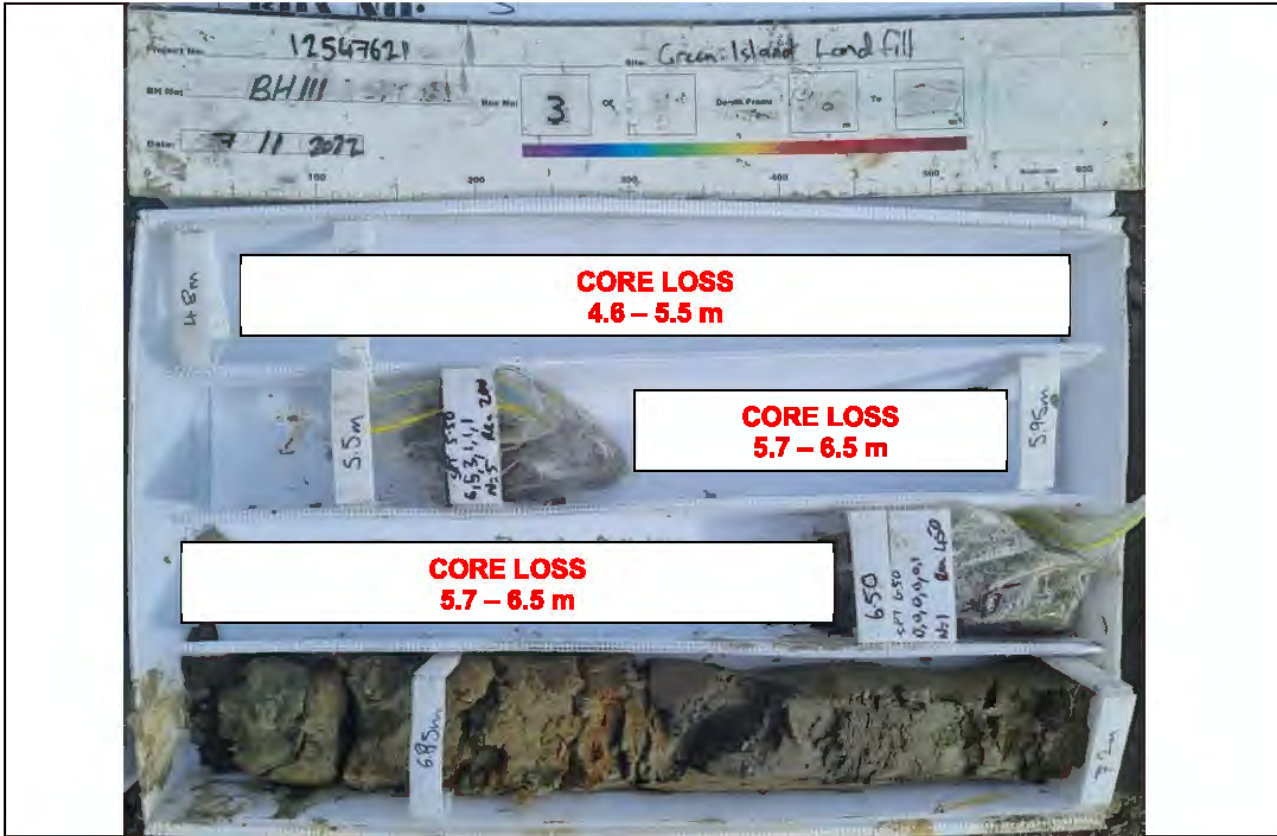
Report ID: GENERAL_LOG || Project: GILF LOGS 16022023.GPJ || Library: GHD - NZGD.GLB || Date: 16 February 2023



Core Box 1, Depth: 0.0 to 2.4 m



Core Box 2, Depth: 2.4 to 4.8 m



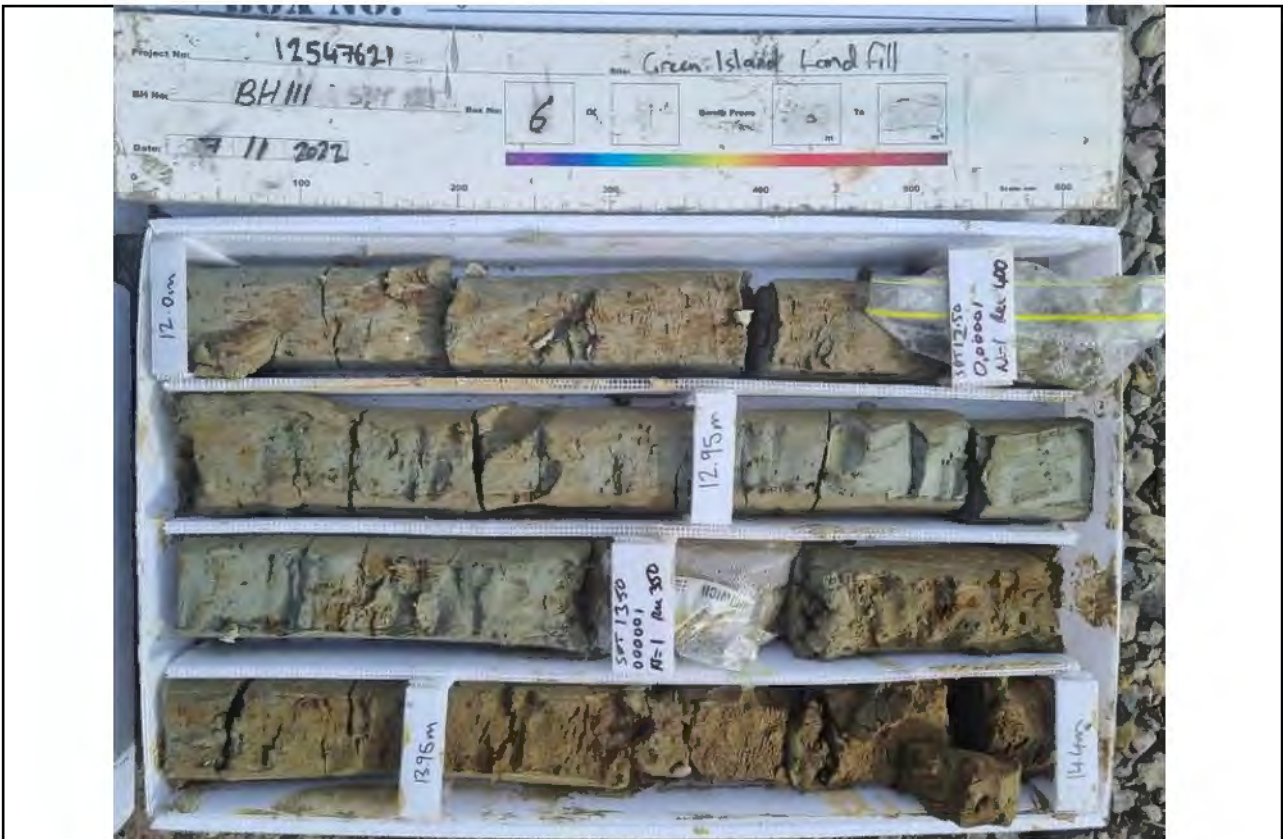
Core Box 3, Depth: 4.8 to 7.2 m



Core Box 4, Depth: 7.2 to 9.6 m



Core Box 5, Depth: 9.0 to 12.0 m



Core Box 6, Depth: 12.0 to 14.4 m



Core Box 7, Depth: 14.4 to 16.8 m



Core Box 8, Depth: 16.8 to 19.2 m



Project	GILF Closure Consents	
Client	DCC	
Job Number	12547621	Page 5 of 5
Borehole ID	BH111	



Core Box 9, Depth: 19.2 to 19.95 m

Appendix C

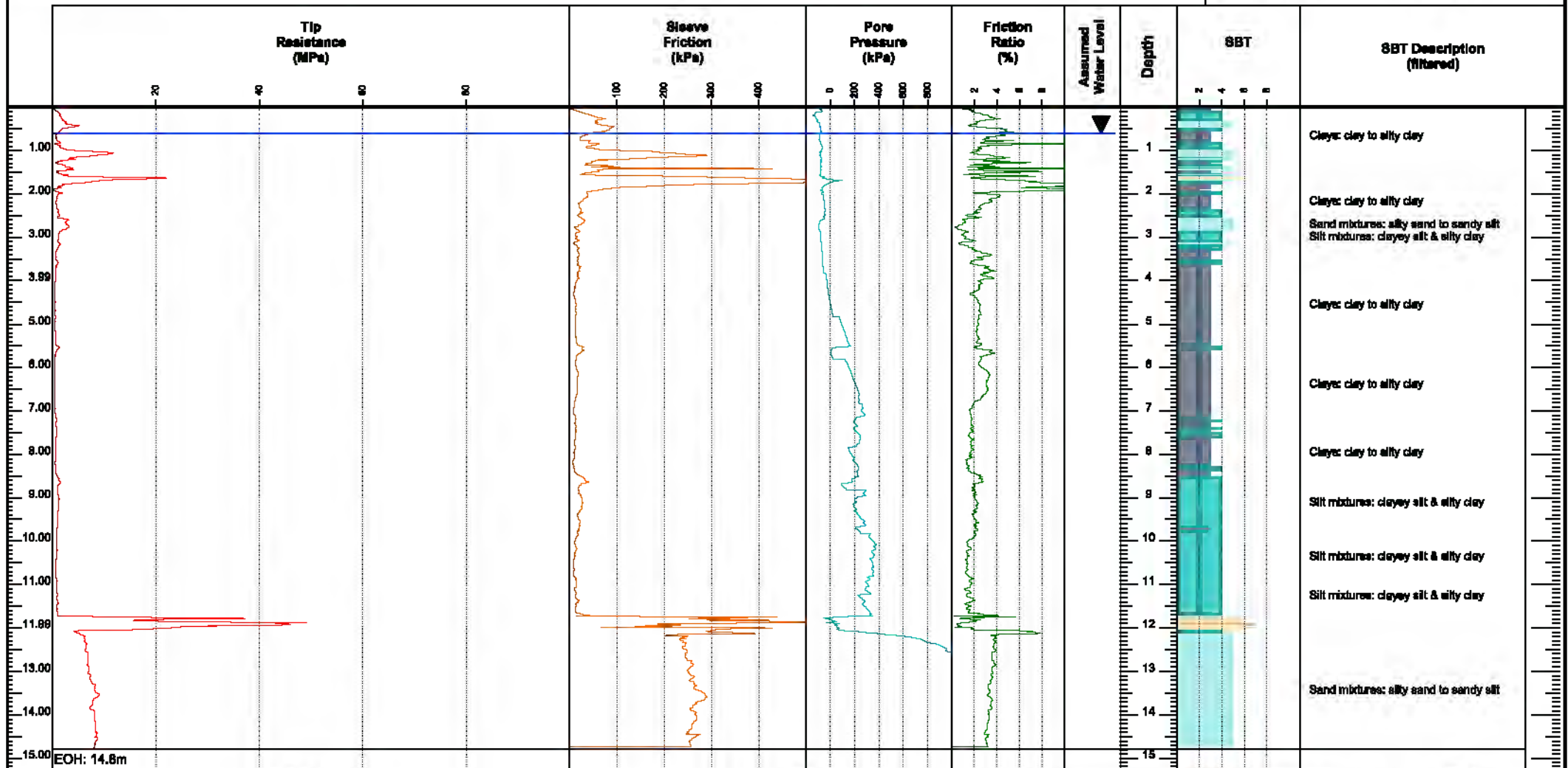
Cone Penetrometer Test Logs



CONE PENETRATION TEST (CPT) LOG

TEST NO.: CPT100

Client Ref.: GHD



Client: GHD
Project: Green Island
Location: Dunedin
Contractor: Speight Drilling Ltd

Remarks:
 50mpa probe used, water level .68m, hole sealed to surface with grout
Termination Reason:
 Refusal at 14.80m due to sleeve resistance

Northing: 4913182
Easting: 1399158
System: NZTM
Elevation: 4m
Datum:
Method: Garmin GPS

Rig: Pagani TG83 - 150
Cone ID: Mks867
Cone Area: 10cm²
Sleeve Area: 150cm²
Area Ratio: 0.79
Predrill: 0m

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures, silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures, clayey silt & silty clay	9	Stiff fine-grained

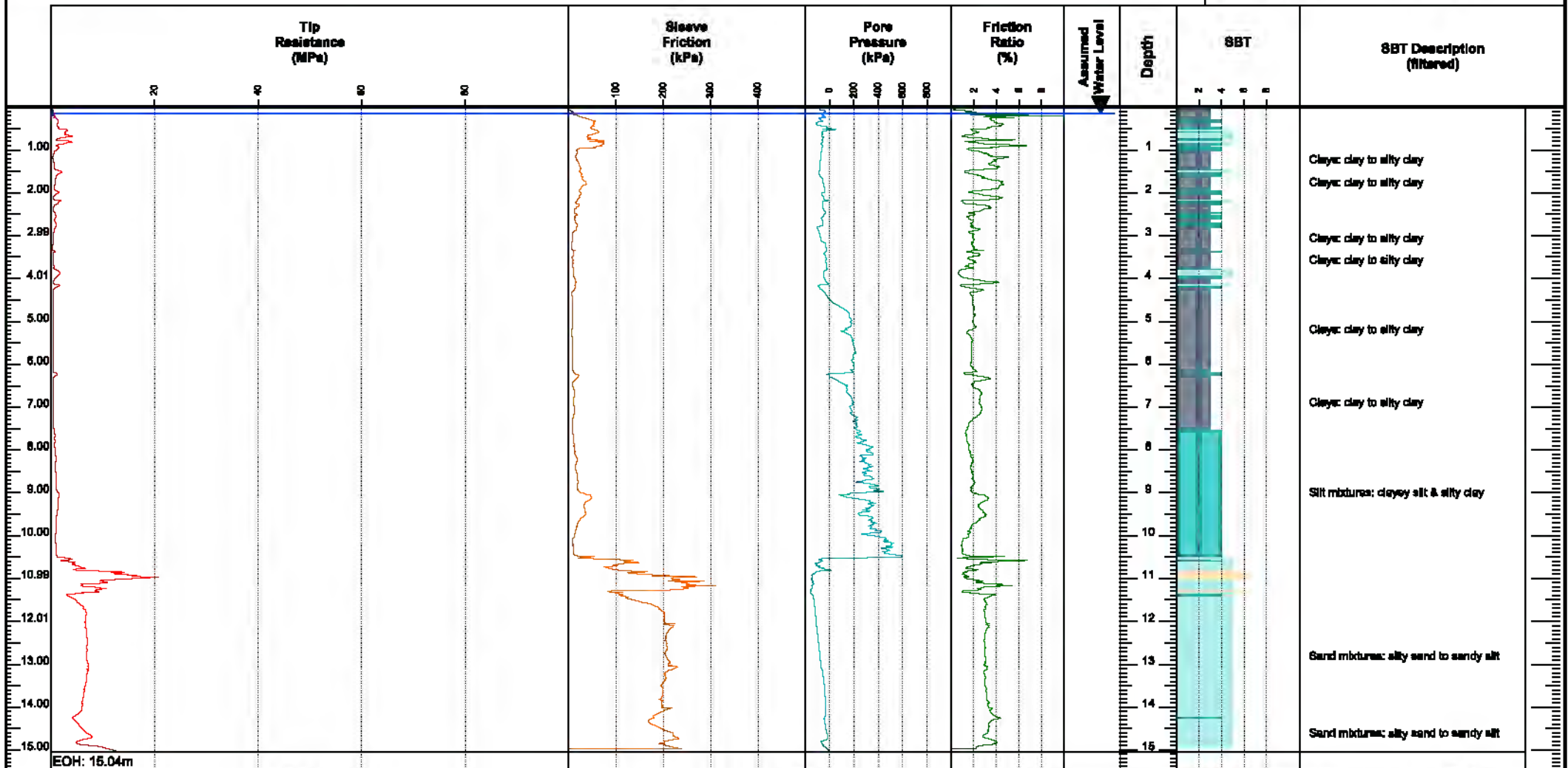
Date:
 18/10/2022 10:02:27 PM
 Page 1 of 1



CONE PENETRATION TEST (CPT) LOG

TEST NO.: CPT101

Client Ref.: GHD



EOH: 15.04m

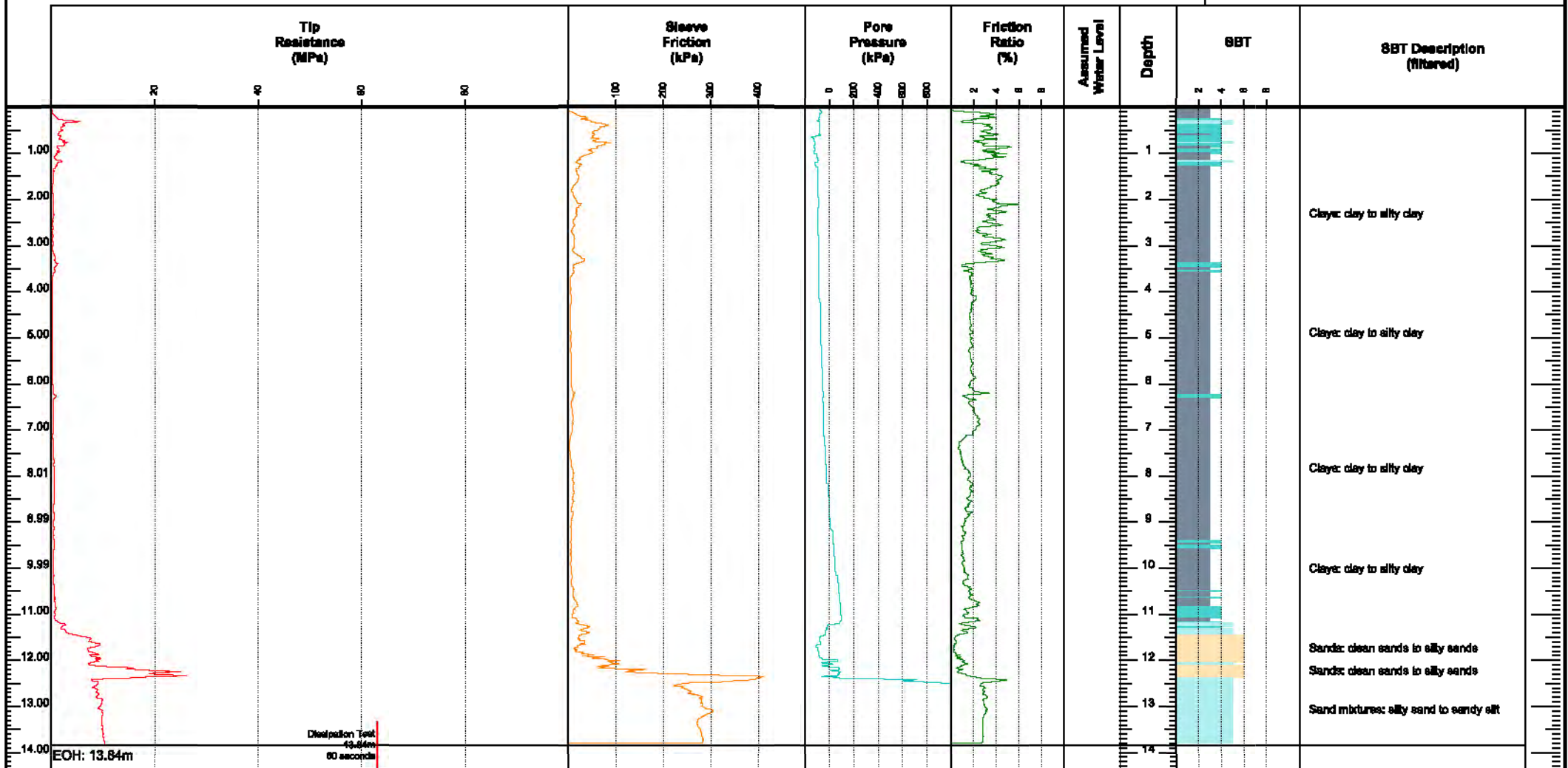
<p>Client: GHD Project: Green Island Location: Dunedin Contractor: Speight Drilling Ltd</p>	<p>Remarks: 50mpa probe used, water level 0.13m, hole sealed to surface with grout Termination Reason: Refusal at 15.04 due to sleeve resistance</p>	<p>Northing: 4913086 Easting: 1399043 System: NZTM Elevation: 4m Datum: Method: Garmin GPS</p>	<p>Rig: Pagani TG83 - 150 Cone ID: Mks867 Cone Area: 10cm² Sleeve Area: 150cm² Area Ratio: 0.79 Predrill: 0m</p>	<p>Soil Behaviour Type (SBT) - Robertson et al. 1986</p> <table border="0"> <tr> <td>0 Undefined</td> <td>5 Sand mixtures: silty sand to sandy silt</td> </tr> <tr> <td>1 Sensitive fine-grained</td> <td>6 Sands: clean sands to silty sands</td> </tr> <tr> <td>2 Clay - organic soil</td> <td>7 Dense sand to gravelly sand</td> </tr> <tr> <td>3 Clays: clay to silty clay</td> <td>8 Stiff sand to clayey sand</td> </tr> <tr> <td>4 Silt mixtures: clayey silt & silty clay</td> <td>9 Stiff fine-grained</td> </tr> </table>	0 Undefined	5 Sand mixtures: silty sand to sandy silt	1 Sensitive fine-grained	6 Sands: clean sands to silty sands	2 Clay - organic soil	7 Dense sand to gravelly sand	3 Clays: clay to silty clay	8 Stiff sand to clayey sand	4 Silt mixtures: clayey silt & silty clay	9 Stiff fine-grained	<p>Date: 18/10/2022 8:46:46 PM</p>
0 Undefined	5 Sand mixtures: silty sand to sandy silt														
1 Sensitive fine-grained	6 Sands: clean sands to silty sands														
2 Clay - organic soil	7 Dense sand to gravelly sand														
3 Clays: clay to silty clay	8 Stiff sand to clayey sand														
4 Silt mixtures: clayey silt & silty clay	9 Stiff fine-grained														



CONE PENETRATION TEST (CPT) LOG

TEST NO.: CPT102

Client Ref.: GHD

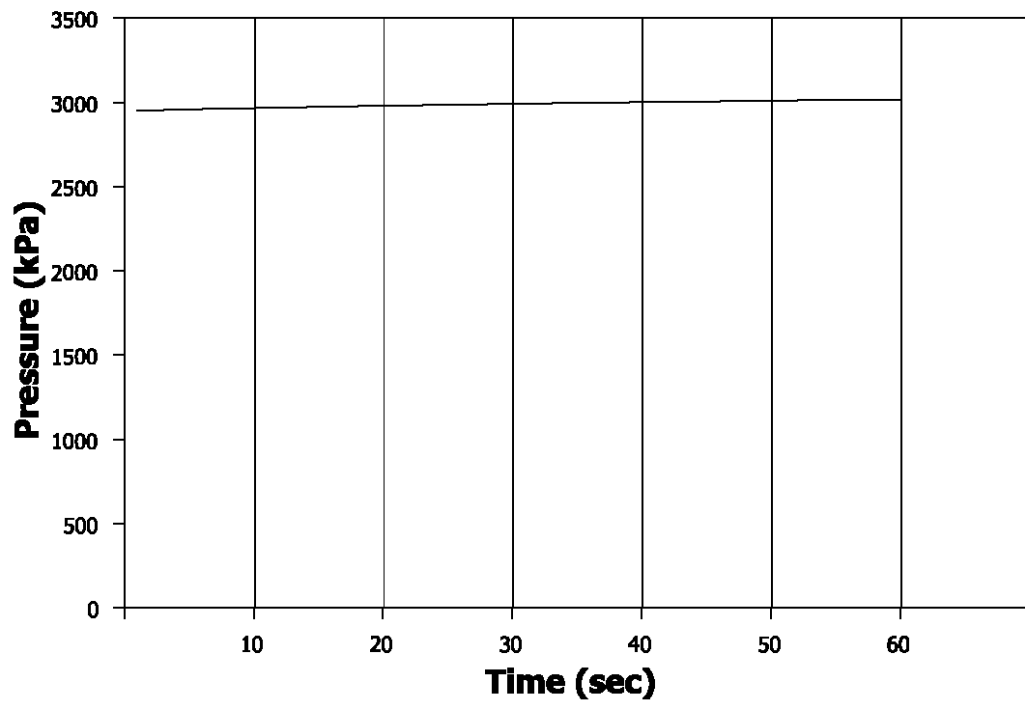


<p>Client: GHD Project: Green Island Location: Dunedin Contractor: Speight Drilling Ltd</p>	<p>Remarks: 50mpa probe used, artesian water pressure, hole sealed to surface with grout</p> <p>Termination Reason: Refusal at 13.04m due to sleeve resistance</p>	<p>Northing: 4812847 Easting: 1399038 System: NZTM Elevation: 4m Datum: Method: Garmin GPS</p>	<p>Rig: Pagani TG83 - 150 Cone ID: Mka867 Cone Area: 10cm² Sleeve Area: 150cm² Area Ratio: 0.79 PreDrill: 0m</p>	<p>Soil Behaviour Type (SBT) - Robertson et al. 1986</p> <table border="0"> <tr> <td>0</td><td>Undeformed</td> <td>5</td><td>Sand mixtures: silty sand to sandy silt</td> </tr> <tr> <td>1</td><td>Sensitive fine-grained</td> <td>6</td><td>Sands: clean sands to silty sands</td> </tr> <tr> <td>2</td><td>Clay - organic soil</td> <td>7</td><td>Dense sand to gravelly sand</td> </tr> <tr> <td>3</td><td>Clays: clay to silty clay</td> <td>8</td><td>Stiff sand to clayey sand</td> </tr> <tr> <td>4</td><td>Silt mixtures: clayey silt & silty clay</td> <td>9</td><td>Stiff fine-grained</td> </tr> </table>	0	Undeformed	5	Sand mixtures: silty sand to sandy silt	1	Sensitive fine-grained	6	Sands: clean sands to silty sands	2	Clay - organic soil	7	Dense sand to gravelly sand	3	Clays: clay to silty clay	8	Stiff sand to clayey sand	4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained	<p>Date: 18/10/2022 4:36:18 AM</p> <p>Page 1 of 2</p>
0	Undeformed	5	Sand mixtures: silty sand to sandy silt																						
1	Sensitive fine-grained	6	Sands: clean sands to silty sands																						
2	Clay - organic soil	7	Dense sand to gravelly sand																						
3	Clays: clay to silty clay	8	Stiff sand to clayey sand																						
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained																						

DISSIPATION TESTS

Test Depth: 13.84

60

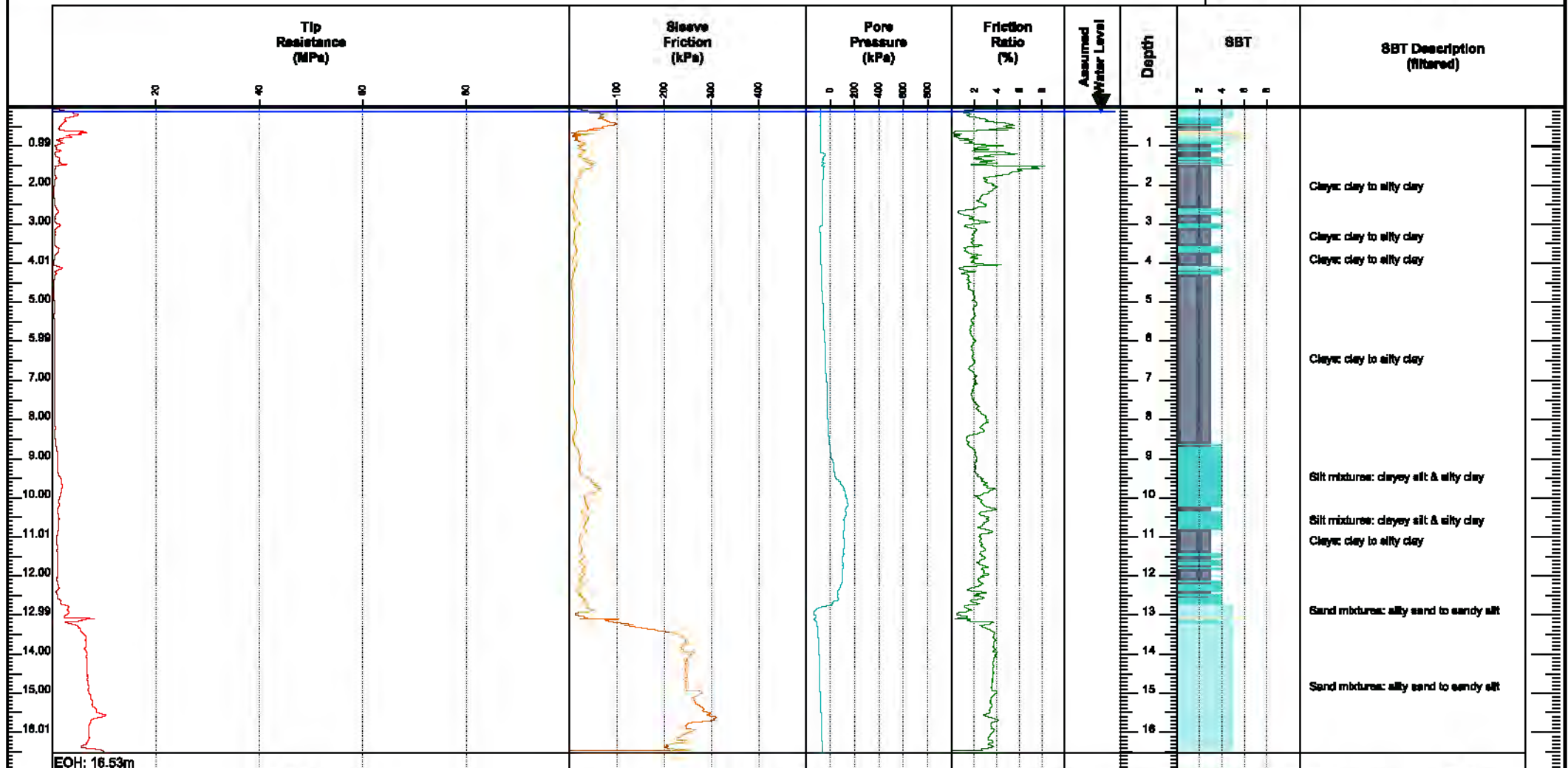




CONE PENETRATION TEST (CPT) LOG

TEST NO.: CPT103

Client Ref.: GHD



EOH: 16.53m

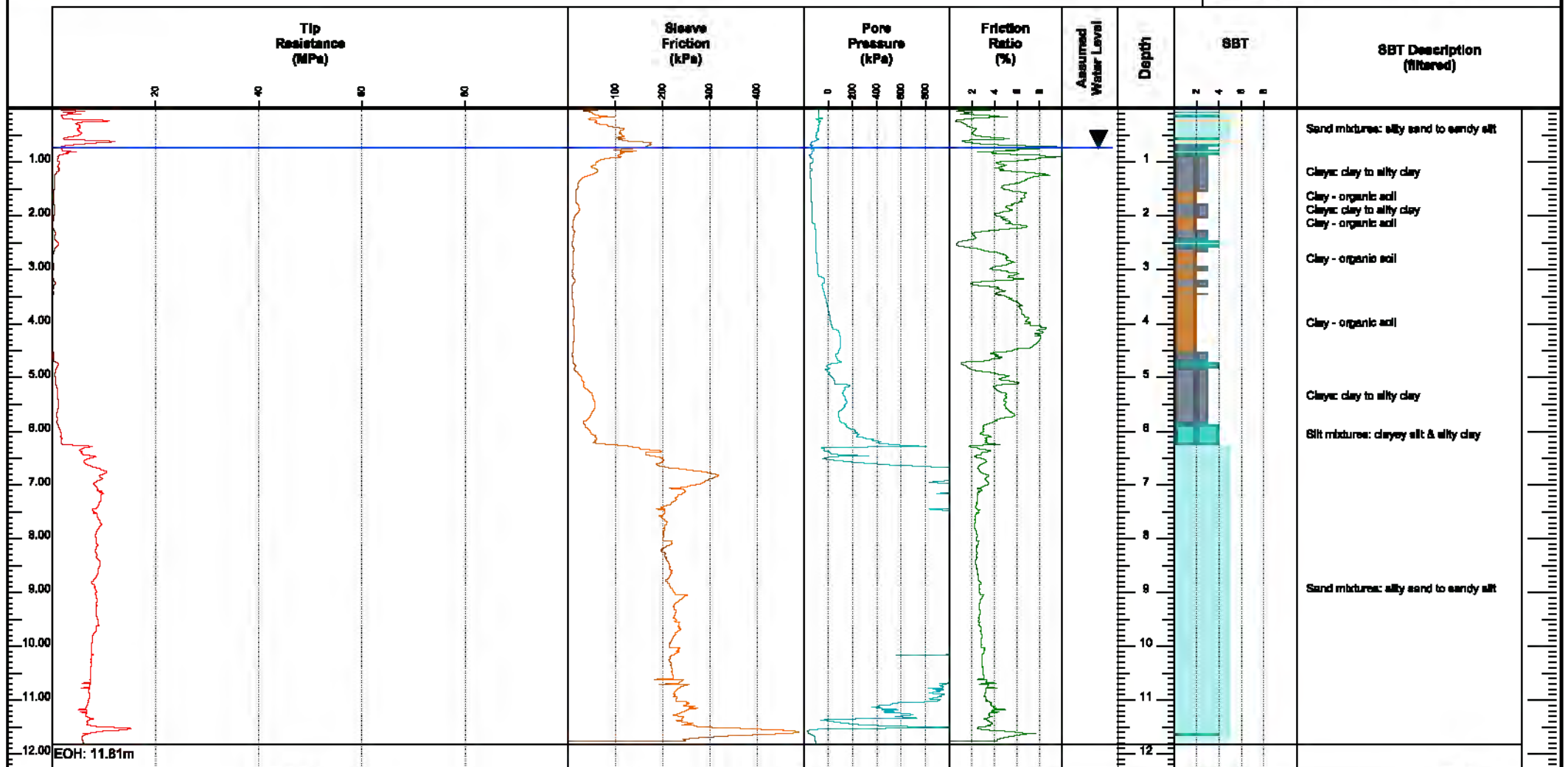
<p>Client: GHD Project: Green Island Location: Dunedin Contractor: Speight Drilling Ltd</p>	<p>Remarks: 50mpa probe used, water level 0.12m, hole sealed to surface with grout. Went deeper than 15m due to minimal resistance at that point Termination Reason: Refusal at 16.53m</p>	<p>Northing: 4912854 Easting: 1399009 System: NZTM Elevation: 5m Datum: Method: Garmin GPS</p>	<p>Rig: Pagani TG63 - 150 Cone ID: Mks867 Cone Area: 10cm² Sleeve Area: 150cm² Area Ratio: 0.79 Predrill: 0m</p>	<p>Soil Behaviour Type (SBT) - Robertson et al. 1986</p> <table border="0"> <tr> <td>0 Undefined</td> <td>5 Sand mixtures: silty sand to sandy silt</td> </tr> <tr> <td>1 Sensitive fine-grained</td> <td>6 Sands: clean sands to silty sands</td> </tr> <tr> <td>2 Clay - organic soil</td> <td>7 Dense sand to gravelly sand</td> </tr> <tr> <td>3 Clays: clay to silty clay</td> <td>8 Stiff sand to clayey sand</td> </tr> <tr> <td>4 Silt mixtures: clayey silt & silty clay</td> <td>9 Stiff fine-grained</td> </tr> </table>	0 Undefined	5 Sand mixtures: silty sand to sandy silt	1 Sensitive fine-grained	6 Sands: clean sands to silty sands	2 Clay - organic soil	7 Dense sand to gravelly sand	3 Clays: clay to silty clay	8 Stiff sand to clayey sand	4 Silt mixtures: clayey silt & silty clay	9 Stiff fine-grained	<p>Date: 18/10/2022 2:36:25 AM</p>
0 Undefined	5 Sand mixtures: silty sand to sandy silt														
1 Sensitive fine-grained	6 Sands: clean sands to silty sands														
2 Clay - organic soil	7 Dense sand to gravelly sand														
3 Clays: clay to silty clay	8 Stiff sand to clayey sand														
4 Silt mixtures: clayey silt & silty clay	9 Stiff fine-grained														



CONE PENETRATION TEST (CPT) LOG

TEST NO.: CPT104

Client Ref.: GHD



Client: GHD
Project: Green Island
Location: Dunedin
Contractor: Speight Drilling Ltd

Remarks:
 50mpa probe used, water level 0.73m, hole sealed to surface with grout
Termination Reason:
 Refusal at 11.81m due to sleeve friction

Northing: 4912658
Easting: 1399017
System: NZTM
Elevation: 3m
Datum:
Method: Garmin GPS

Rig: Pagani TG83 - 150
Cone ID: Mks867
Cone Area: 10cm²
Sleeve Area: 150cm²
Area Ratio: 0.79
Predrill: 0m

Soil Behaviour Type (SBT) - Robertson et al. 1986

0	Undefined	5	Sand mixtures: silty sand to sandy silt
1	Sensitive fine-grained	6	Sands: clean sands to silty sands
2	Clay - organic soil	7	Dense sand to gravelly sand
3	Clays: clay to silty clay	8	Stiff sand to clayey sand
4	Silt mixtures: clayey silt & silty clay	9	Stiff fine-grained

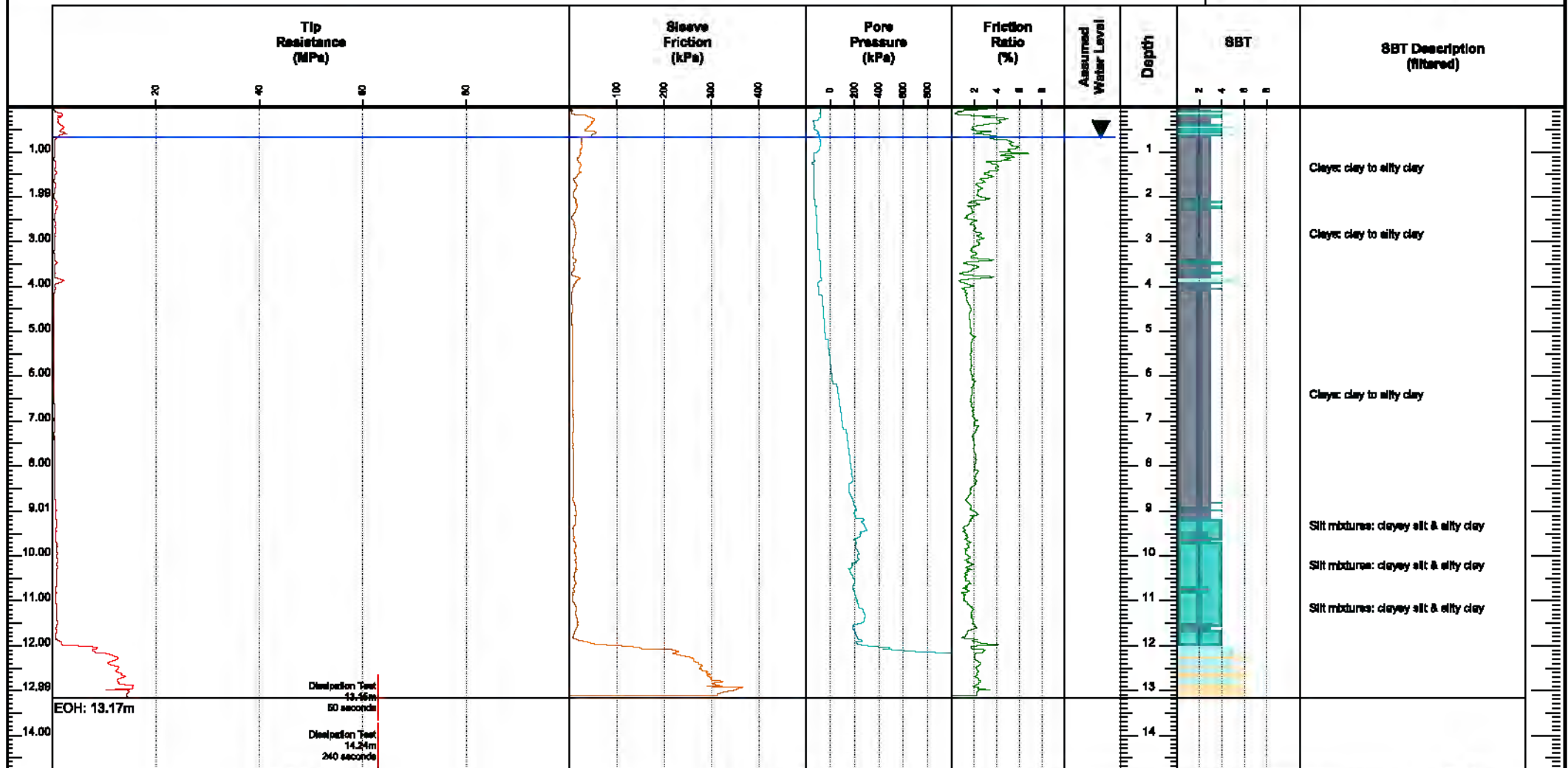
Date: 18/10/2022 1:00:49 AM
 Page 1 of 1



CONE PENETRATION TEST (CPT) LOG

TEST NO.: CPT105

Client Ref.: GHD

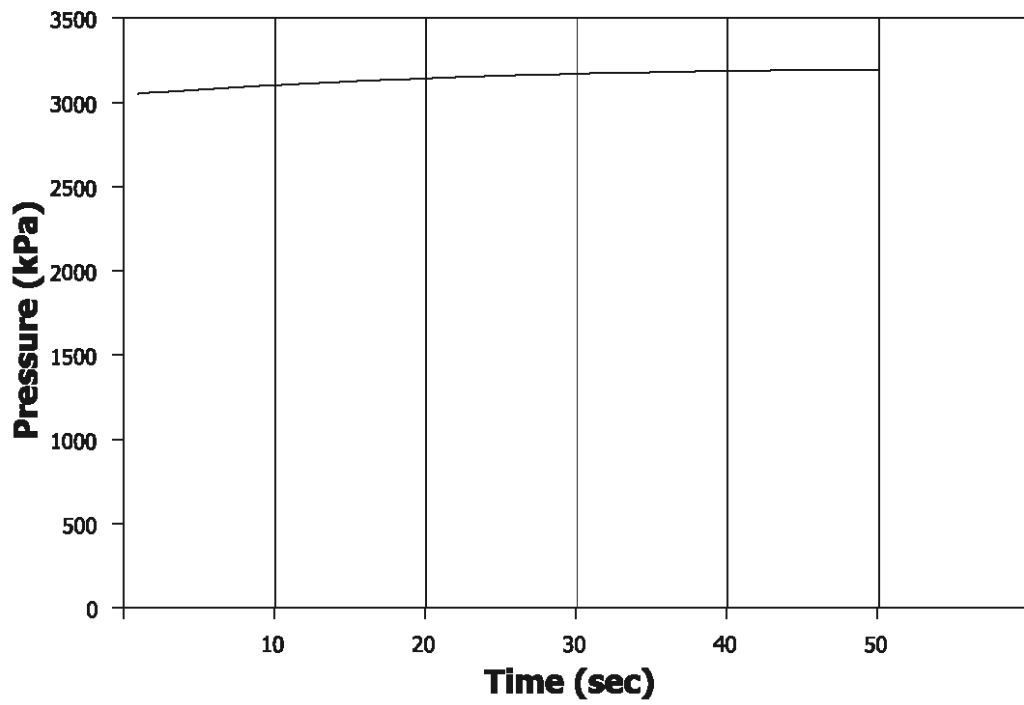


<p>Client: GHD Project: Green Island Location: Dunedin Contractor: Speight Drilling Ltd</p>	<p>Remarks: 100mpa probe used, water level 0.68m, hole sealed to surface with grout</p> <p>Termination Reason: Refusal due to excess pore pressure at 13.15m</p>	<p>Northing: 4912600 Easting: 1399102 System: NZTM Elevation: 3m Datum: Method: Garmin GPS</p>	<p>Rig: Pagani TG63 - 150 Cone ID: Mks644 Cone Area: 10cm² Sleeve Area: 150cm² Area Ratio: 0.79 Predrill: 0m</p>	<p>Soil Behaviour Type (SBT) - Robertson et al. 1986</p> <table border="0"> <tr> <td>0 Undefined</td> <td>5 Sand mixtures, silty sand to sandy silt</td> </tr> <tr> <td>1 Sensitive fine-grained</td> <td>6 Sands: clean sands to silty sands</td> </tr> <tr> <td>2 Clay - organic soil</td> <td>7 Dense sand to gravelly sand</td> </tr> <tr> <td>3 Clays: clay to silty clay</td> <td>8 Stiff sand to clayey sand</td> </tr> <tr> <td>4 Silt mixtures, clayey silt & silty clay</td> <td>9 Stiff fine-grained</td> </tr> </table>	0 Undefined	5 Sand mixtures, silty sand to sandy silt	1 Sensitive fine-grained	6 Sands: clean sands to silty sands	2 Clay - organic soil	7 Dense sand to gravelly sand	3 Clays: clay to silty clay	8 Stiff sand to clayey sand	4 Silt mixtures, clayey silt & silty clay	9 Stiff fine-grained	<p>Date: 17/10/2022 9:53:57 PM</p> <p style="text-align: right;">Page 1 of 2</p>
0 Undefined	5 Sand mixtures, silty sand to sandy silt														
1 Sensitive fine-grained	6 Sands: clean sands to silty sands														
2 Clay - organic soil	7 Dense sand to gravelly sand														
3 Clays: clay to silty clay	8 Stiff sand to clayey sand														
4 Silt mixtures, clayey silt & silty clay	9 Stiff fine-grained														

DISSIPATION TESTS

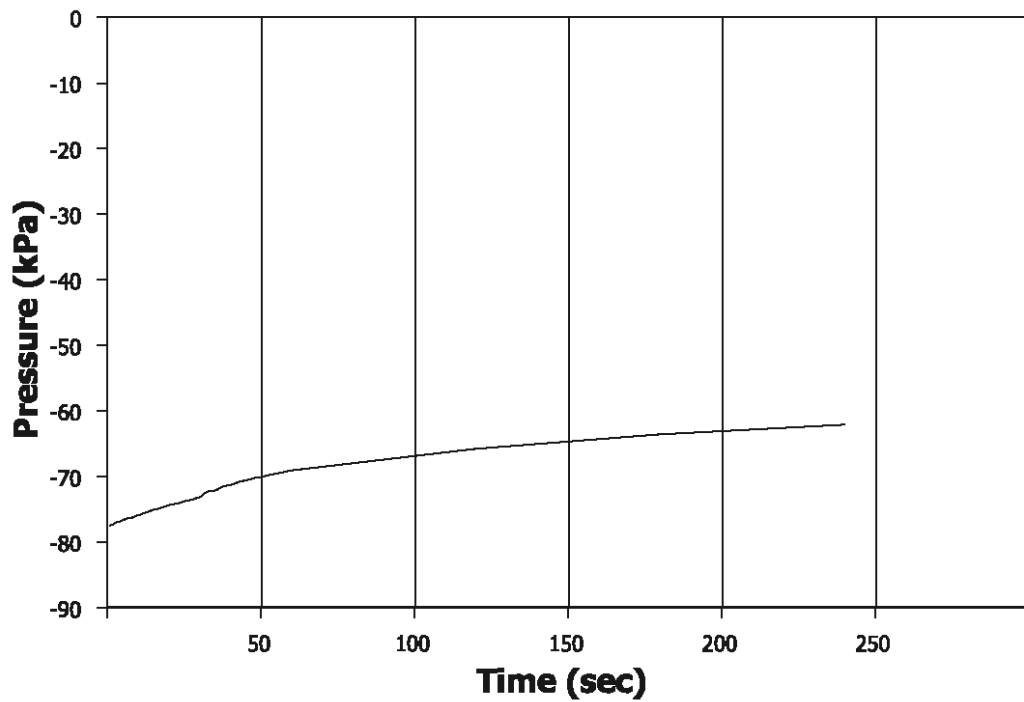
Test Depth: 13.15

50



Test Depth: 14.24

240

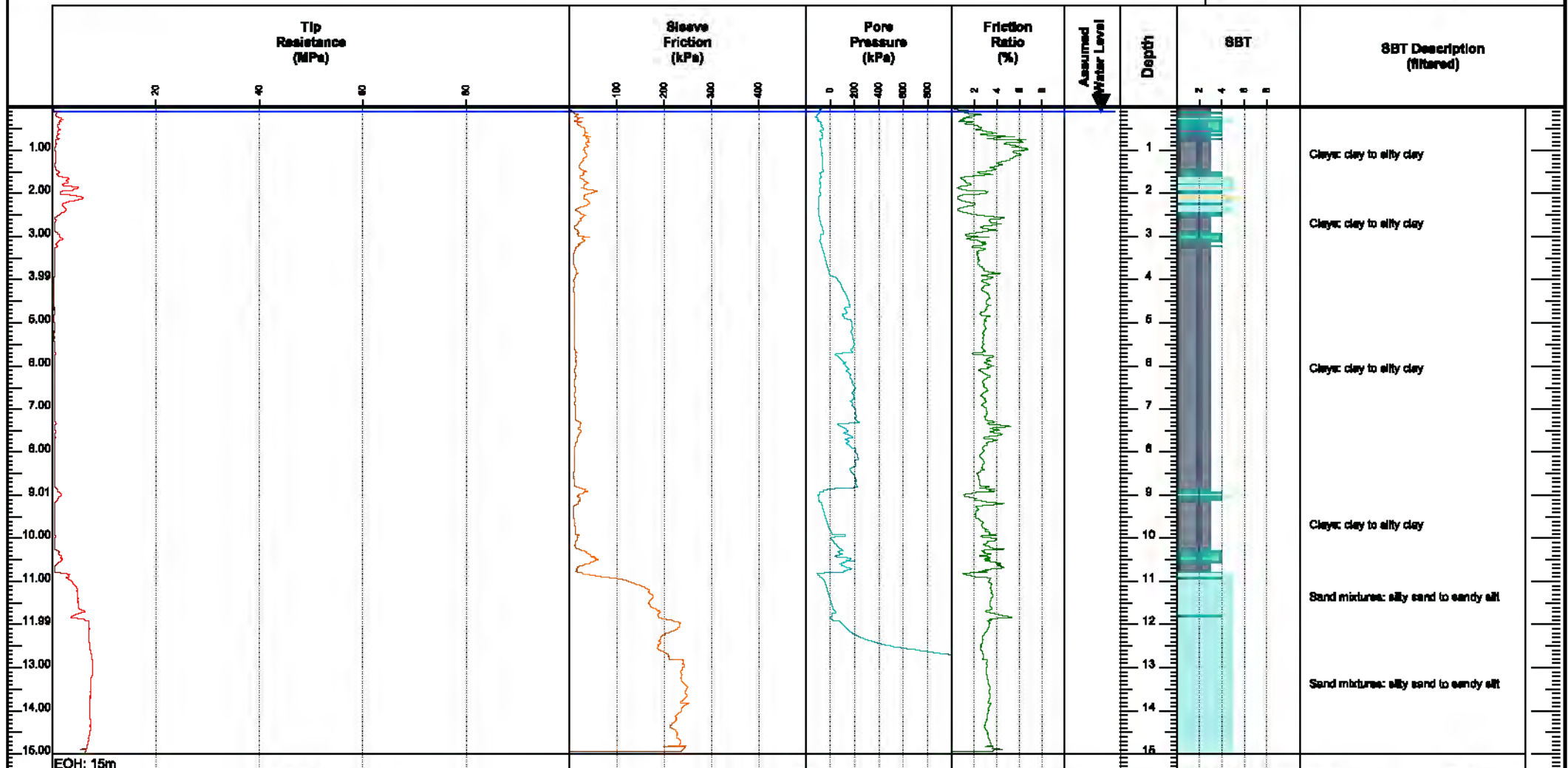




CONE PENETRATION TEST (CPT) LOG

TEST NO.: CPT108

Client Ref.: GHD



<p>Client: GHD</p> <p>Project: Green Island</p> <p>Location: Dunedin</p> <p>Contractor: Speight Drilling Ltd</p>	<p>Remarks: 50mpa probe used, water level 0.11m, hole sealed to surface with grout</p> <p>Termination Reason: Refusal at 15m due to sleeve resistance</p>	<p>Northing: 4913237</p> <p>Easting: 1399262</p> <p>System: NZTM</p> <p>Elevation: 4m</p> <p>Datum:</p> <p>Method: Garmin GPS</p>	<p>Rig: Pagani TG83 - 150</p> <p>Cone ID: Mks867</p> <p>Cone Area: 10cm²</p> <p>Sleeve Area: 150cm²</p> <p>Area Ratio: 0.79</p> <p>Predrill: 0m</p>	<p>Soil Behaviour Type (SBT) - Robertson et al. 1986</p> <table style="font-size: small;"> <tr> <td style="background-color: #cccccc; width: 15px; height: 15px; display: inline-block;"></td> <td>0 Undefined</td> <td style="background-color: #ffffcc; width: 15px; height: 15px; display: inline-block;"></td> <td>5 Sand mixtures: silty sand to sandy silt</td> </tr> <tr> <td style="background-color: #ffcccc; width: 15px; height: 15px; display: inline-block;"></td> <td>1 Sensitive fine-grained</td> <td style="background-color: #ccffcc; width: 15px; height: 15px; display: inline-block;"></td> <td>6 Sands: clean sands to silty sands</td> </tr> <tr> <td style="background-color: #ffcc99; width: 15px; height: 15px; display: inline-block;"></td> <td>2 Clay - organic soil</td> <td style="background-color: #ccff99; width: 15px; height: 15px; display: inline-block;"></td> <td>7 Dense sand to gravelly sand</td> </tr> <tr> <td style="background-color: #ccffcc; width: 15px; height: 15px; display: inline-block;"></td> <td>3 Clays: clay to silty clay</td> <td style="background-color: #ffffcc; width: 15px; height: 15px; display: inline-block;"></td> <td>8 Stiff sand to clayey sand</td> </tr> <tr> <td style="background-color: #ccffcc; width: 15px; height: 15px; display: inline-block;"></td> <td>4 Silt mixtures: clayey silt & silty clay</td> <td style="background-color: #ffffcc; width: 15px; height: 15px; display: inline-block;"></td> <td>9 Stiff fine-grained</td> </tr> </table>		0 Undefined		5 Sand mixtures: silty sand to sandy silt		1 Sensitive fine-grained		6 Sands: clean sands to silty sands		2 Clay - organic soil		7 Dense sand to gravelly sand		3 Clays: clay to silty clay		8 Stiff sand to clayey sand		4 Silt mixtures: clayey silt & silty clay		9 Stiff fine-grained	<p>Date: 18/10/2022 11:04:58 PM</p>
	0 Undefined		5 Sand mixtures: silty sand to sandy silt																						
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Appendix D

Equipment Calibration Sheet

CONE CALIBRATION CERTIFICATE

N° Z240/22

Calibrated system (Sistema tarato):

Serial number	Mks867
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	50
Scaling Factor:	179640
Tip net area ratio (a_n):	0,79
Sleeve net ratio (b_n):	0,00

Addressee (destinatario):

Speight Drilling Ltd
510 Bannockburn Road, Bannockburn,
Central Otago (New Zealand)

Applied load measurement system:

(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

Power press:

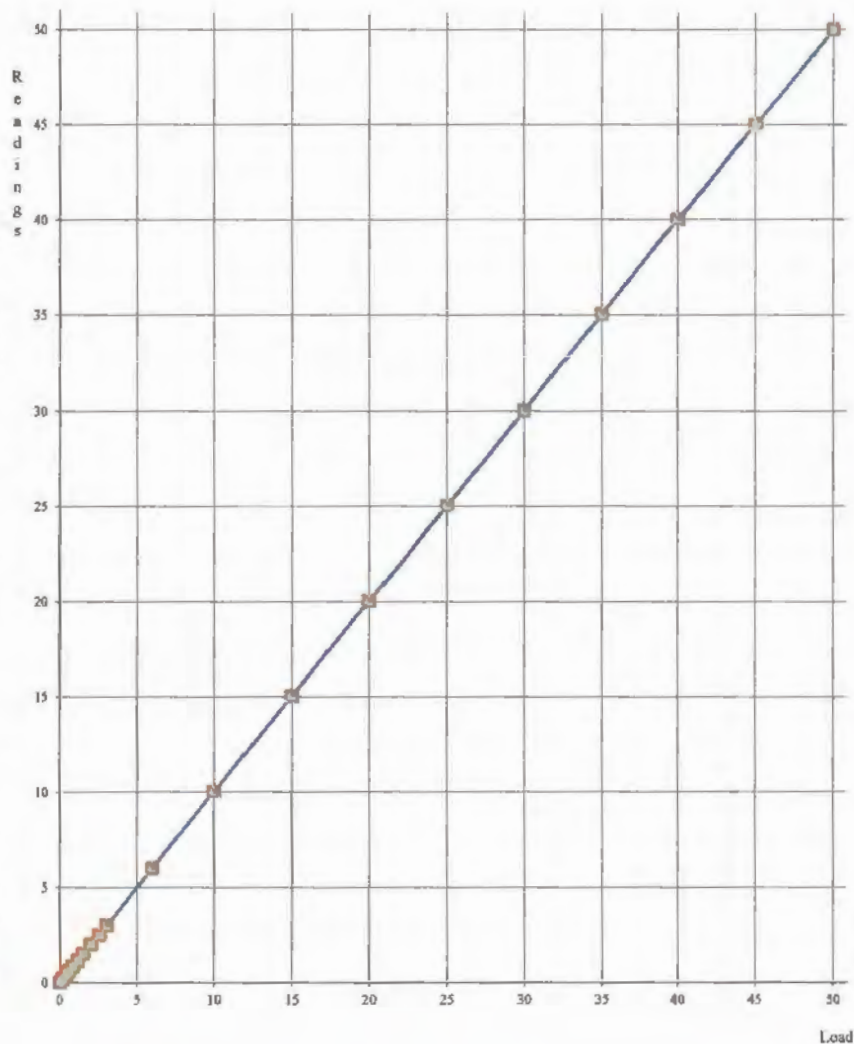
Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. (Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)

Last verification date:	11/01/2022
Certificate N.	LAT 091 2022-004

Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with **ASTM D5778-12**

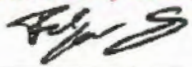


	Ascending		Descending	
	Load	Readings	Load	Readings
1	0,00	0,01	0,00	0,01
2	0,03	0,02	0,03	0,03
3	0,20	0,20	0,20	0,20
4	0,40	0,40	0,40	0,40
5	0,60	0,60	0,60	0,60
6	0,85	0,85	0,85	0,85
7	1,15	1,15	1,15	1,15
8	1,50	1,50	1,50	1,50
9	2,00	2,00	2,00	2,00
10	2,50	2,51	2,50	2,51
11	3,00	3,00	3,00	3,01
12	6,00	6,01	6,00	6,01
13	10,00	10,02	10,00	10,03
14	15,00	15,03	15,00	15,04
15	20,00	20,04	20,00	20,05
16	25,00	25,04	25,00	25,05
17	30,00	30,04	30,00	30,04
18	35,00	35,03	35,00	35,04
19	40,00	40,02	40,00	40,04
20	45,00	45,01	45,00	45,02
21	50,00	50,00	50,00	50,00

Unit: Mpa

Zero-load error:	=	0,000	% FSO
Zero-load thermal stability:	<=	1,000	% FSO
Nonlinearity:	=	0,078	% FSO
Hysteresis:	=	0,024	% FSO
Calibration error:	=	0,000	% MO
Apparent load:	=	0,022	% FSO

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by 

Date of issue 21/09/2022

CONE CALIBRATION CERTIFICATE N° Z240/22

Calibrated system (Sistema tarato):

Serial number	Mks867
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	29667

Addressee (destinatario):

Speight Drilling Ltd
510 Bannockburn Road, Bannockburn,
Central Otago (New Zealand)

Applied load measurement system:

(Sistema di rilevamento del carico applicato)

Load cell:

Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495

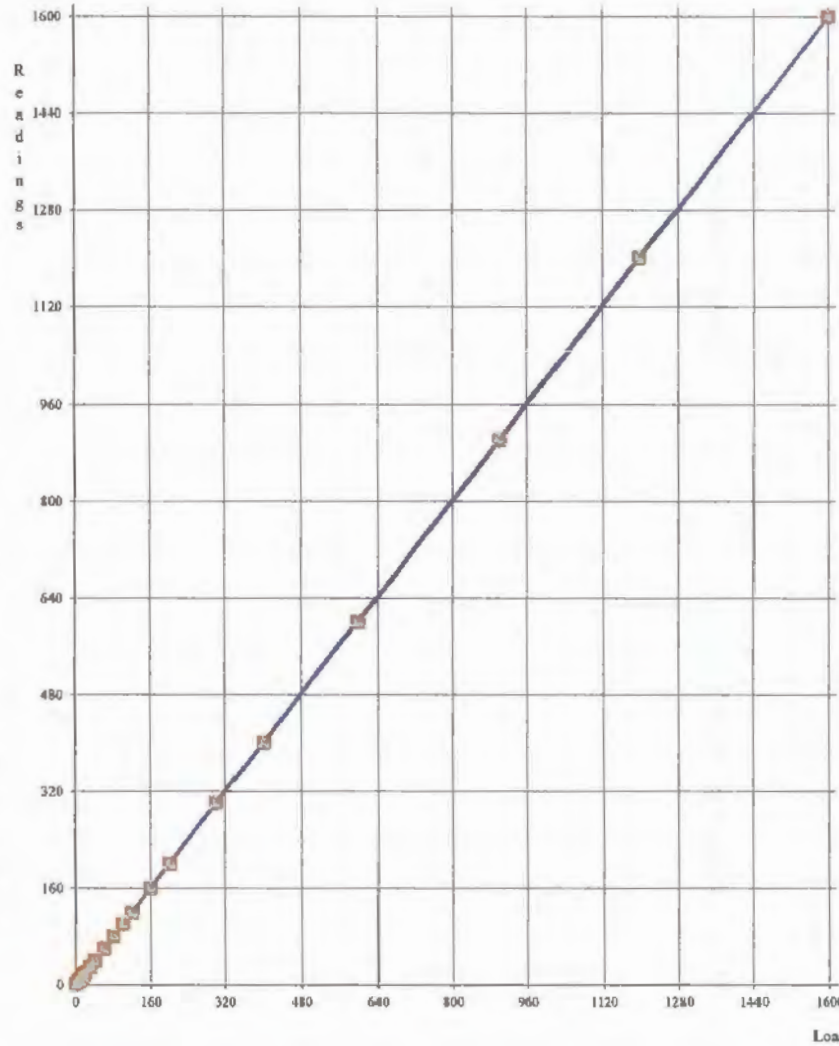
Power press:

Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. (Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)

Last verification date:	11/01/2022
Certificate N.	LAT 091 2022-004
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with ASTM D5778-12



	Ascending		Descending	
	Load	Readings	Load	Readings
1	0,00	0,73	0,00	1,13
2	2,00	1,07	2,00	2,33
3	5,00	4,80	5,00	5,33
4	7,00	6,80	7,00	7,33
5	10,00	9,80	10,00	10,40
6	16,00	15,60	16,00	16,27
7	20,00	19,53	20,00	20,33
8	30,00	29,67	30,00	30,60
9	40,00	39,67	40,00	40,67
10	60,00	59,80	60,00	60,87
11	80,00	79,93	80,00	81,07
12	100,00	100,07	100,00	101,27
13	120,00	120,20	120,00	121,40
14	160,00	160,33	160,00	161,73
15	200,00	200,47	200,00	202,00
16	300,00	300,87	300,00	302,47
17	400,00	401,00	400,00	402,80
18	600,00	601,47	600,00	603,60
19	900,00	902,00	900,00	904,40
20	1200,00	1201,73	1200,00	1204,20
21	1600,00	1600,00	1600,00	1600,33

Unit: kPa

Zero-load error:	=	0,025	% FSO
Zero-load thermal stability:	≤	1,000	% FSO
Nonlinearity:	=	0,125	% FSO
Hysteresis:	=	0,154	% FSO
Calibration error:	=	0,000	% MO
Apparent load:	=	0,120	% FSO

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by

Date of issue

21/09/2022

CONE CALIBRATION CERTIFICATE

N° Z240/22

Calibrated system (Sistema tarato) :

Serial number **Mks867**
Sensor **PORE PRESSURE**
Max. Capacity [kPa]: **2500**
Scaling Factor: **10444**

Sensor **TILT ANGLE**
Max. Inclination [°]: **20**
Scaling Factor: **277280**

Addressee (destinatario) :

Speight Drilling Ltd
510 Bannockburn Road, Bannockburn,
Central Otago (New Zealand)

Applied load measurement system:

(Sistema di rilevamento del carico applicato)

Pressure Generator:

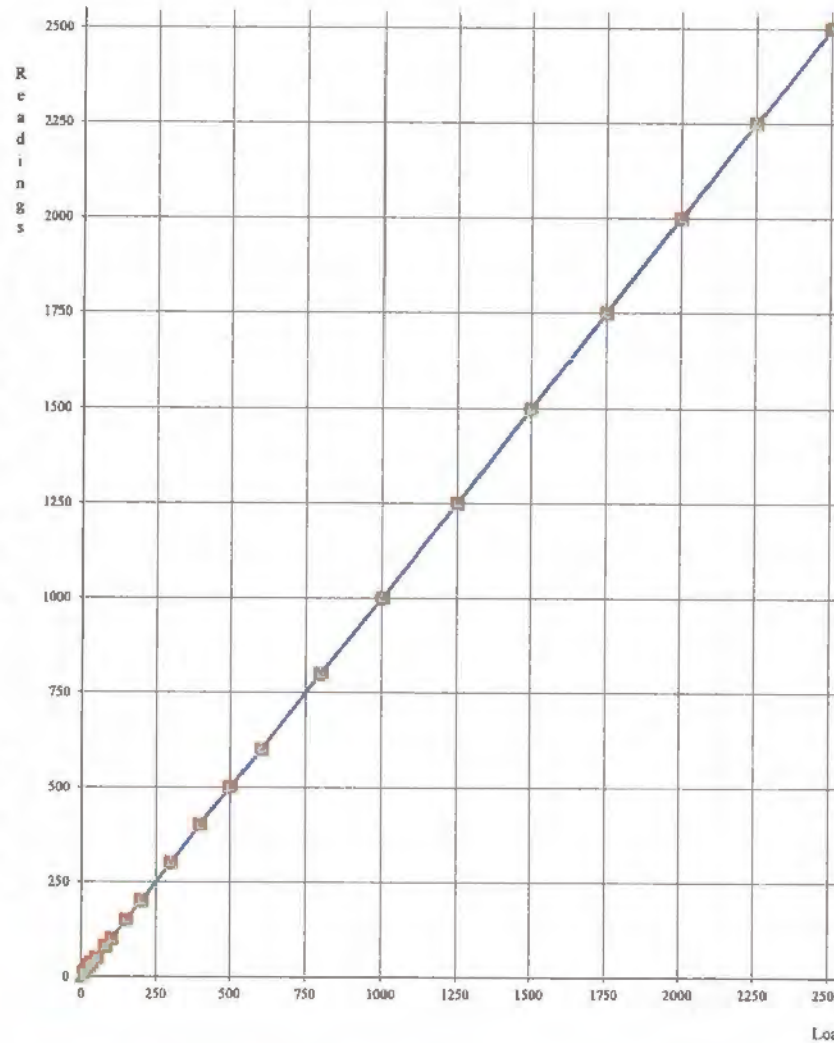
Manufacturer **MENSOR**
Model **CPC 4000**
Serial Number **41000V56**
Sensor Descr **Silicon Pressure Transducer**
Sensor Serial Number **41000V3Y**

The measurement system is periodically checked in a SIT calibration center. (Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)

Last verification date: **22/04/2022**
Certificate N. **0284-SP-22**

Temperature of calibration **22°C**
Humidity **45%**

Factory calibration in accordance with **ASTM D5778-12**



	Ascending		Descending	
	Load	Readings	Load	Readings
1	-0,10	0,00	0,00	0,00
2	10,00	10,00	10,00	10,00
3	25,00	24,80	25,00	24,90
4	35,00	34,80	35,00	34,70
5	50,00	49,60	49,90	49,50
6	80,00	79,50	80,00	79,80
7	100,00	99,70	100,00	99,90
8	150,00	149,90	150,00	150,00
9	200,00	200,10	200,00	200,00
10	300,00	300,20	300,00	300,00
11	400,00	400,10	399,90	399,80
12	500,00	500,00	499,90	499,70
13	600,00	599,80	599,90	599,60
14	800,00	799,50	799,90	799,10
15	1000,00	999,30	999,90	998,70
16	1250,00	1249,00	1250,00	1248,60
17	1500,00	1498,90	1499,80	1498,10
18	1750,00	1749,00	1750,00	1748,50
19	2000,00	1999,10	2000,00	1998,70
20	2250,00	2249,50	2250,00	2249,40
21	2500,00	2500,00	2500,00	2500,20

Unit: kPa

Zero-load error:	=	0,004	% FSO
Nonlinearity:	=	0,044	% FSO

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by

Date of issue

21/09/2022

CONE CALIBRATION CERTIFICATE

N° Z240/22

Calibrated system (*Sistema tarato*) :

Serial number **Mks867**

Tip net area ratio (a_n): **0,7893**

Sleeve net ratio (b_n): **0,0000**

Addressee (*destinatario*) :

Speight Drilling Ltd

510 Bannockburn Road, Bannockburn,

Central Otago (New Zealand)

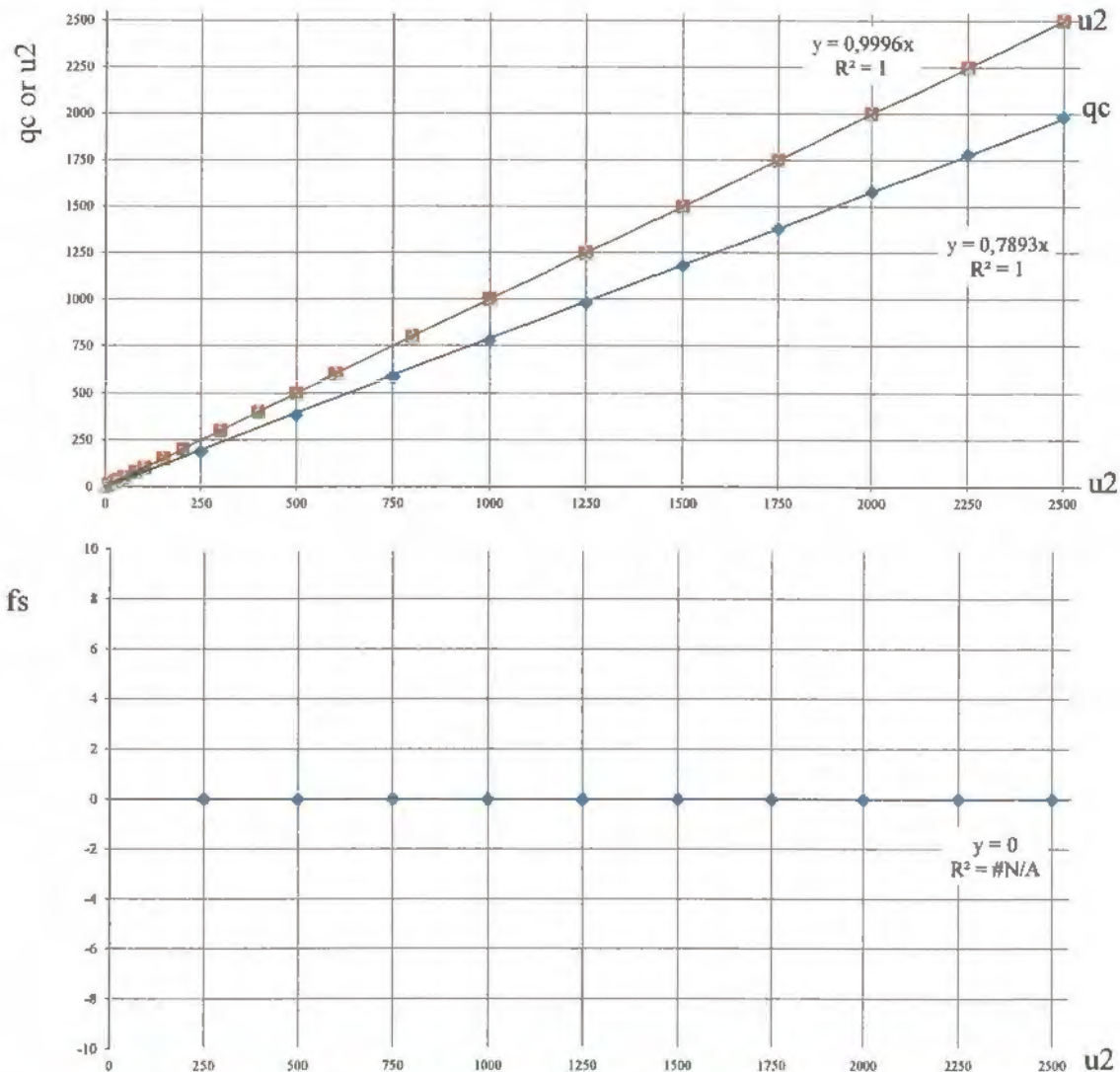
	u2 (kPa)	qc (kPa)	fs (kPa)	u2 (psi)	qc (psi)	fs (psi)
0 (0)	-0,10	0,00	0,00	0,00	0,00	0,00
250 (36,26)	250,00	189,00	0,00	250,30	27,41	0,00
500 (72,52)	500,00	384,00	0,00	500,20	55,69	0,00
750 (108,78)	750,00	585,00	0,00	749,90	84,85	0,00
1000 (145,04)	1000,00	779,00	0,00	999,60	112,98	0,00
1250 (181,30)	1250,00	980,00	0,00	1249,40	142,14	0,00
1500 (217,56)	1500,00	1180,00	0,00	1499,20	171,14	0,00
1750 (253,82)	1750,00	1381,00	0,00	1749,40	200,30	0,00
2000 (290,08)	2000,00	1581,00	0,00	1999,60	229,30	0,00
2250 (326,33)	2250,00	1781,00	0,00	2250,20	258,31	0,00
2500 (362,59)	2500,00	1982,00	0,00	2500,80	287,46	0,00

Unit: kPa - (psi)

Temperature of calibration 22°C

Humidity 45%

Factory calibration in accordance with *ASTM D5778-12*



The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by 

Date of issue

21/09/2022

CONE CALIBRATION CERTIFICATE
N° Z113/22

Calibrated system (Sistema tarato):

Serial number	Mks844
Sensor	TIP RESISTANCE
Max. Capacity [MPa]:	100
Scaling Factor:	187250
Tip net area ratio (a_n):	0,79
Sleeve net ratio (b_n):	0,00

Addressee (destinatario):

Speight Drilling Ltd
510 Bannockburn Road, Bannockburn,
Central Otago (New Zealand)

Applied load measurement system:

(Sistema di rilevamento del carico applicato)

Load cell:

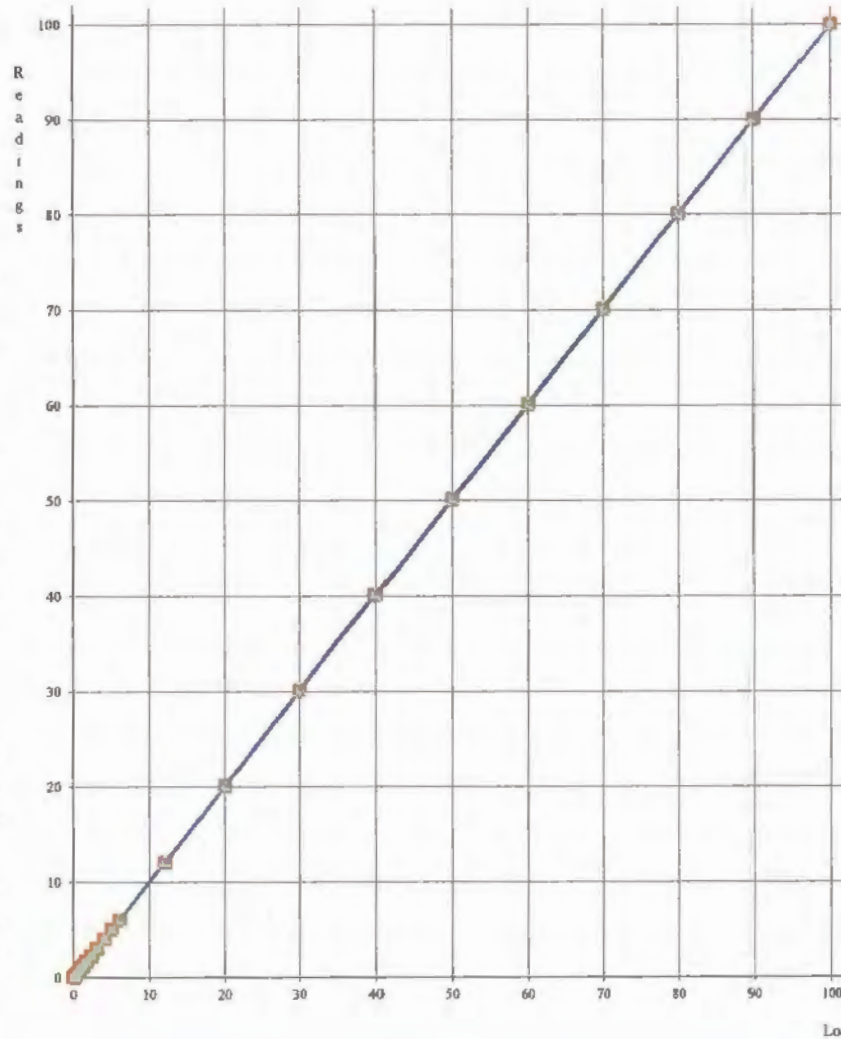
Manufacturer	AEP transducers
Model	KAL 200 kN
Serial Number	138913
Power press:	
Manufacturer	Easydur Italiana
Model	Aura 20T
Serial Number	29084

The measurement system is periodically checked in a SIT calibration center. (Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)

Last verification date:	11/01/2022
Certificate N.	LAT 091 2022-005

Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with **ASTM D5778-12**

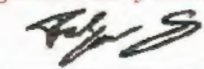


	Ascending		Descending	
	Load	Readings	Load	Readings
1	0,00	0,01	0,00	0,00
2	0,06	0,05	0,06	0,05
3	0,40	0,40	0,40	0,40
4	0,80	0,80	0,80	0,80
5	1,20	1,20	1,20	1,20
6	1,70	1,70	1,70	1,71
7	2,30	2,31	2,30	2,31
8	3,00	3,01	3,00	3,02
9	4,00	4,01	4,00	4,02
10	5,00	5,02	5,00	5,03
11	6,00	6,02	6,00	6,04
12	12,00	12,04	12,00	12,08
13	20,00	20,08	20,00	20,12
14	30,00	30,11	30,00	30,16
15	40,00	40,14	40,00	40,20
16	50,00	50,15	50,00	50,21
17	60,00	60,16	60,00	60,20
18	70,00	70,13	70,00	70,18
19	80,00	80,11	80,00	80,14
20	90,00	90,06	90,00	90,08
21	100,00	100,00	100,00	100,00

Unit: Mpa

Zero-load error:	=	0,005	% FSO
Zero-load thermal stability:	<=	1,000	% FSO
Nonlinearity:	=	0,155	% FSO
Hysteresis:	=	0,059	% FSO
Calibration error:	=	0,000	% MO
Apparent load:	=	0,000	% FSO

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by 

Date of issue 28/04/2022

CONE CALIBRATION CERTIFICATE
N° Z113/22

Calibrated system (Sistema tarato):

Serial number	Mks844
Sensor	SLEEVE FRICTION
Max. Capacity [kPa]:	1600
Scaling Factor:	29590

Addressee (destinatario):

Speight Drilling Ltd
510 Bannockburn Road, Bannockburn,
Central Otago (New Zealand)

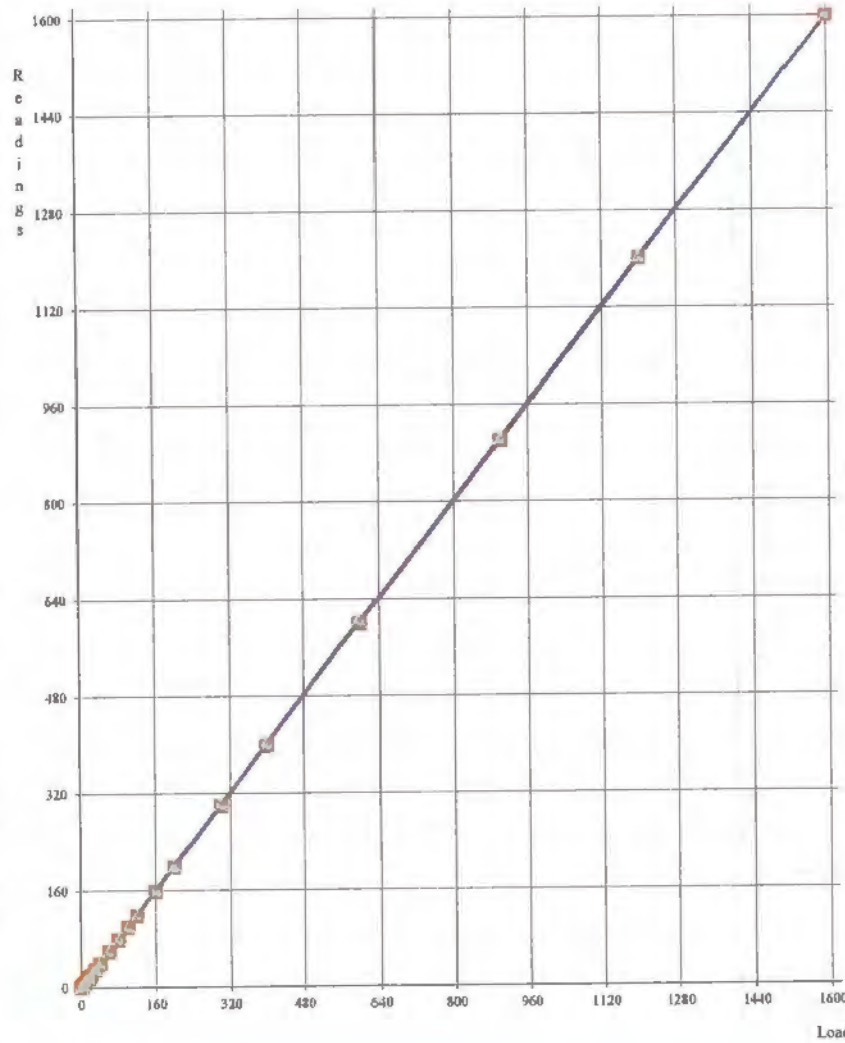
Applied load measurement system:
(Sistema di rilevamento del carico applicato)

Load cell:	
Manufacturer	AEP transducers
Model	KAL 50 kN
Serial Number	65495
Power press:	
Manufacturer	Easydur Italiana
Model	Aura 10T
Serial Number	29002

The measurement system is periodically checked in a SIT calibration center. (Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)

Last verification date:	11/01/2022
Certificate N.	LAT 091 2022-004
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with **ASTM D5778-12**



	Ascending		Descending	
	Load	Readings	Load	Readings
1	0,00	0,07	0,00	0,20
2	2,00	1,87	2,00	2,20
3	5,00	4,73	5,00	5,33
4	7,00	6,67	7,00	7,40
5	10,00	9,67	10,00	10,47
6	16,00	15,53	16,00	16,47
7	20,00	19,47	20,00	20,53
8	30,00	29,40	30,00	30,73
9	40,00	39,20	40,00	40,73
10	60,00	59,00	60,00	60,80
11	80,00	78,87	80,00	80,93
12	100,00	98,73	100,00	101,07
13	120,00	118,73	120,00	121,20
14	160,00	158,73	160,00	161,40
15	200,00	198,80	200,00	201,60
16	300,00	299,13	300,00	302,13
17	400,00	399,40	400,00	402,73
18	600,00	600,13	600,00	603,87
19	900,00	900,93	900,00	904,60
20	1200,00	1201,07	1200,00	1204,00
21	1600,00	1600,00	1600,00	1600,33

Unit: kPa

Zero-load error:	=	0,008	% FSO
Zero-load thermal stability:	≤	1,000	% FSO
Nonlinearity:	=	0,079	% FSO
Hysteresis:	=	0,233	% FSO
Calibration error:	=	0,000	% MO
Apparent load:	=	0,163	% FSO

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by 

Date of issue 28/04/2022

CONE CALIBRATION CERTIFICATE N° Z113/22

Calibrated system (Sistema tarato):

Serial number	Mks844
Sensor	PORE PRESSURE
Max. Capacity [kPa]:	2500
Scaling Factor:	10492
Sensor	TILT ANGLE
Max. Inclination [°]:	20
Scaling Factor:	279278

Addressee (destinatario):

Speight Drilling Ltd
510 Bannockburn Road, Bannockburn,
Central Otago (New Zealand)

Applied load measurement system: (Sistema di rilevamento del carico applicato)

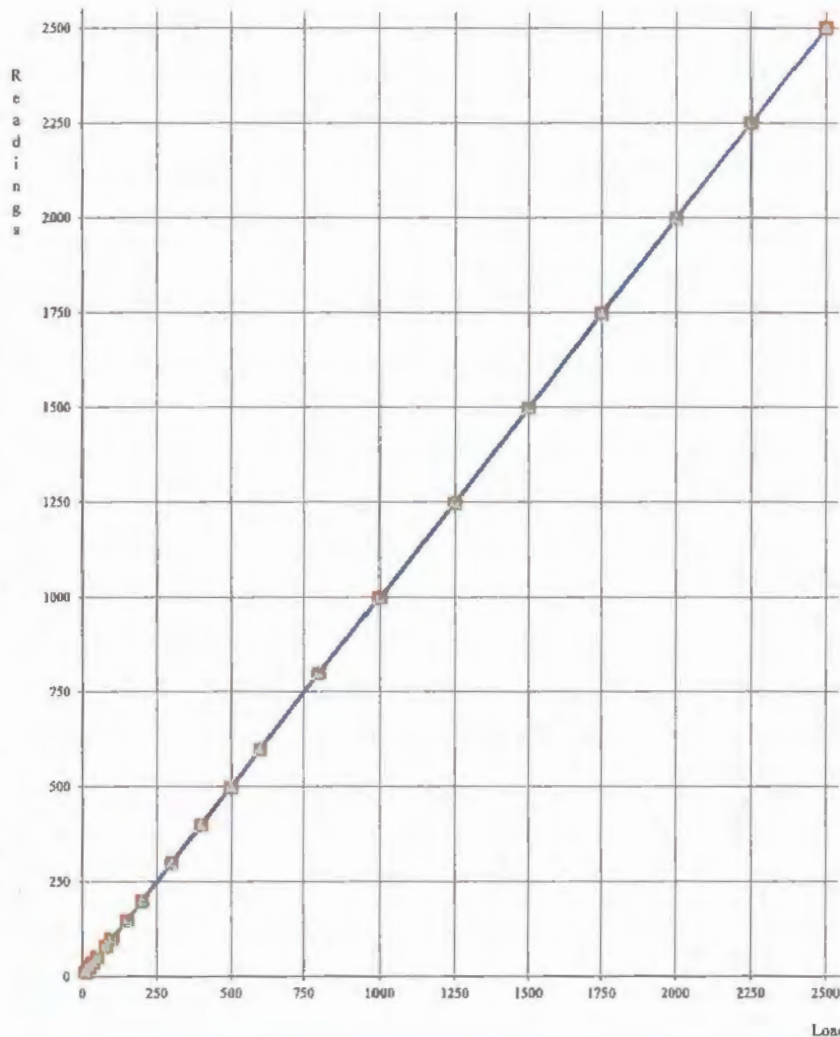
Pressure Generator:

Manufacturer	MENSOR
Model	CPC 4000
Serial Number	41000V56
Sensor Descr	Silicon Pressure Transducer
Sensor Serial Number	41000V3Y

The measurement system is periodically checked in a SIT calibration center. (Il sistema di rilevamento è sottoposto a verifica periodica presso un centro SIT)

Last verification date:	22/04/2022
Certificate N.	0284-SP-22
Temperature of calibration	22°C
Humidity	45%

Factory calibration in accordance with **ASTM D5778-12**

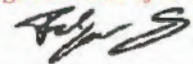


	Ascending		Descending	
	Load	Readings	Load	Readings
1	-0,10	0,00	0,00	-0,30
2	10,00	9,60	9,80	9,30
3	25,00	24,40	25,00	24,20
4	35,00	34,20	35,00	34,00
5	50,00	49,10	50,00	48,70
6	80,00	78,50	80,00	78,30
7	100,00	98,30	100,00	98,10
8	150,00	147,80	150,00	147,70
9	200,00	197,50	200,00	197,60
10	300,00	297,20	300,00	297,40
11	400,00	397,00	400,00	397,10
12	500,00	496,60	500,00	496,90
13	600,00	596,50	600,00	596,80
14	800,00	796,30	800,00	796,60
15	1000,00	996,20	1000,00	996,40
16	1250,00	1246,20	1250,00	1246,50
17	1500,00	1496,60	1500,00	1496,80
18	1750,00	1747,00	1750,00	1747,20
19	2000,00	1997,80	2000,00	1997,80
20	2250,00	2248,80	2250,00	2249,00
21	2500,00	2500,00	2500,00	2500,00

Unit: kPa

Zero-load error:	=	0,016	% FSO
Nonlinearity:	=	0,152	% FSO

The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by 

Date of issue **28/04/2022**

CONE CALIBRATION CERTIFICATE

N° Z113/22

Calibrated system (Sistema tarato):

Serial number **Mks844**

Tip net area ratio (a_n): **0,7887**

Sleeve net ratio (b_n): **0,0000**

Addressee (destinatario):

Speight Drilling Ltd

510 Bannockburn Road, Bannockburn,

Central Otago (New Zealand)

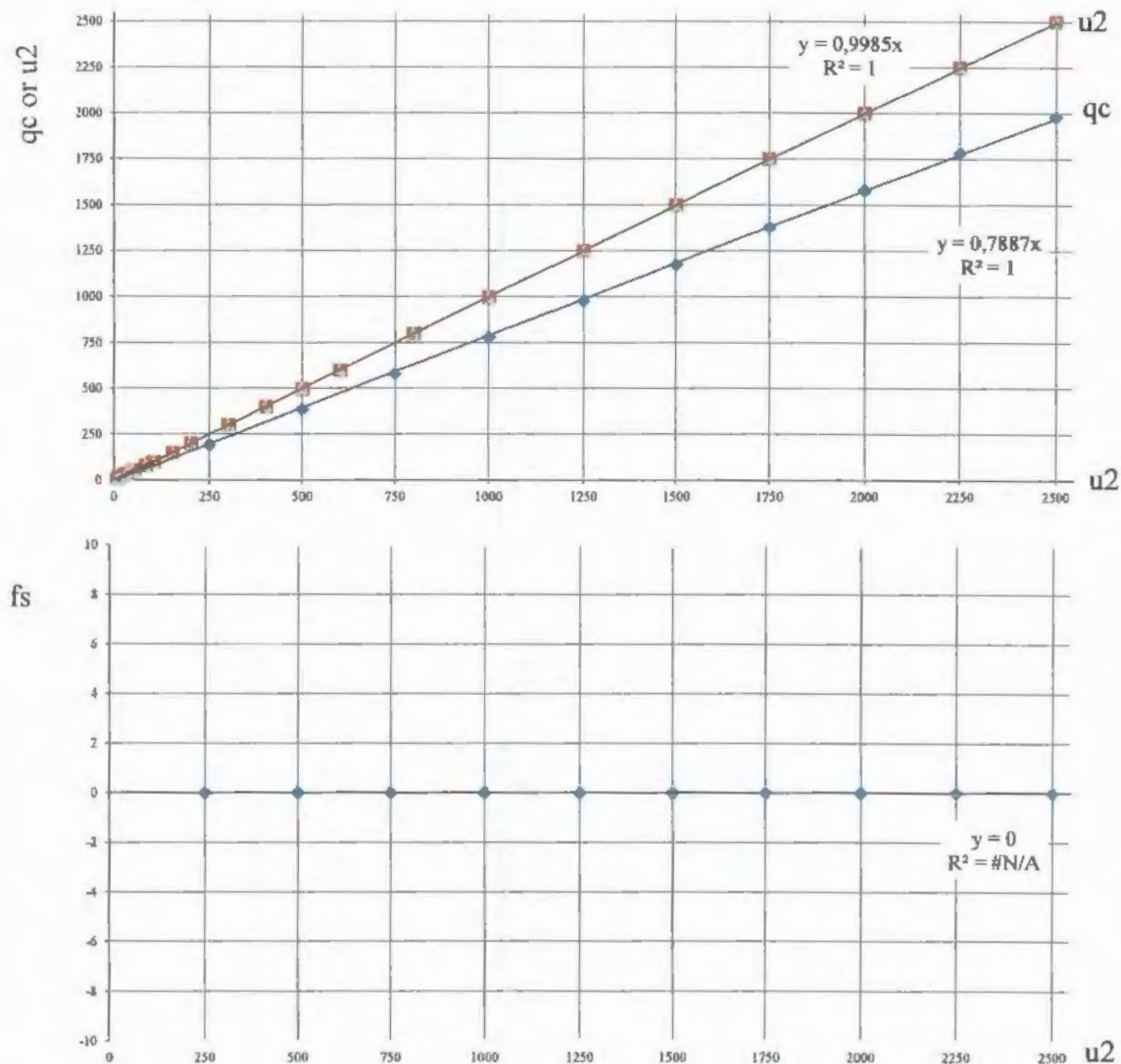
	u2 (kPa)	qc (kPa)	fs (kPa)	u2 (psi)	qc (psi)	fs (psi)
0 (0)	-0,10	0,00	0,00	0,00	0,00	0,00
250 (36,26)	250,10	192,00	0,00	247,90	27,85	0,00
500 (72,52)	500,00	385,00	0,00	497,60	55,84	0,00
750 (108,78)	750,00	577,00	0,00	747,50	83,69	0,00
1000 (145,04)	1000,00	780,00	0,00	997,50	113,13	0,00
1250 (181,30)	1250,00	977,00	0,00	1247,90	141,70	0,00
1500 (217,56)	1500,00	1175,00	0,00	1498,30	170,42	0,00
1750 (253,82)	1750,00	1378,00	0,00	1749,10	199,86	0,00
2000 (290,08)	2000,00	1581,00	0,00	1999,90	229,30	0,00
2250 (326,33)	2250,00	1784,00	0,00	2251,20	258,75	0,00
2500 (362,59)	2500,00	1981,00	0,00	2502,60	287,32	0,00

Unit: kPa - (psi)

Temperature of calibration 22°C

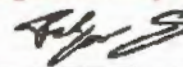
Humidity 45%

Factory calibration in accordance with **ASTM D5778-12**



The adopted calibration procedure has been developed according to the suggestions given by Prof. Paul W. Mayne (Georgia Institute of technology) and Prof. Diego Lo Presti (University of Pisa)

Cone calibrated by



Date of issue

28/04/2022

Test Information			
Block Job No.:	SDL0004	Testing Date:	18/11/2020
Client:	SPEIGHT DRILLING LTD	Reporting Date:	22/12/2020
Client Project No. ^A :	Bannockburn	Test Operator(s):	Kevin Speight
Location:	510 Bannockburn Road, Bannockburn, Otago	Drill Operator ^A :	Jamie Edgar
Project ^A :	Site test	Drill Rig:	HD900 Sonic
Weather conditions:	Sunny		

Instrumented Rod Information			
Rod Manufacturer:	File Dynamics Inc.	Diameter (OD) (mm):	44.450
Rod Size:	BWJ	Wall Thickness (mm):	6.350
Rod Serial No.:	543 BWJ-1	Area (cm ²):	7.600
Calibration Date:	16/09/2020	Accelerometer 1:	K10737 Calibration: 16/09/20
Assumed Mod. (MPa):	207000	Accelerometer 2:	K10740 Calibration: 16/09/20

SPT Hammer Information			
Manufacturer ^A :	SPEIGHT ENGINEERING	Anvil Dimensions ^{A,B} :	69 mm diameter x 210 mm long
Model ^A :	TYPICAL TRIP DONUT HAMMER	Other Notes:	Manual drop hammer with automatic mechanical level release. Manufactured June 2018.
Serial No. ^A :	CS		
Mass ^A (kg):	63.6		
Falling Height ^A (mm):	760		
Potential Energy (J):	473.27		

Processing Equipment Information			
Manufacturer:	File Dynamics Inc.	Serial No.:	4541 TB
Model:	File Driving Analyzer 8, Model SFT	Calibration Date:	16/09/2020

^A Supplied directly by the client or derived by information supplied by the client.

^B Diameter refers to nominal diameter of impact surface & length refers to distance from impact surface to top of anvil thread.

^C ASTM D4633-10 states energy evaluation of the hammer system is more reliable when the length of drill string below the sensors is 9 m to 12 m, or more.

^D ASTM D4633-10 recommends limiting energy measurement to moderate N-value ranges between 10 and 50.

Measurements					
Test No.:	Test 1	Test 2	Test 3	Test 4	Test 5
Test Time:	8:30a.m.	9:16 AM	10:09 AM		
Borehole No. ^A :	BH01	BH01	BH01		
SPT Drill Rod Size ^A :	JACKROW	JACKROW	JACKROW		
Test Depth Below Ground Surface ^A (m):	6.00	7.60	9.00		
Drill String Length Below Sensors ^{A,D} (m):	6.90	8.40	9.90		
Hammer Impact Surface to Sensors ^A (m):	0.88	0.88	0.88		
SPT No. Blows - Interval 1 ^A :	34	60	53		
SPT No. Blows - Interval 2 ^A :	60	0	30		
SPT No. Blows - Interval 3 ^A :	0	0	30		
SPT N-Value ^{A,D} :	60	60	60		
Average Measured Blows Per Minute:	13	13	13		
Average Measured Energy (J):	309.04	311.88	306.21		

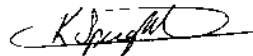
Combined Average Measured Energy, EPV (J):	308.05
Theoretical Maximum Potential Energy, PE (J):	473.27

Energy Transfer Ratio, ETR=EPV/PE (%):	66.3
----------------------------------------	------

Certificate Number:	SDL-8004
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Standard(s)	ASTM D4633-10, ISO 22478-3-2005
Recommended Calibration Interval	24 months
Document Version & Date	V2, 22 December 2020

Certificate Issued By: Kevin Speight

Signed: 

This certificate is valid for the specific SPT Hammer tested. It cannot be inferred to represent other SPT Hammers, even for like SPT Hammers of the same make and model.



Calibration Certificate

Certificate No: 718397.01

Certificate Issued To	GHD Limited - Christchurch		Address	Level 3 138 Victoria Street Christchurch
Purchase Order No				
Manufacturer	Geotechnics	Model	Geovane	S/No 937 Unique ID
Description	Handheld shear vane with matching blade(s)			
Calibration Date	28/03/2022	Temp During Test	19.8 to 20.4 °C	
Method	MCC 5.51c.01 – Handheld Soil Shear Vane Testers (2021), Guideline for Hand Held Shear Vane Test (NZGS, 2001) was used as a guide.			
Statement of Performance	The equipment meets the requirements of the method for which it was tested.			
Results				

19 mm Ø Vane Blade

Shear Strength = A × Reading	A (kPa/div)	1.449	Area Ratio	24.7%
------------------------------	-------------	-------	------------	-------

Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)	Reading (div)	Shear Strength (kPa)
0	0	30	43	60	87	90	130	120	174
2	3	32	46	62	90	92	133	122	177
4	6	34	49	64	93	94	136	124	180
6	9	36	52	66	96	96	139	126	183
8	12	38	55	68	99	98	142	128	186
10	14	40	58	70	101	100	145	130	188
12	17	42	61	72	104	102	148	132	191
14	20	44	64	74	107	104	151	134	194
16	23	46	67	76	110	106	154	136	197
18	26	48	70	78	113	108	157	138	200
20	29	50	72	80	116	110	159	140	203
22	32	52	75	82	119	112	162		
24	35	54	78	84	122	114	165		
26	38	56	81	86	125	116	168		
28	41	58	84	88	128	118	171		

The expanded uncertainty of measurement, expressed at the 95% confidence level, is ±5.7 kPa. The coverage factor (k) is 2.

Remarks

When received, this equipment was in good condition.

Measurement results are traceable to the International System of Units (SI), or other recognised references via an unbroken chain of comparisons to the New Zealand National Standards or to the National Standards of other Signatories to the CIPM MRA.

This certificate has been prepared for the benefit of GHD Limited - Christchurch, with respect to the particular brief given to us and it cannot be relied upon in other contexts or for any other purpose without our prior review and agreement.

This calibration was performed at 1 Hill Street, Onehunga, Auckland, NZ.

Prepared by

Annalyse Ryan
Metrologist

Checked by

B. Kriel Bernard Kriel
Calibration Technician

Key Technical Person

B. Kriel Bernard Kriel
Calibration Technician



All measurements reported herein have been performed in accordance with the laboratory's scope of accreditation.

Appendix E

Service Plans

ORIGINAL SIZE A3
DO NOT SCALE - IF IN DOUBT, ASK

LEGEND

- FENCE
- LANDFILL OPERATION AREA
- LANDFILL DESIGNATION D658
DUNEDIN CITY COUNCIL DISTRICT PLAN
- SEWER LINE
- STORMWATER DITCH
- LEACHATE OPEN DITCH
- GAS PIPELINE
- WATER PIPE (ABOVE GROUND)
- EXTENT OF LANDFILLED AREA
- GAS WELL HEAD (OPERATIONAL)
- GAS WELL HEAD (INACTIVE)
- GROUND WATER PIZO

ASBESTOS PITS

PIT NO	DESCRIPTION	DATE
A1	5M X 3M (2 AREAS)	PRIOR 1993
A2	ASBESTOS CONTAMINATED (LOW LEVEL) BRICKS AT RL 102	EST 1998
A3	ASBESTOS AT RL 102	EST 1997
A4	SMALL AMOUNT BURIED IN PLASTIC BAGS (POSITION UNDEFINED)	PRIOR 1993
A5	"	1/6/98
A6	"	16/6/98
A7	"	14/9/98
A8	"	31/9/98
A9	"	12/98
A10	"	29/6/99

NOTE: ASBESTOS FROM 1999 DATES NOT RECORDED. LOCATION ONLY IDENTIFIED

GAS WORKS MATERIAL

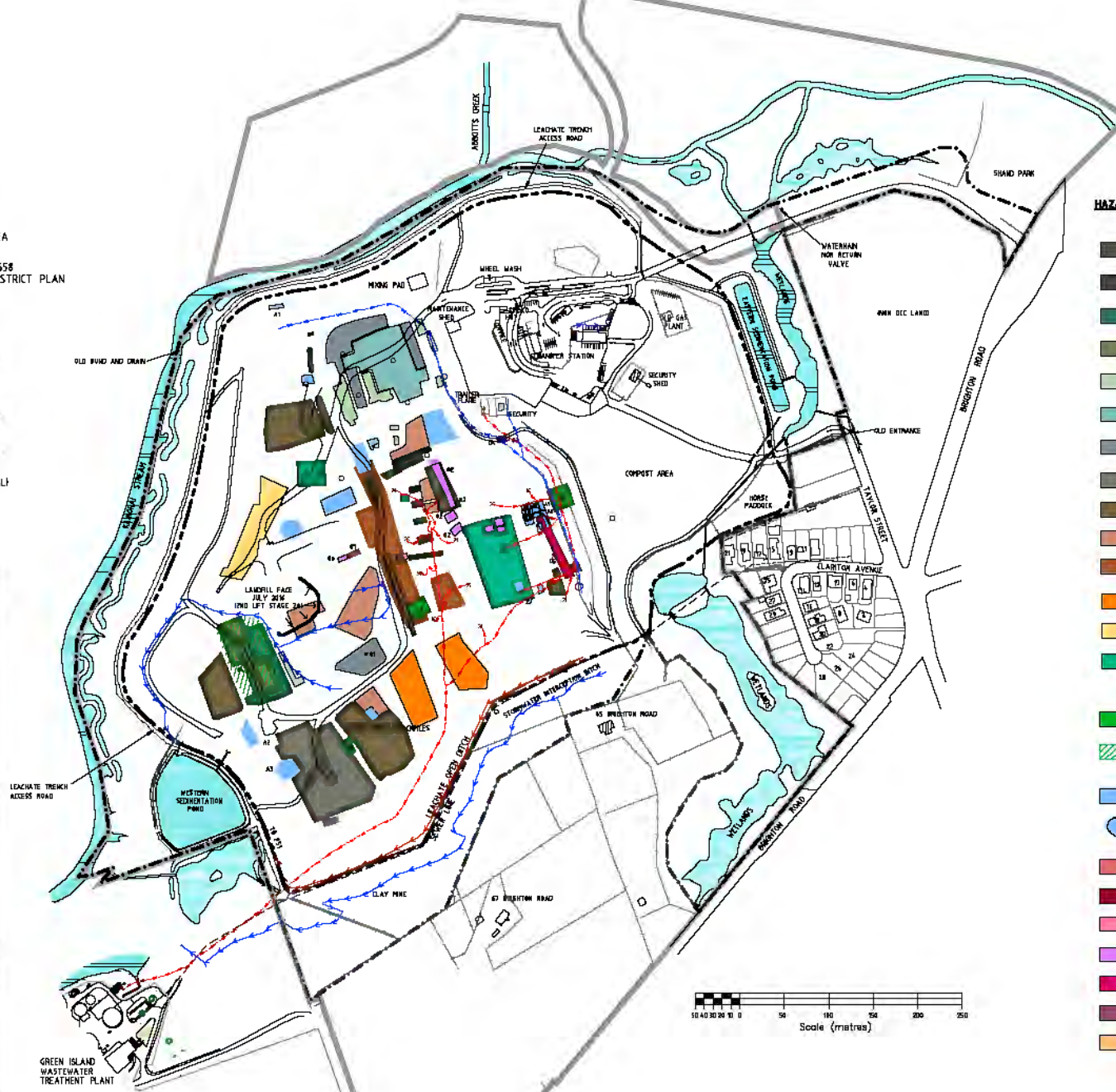
PIT NO	DESCRIPTION	DATE
G1	GAS WASTE MATERIAL	PRIOR 1996
G2	GAS/WORKS SPOIL 600m OF CYANIDE CONTAMINATED MATERIAL	EST 1999
G3	GAS/WORKS SPOIL	MAY 1997
G4	GAS WORKS CONTAMINATED (LOW LEVEL) SOIL OVER LAID WITH 200mm CLEARFILL AND 50mm COMPOST	JULY/AUG 98
G5	GAS WORKS TAR FROM ABOVE GROUND STORAGE TANK	2000

OTHER

PIT NO	DESCRIPTION	DATE
O1	SODIUM SULFIDE (10KG) 300X300M DEEP	8/2/95
O2	ACID TARS 400X20M DEEP SERIES OF PITS	EST 1999
O3	CYANIDE	1992
O4	ARSENIC PIT. SMALL TIN APPROX 2KG	26/5/94
O5	FORTEX OFFAL BURIED IN CENTRE OF PIT.	EST 1998
O6	DTAG ELECTROPLATERS CHROMIUM AND NICKEL SALTS IN CONCRETE TUBE	2004
O7	TANALISED CONTAMINATED CONCRETE	2005/2006

HAZARDOUS WASTE LEGEND

- 1994
 - 1995
 - 1996
 - 1997
 - 1998
 - 1999
 - 2000/2001
 - 2002
 - 2003/2004
 - 2004/2005
 - 2005/2006
 - 2006/2007
 - 2007/2008
 - 2008/2009
- SLUDGE**
- GASWORKS
 - GASWORKS CONTAMINATED (LOW LEVEL) SOIL OVER LAID WITH 200mm CLEARFILL AND 150mm COMPOST
 - ASBESTOS
 - ASBESTOS CONTAMINATED FILL (LOW LEVEL) (located at base of face)
 - CYANIDE
 - ARSENIC
 - SODIUM SULFIDE
 - ACID TARS
 - FORTEX OFFAL
 - OTHER SPECIAL HAZARDOUS WASTE
 - BATTERIES



FINAL

Prepared For:	No.	Amendments	Drawn	Date


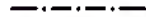







DCC LANDFILLS
ANNUAL SURVEY PLANS - JULY 2016
GREEN ISLAND LANDFILL
GENERAL LOCATIONS OF HAZARDOUS WASTE PITS PLAN

Project No:	18031	Surveyed:	DS
Scale:	1:5000	Designed:	DH
Date:	JULY 2016	Drawn:	DS/CC
Sheet:	G06A	Checked:	DH

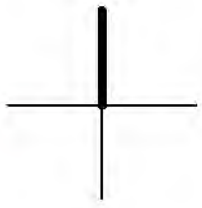
Surveying Consultants
TL Survey Services Limited
 P.O. Box 801 DUNEDIN
 Phone (03) 477 1133

ORIGINAL SIZE A3
DO NOT SCALE - IF IN DOUBT, ASK

LEGEND

-  FENCE
-  LANDFILL OPERATION AREA
-  LANDFILL DESIGNATION D658
DUNEDIN CITY COUNCIL DISTRICT PLAN
-  SEWER LINE
-  STORMWATER DITCH
-  LEACHATE OPEN DITCH
-  GAS PIPELINE
-  WATER PIPE (ABOVE GROUND)
-  EXTENT OF LANDFILLED AREA

-  BOTTOM OF LIFT 2
-  SLUDGE PITS 2003
-  SLUDGE PITS 2003/2004
-  SLUDGE PITS 2004/2005
-  SLUDGE PITS 2006/2007
-  SLUDGE PITS 2007/2008
-  SLUDGE PITS 2008/2009
-  SLUDGE PITS 2009/2010
-  SLUDGE PITS 2010/2012
-  SLUDGE PITS 2012/2013
-  SLUDGE PITS 2013/2014
-  SLUDGE PITS 2014/2015
-  SLUDGE PITS 2nd LIFT
2015/2016
-  ASBESTOS



FINAL

File Ref:

Prepared For:



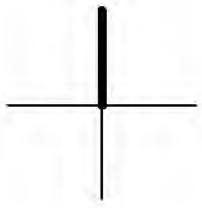
No.	Amendments	Drawn	Date

DCC LANDFILLS
ANNUAL SURVEY PLANS - JULY 2016
GREEN ISLAND LANDFILL
HAZARDOUS WASTE PITS LIFT 2 PLAN

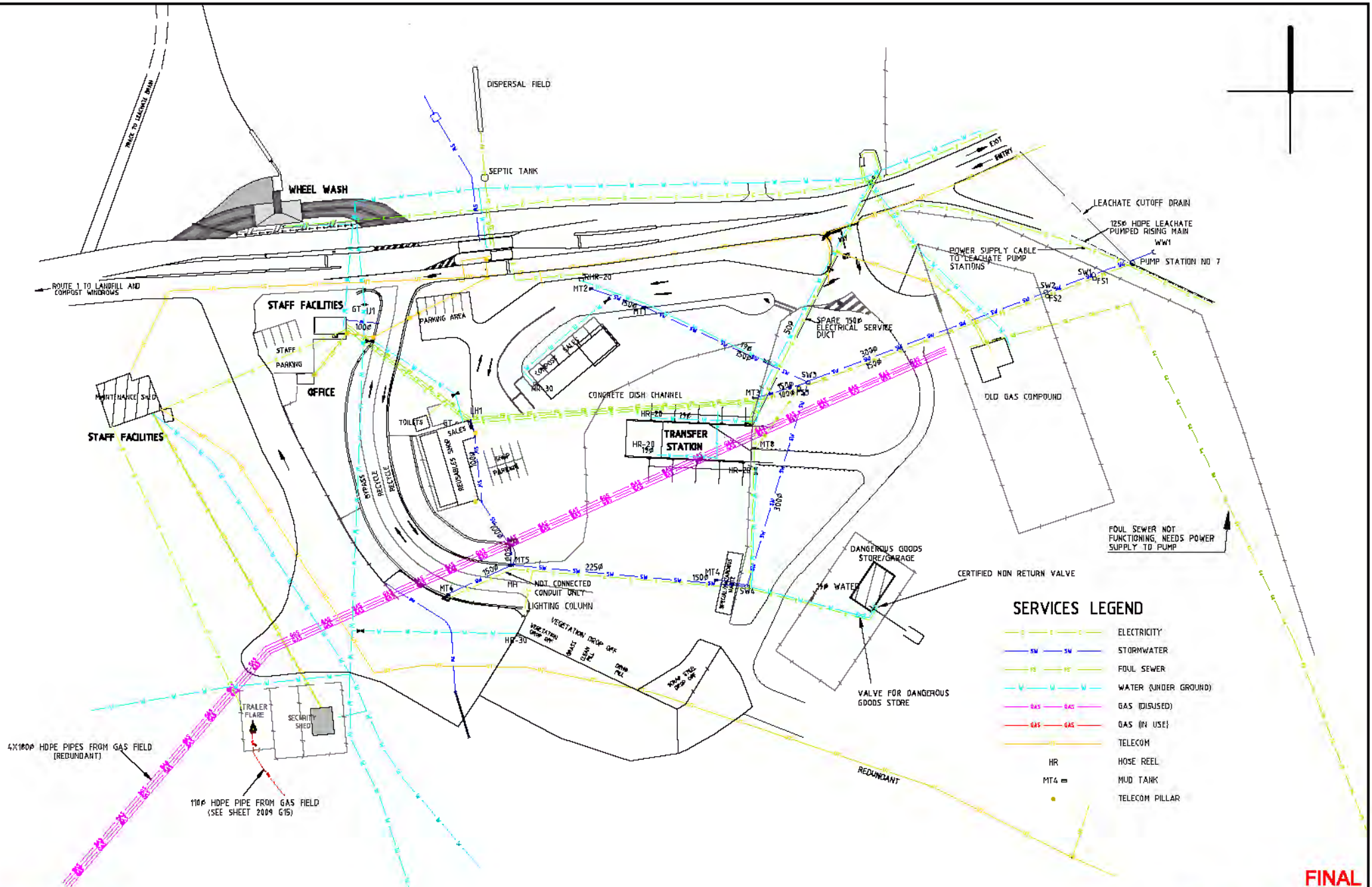
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Scale: 1:5000	Designed: DH
Date: JULY 2016	Drawn: DS/CC
Sheet: G05B	Checked: DH



TL Survey Services Limited
P.O. Box 801 DUNEDIN
Phone (03) 477 1133



ORIGINAL SIZE A3
DO NOT SCALE - IF IN DOUBT, ASK



SERVICES LEGEND

- ELECTRICITY
- STORMWATER
- FOUL SEWER
- WATER (UNDER GROUND)
- GAS (DISUSED)
- GAS (IN USE)
- TELECOM
- HOSE REEL
- MUD TANK
- TELECOM PILLAR

FINAL

Prepared For:

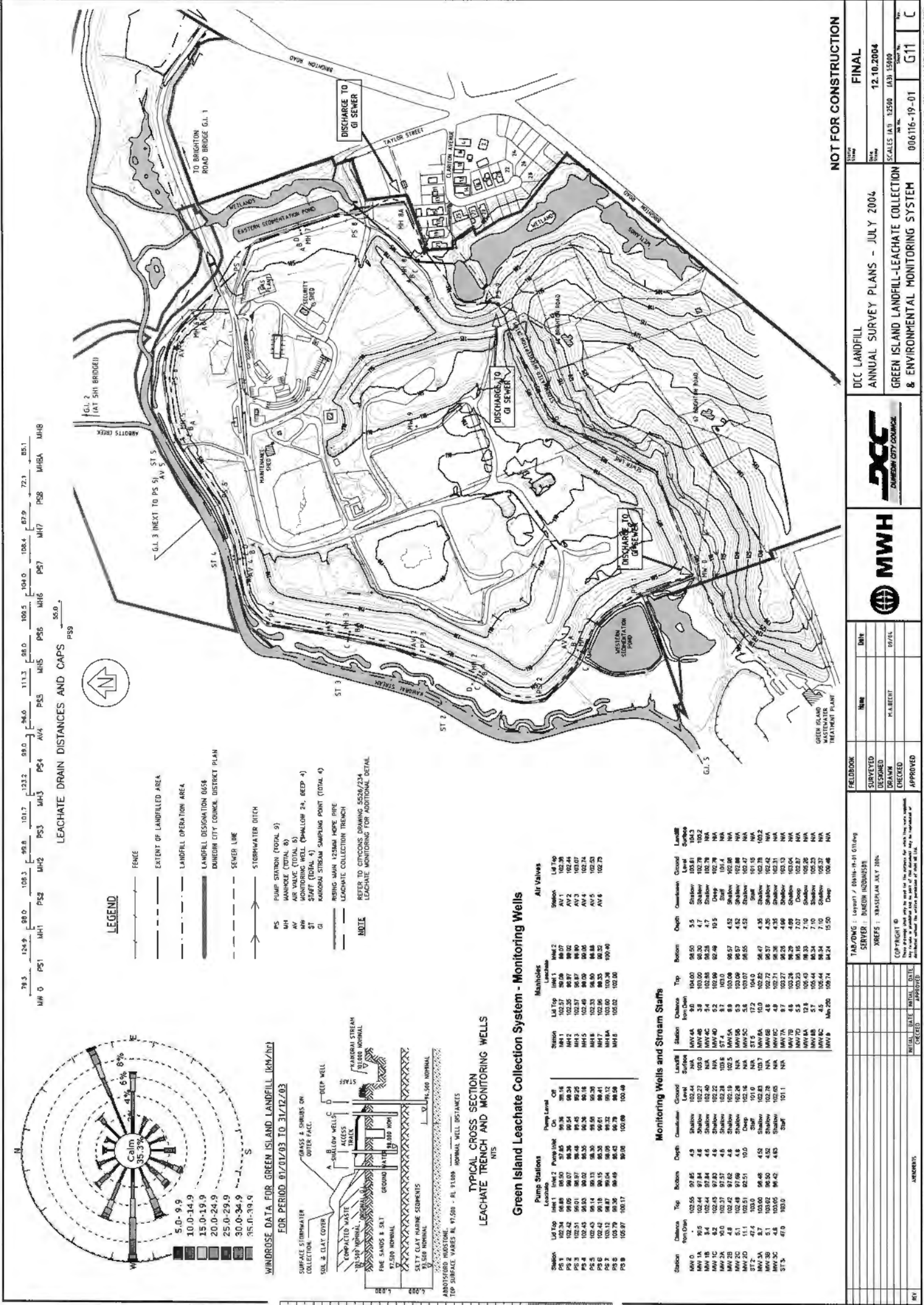
No.	Amendments	Drawn	Date

DCC LANDFILLS
ANNUAL SURVEY PLANS - JULY 2016
GREEN ISLAND LANDFILL
TRANSFER STATION SERVICES PLAN

Project No.:	16031	Surveyed:	DS
Scale:	1:1000	Designed:	DH
Date:	JULY 2016	Drawn:	DS/JCC
Sheet:	G06	Checked:	DH

TL Survey Services Limited
 P.O. Box 801 DUNEDIN
 Phone (03) 477 1133

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Windrose Data for Green Island Landfill (km/h)
 FOR PERIOD 07/01/03 TO 31/12/03

5.0 - 9.9
10.0 - 14.9
15.0 - 19.9
20.0 - 24.9
25.0 - 29.9
30.0 - 34.9
35.0 - 39.9

Leachate Drain Distances and Caps

MW 0	PS1	MW1	PS2	MW2	PS3	MW3	PS4	MW4	PS5	MW5	PS6	MW6	PS7	MW7	PS8	MW8A	MW8B
79.3	124.9	98.0	108.3	95.8	101.7	123.2	98.0	111.3	98.0	104.0	104.0	104.0	104.0	87.9	72.1	85.1	

Legend

- FENCE
- EXTENT OF LANDFILLED AREA
- LANDFILL OPERATION AREA
- LANDFILL DESIGNATION 0554
- DUNEDIN CITY COUNCIL DISTRICT PLAN
- SEWER LINE
- STORMWATER DITCH
- PUMP STATION (TOTAL 9)
- MONITORING WELL (SHALLOW 24, DEEP 4)
- MONITORING WELL (SHALLOW 24, DEEP 4)
- KAHOROAI STREAM SAMPLING POINT (TOTAL 4)
- KAHOROAI STREAM SAMPLING POINT (TOTAL 4)
- LEACHATE COLLECTION TRENCH
- REFER TO CITYCOUNS DRAWING S526/234 LEACHATE MONITORING FOR ADDITIONAL DETAIL

Monitoring Wells and Stream Shafts

Station	Location	Depth	Construction	Ground Level	Surf Level
MW 0	102.55	97.85	4.9	Shallow	102.44
MW 1A	102.44	97.84	4.8	Shallow	102.27
MW 1B	102.44	97.84	4.8	Shallow	102.27
MW 1C	102.45	97.83	4.6	Shallow	102.22
MW 2A	102.37	97.57	4.6	Shallow	102.28
MW 2B	102.42	97.62	4.8	Shallow	102.19
MW 2C	102.42	97.62	4.8	Shallow	102.19
MW 2D	102.51	97.51	10.0	Deep	102.51
MW 3A	102.00	96.48	4.52	Shallow	102.83
MW 3B	102.00	96.48	4.52	Shallow	102.83
MW 3C	102.00	96.48	4.52	Shallow	102.83
MW 3D	102.00	96.48	4.52	Shallow	102.83

Pump Stations

Station	Location	Depth	Construction	Ground Level	Surf Level
PS 1	102.57	98.07	98.54	98.54	98.54
PS 2	102.51	98.01	98.50	98.50	98.50
PS 3	102.45	98.02	98.50	98.50	98.50
PS 4	102.45	98.14	98.30	98.30	98.30
PS 5	102.33	98.13	98.30	98.30	98.30
PS 6	102.33	98.13	98.30	98.30	98.30
PS 7	102.33	98.13	98.30	98.30	98.30
PS 8	102.33	98.13	98.30	98.30	98.30
PS 9	102.79	98.36	98.49	98.49	98.49
PS 10	102.87	98.36	98.49	98.49	98.49
PS 11	102.87	98.36	98.49	98.49	98.49
PS 12	102.87	98.36	98.49	98.49	98.49
PS 13	102.87	98.36	98.49	98.49	98.49
PS 14	102.87	98.36	98.49	98.49	98.49
PS 15	102.87	98.36	98.49	98.49	98.49
PS 16	102.87	98.36	98.49	98.49	98.49
PS 17	102.87	98.36	98.49	98.49	98.49
PS 18	102.87	98.36	98.49	98.49	98.49
PS 19	102.87	98.36	98.49	98.49	98.49
PS 20	102.87	98.36	98.49	98.49	98.49
PS 21	102.87	98.36	98.49	98.49	98.49
PS 22	102.87	98.36	98.49	98.49	98.49
PS 23	102.87	98.36	98.49	98.49	98.49
PS 24	102.87	98.36	98.49	98.49	98.49
PS 25	102.87	98.36	98.49	98.49	98.49
PS 26	102.87	98.36	98.49	98.49	98.49
PS 27	102.87	98.36	98.49	98.49	98.49
PS 28	102.87	98.36	98.49	98.49	98.49
PS 29	102.87	98.36	98.49	98.49	98.49
PS 30	102.87	98.36	98.49	98.49	98.49
PS 31	102.87	98.36	98.49	98.49	98.49
PS 32	102.87	98.36	98.49	98.49	98.49
PS 33	102.87	98.36	98.49	98.49	98.49
PS 34	102.87	98.36	98.49	98.49	98.49
PS 35	102.87	98.36	98.49	98.49	98.49
PS 36	102.87	98.36	98.49	98.49	98.49
PS 37	102.87	98.36	98.49	98.49	98.49
PS 38	102.87	98.36	98.49	98.49	98.49
PS 39	102.87	98.36	98.49	98.49	98.49
PS 40	102.87	98.36	98.49	98.49	98.49
PS 41	102.87	98.36	98.49	98.49	98.49
PS 42	102.87	98.36	98.49	98.49	98.49
PS 43	102.87	98.36	98.49	98.49	98.49
PS 44	102.87	98.36	98.49	98.49	98.49
PS 45	102.87	98.36	98.49	98.49	98.49
PS 46	102.87	98.36	98.49	98.49	98.49
PS 47	102.87	98.36	98.49	98.49	98.49
PS 48	102.87	98.36	98.49	98.49	98.49
PS 49	102.87	98.36	98.49	98.49	98.49
PS 50	102.87	98.36	98.49	98.49	98.49

All Values

Station	Location	Depth	Construction	Ground Level	Surf Level
Line 1	102.57	98.07	98.54	98.54	98.54
Line 2	102.51	98.01	98.50	98.50	98.50
Line 3	102.45	98.02	98.50	98.50	98.50
Line 4	102.45	98.14	98.30	98.30	98.30
Line 5	102.33	98.13	98.30	98.30	98.30
Line 6	102.33	98.13	98.30	98.30	98.30
Line 7	102.33	98.13	98.30	98.30	98.30
Line 8	102.33	98.13	98.30	98.30	98.30
Line 9	102.79	98.36	98.49	98.49	98.49
Line 10	102.87	98.36	98.49	98.49	98.49
Line 11	102.87	98.36	98.49	98.49	98.49
Line 12	102.87	98.36	98.49	98.49	98.49
Line 13	102.87	98.36	98.49	98.49	98.49
Line 14	102.87	98.36	98.49	98.49	98.49
Line 15	102.87	98.36	98.49	98.49	98.49
Line 16	102.87	98.36	98.49	98.49	98.49
Line 17	102.87	98.36	98.49	98.49	98.49
Line 18	102.87	98.36	98.49	98.49	98.49
Line 19	102.87	98.36	98.49	98.49	98.49
Line 20	102.87	98.36	98.49	98.49	98.49
Line 21	102.87	98.36	98.49	98.49	98.49
Line 22	102.87	98.36	98.49	98.49	98.49
Line 23	102.87	98.36	98.49	98.49	98.49
Line 24	102.87	98.36	98.49	98.49	98.49
Line 25	102.87	98.36	98.49	98.49	98.49
Line 26	102.87	98.36	98.49	98.49	98.49
Line 27	102.87	98.36	98.49	98.49	98.49
Line 28	102.87	98.36	98.49	98.49	98.49
Line 29	102.87	98.36	98.49	98.49	98.49
Line 30	102.87	98.36	98.49	98.49	98.49
Line 31	102.87	98.36	98.49	98.49	98.49
Line 32	102.87	98.36	98.49	98.49	98.49
Line 33	102.87	98.36	98.49	98.49	98.49
Line 34	102.87	98.36	98.49	98.49	98.49
Line 35	102.87	98.36	98.49	98.49	98.49
Line 36	102.87	98.36	98.49	98.49	98.49
Line 37	102.87	98.36	98.49	98.49	98.49
Line 38	102.87	98.36	98.49	98.49	98.49
Line 39	102.87	98.36	98.49	98.49	98.49
Line 40	102.87	98.36	98.49	98.49	98.49
Line 41	102.87	98.36	98.49	98.49	98.49
Line 42	102.87	98.36	98.49	98.49	98.49
Line 43	102.87	98.36	98.49	98.49	98.49
Line 44	102.87	98.36	98.49	98.49	98.49
Line 45	102.87	98.36	98.49	98.49	98.49
Line 46	102.87	98.36	98.49	98.49	98.49
Line 47	102.87	98.36	98.49	98.49	98.49
Line 48	102.87	98.36	98.49	98.49	98.49
Line 49	102.87	98.36	98.49	98.49	98.49
Line 50	102.87	98.36	98.49	98.49	98.49

Monitoring Wells and Stream Shafts

Station	Location	Depth	Construction	Ground Level	Surf Level
MW 0	102.55	97.85	4.9	Shallow	102.44
MW 1A	102.44	97.84	4.8	Shallow	102.27
MW 1B	102.44	97.84	4.8	Shallow	102.27
MW 1C	102.45	97.83	4.6	Shallow	102.22
MW 2A	102.37	97.57	4.6	Shallow	102.28
MW 2B	102.42	97.62	4.8	Shallow	102.19
MW 2C	102.42	97.62	4.8	Shallow	102.19
MW 2D	102.51	97.51	10.0	Deep	102.51
MW 3A	102.00	96.48	4.52	Shallow	102.83
MW 3B	102.00	96.48	4.52	Shallow	102.83
MW 3C	102.00	96.48	4.52	Shallow	102.83
MW 3D	102.00	96.48	4.52	Shallow	102.83

Typical Cross Section Leachate Trench and Monitoring Wells

ABOVEGROUND HOUSING
 TOP SURFACE VARIES BY 1:500 - RL 11000 - NORMAL WELL DISTANCES

Green Island Leachate Collection System - Monitoring Wells

Legend for monitoring wells: MW 0, MW 1A, MW 1B, MW 1C, MW 2A, MW 2B, MW 2C, MW 2D, MW 3A, MW 3B, MW 3C, MW 3D.

NOT FOR CONSTRUCTION

DATE: 12.10.2004
 SCALE: 1:3250
 SHEET NO: G11

Legend

- FENCE
- EXTENT OF LANDFILLED AREA
- LANDFILL OPERATION AREA
- LANDFILL DESIGNATION 0554
- DUNEDIN CITY COUNCIL DISTRICT PLAN
- SEWER LINE
- STORMWATER DITCH
- PUMP STATION (TOTAL 9)
- MONITORING WELL (SHALLOW 24, DEEP 4)
- MONITORING WELL (SHALLOW 24, DEEP 4)
- KAHOROAI STREAM SAMPLING POINT (TOTAL 4)
- KAHOROAI STREAM SAMPLING POINT (TOTAL 4)
- LEACHATE COLLECTION TRENCH
- REFER TO CITYCOUNS DRAWING S526/234 LEACHATE MONITORING FOR ADDITIONAL DETAIL

Monitoring Wells and Stream Shafts

Station	Location	Depth	Construction	Ground Level	Surf Level
MW 0	102.55	97.85	4.9	Shallow	102.44
MW 1A	102.44	97.84	4.8	Shallow	102.27
MW 1B	102.44	97.84	4.8	Shallow	102.27
MW 1C	102.45	97.83	4.6	Shallow	102.22
MW 2A	102.37	97.57	4.6	Shallow	102.28
MW 2B	102.42	97.62	4.8	Shallow	102.19
MW 2C	102.42	97.62	4.8	Shallow	102.19
MW 2D	102.51	97.51	10.0	Deep	102.51
MW 3A	102.00	96.48	4.52	Shallow	102.83
MW 3B	102.00	96.48	4.52	Shallow	102.83
MW 3C	102.00	96.48	4.52	Shallow	102.83
MW 3D	102.00	96.48	4.52	Shallow	102.83

Pump Stations

Station	Location	Depth	Construction	Ground Level	Surf Level
PS 1	102.57	98.07	98.54	98.54	98.54
PS 2	102.51	98.01	98.50	98.50	98.50
PS 3	102.45	98.02	98.50	98.50	98.50
PS 4	102.45	98.14	98.30	98.30	98.30
PS 5	102.33	98.13	98.30	98.30	98.30
PS 6	102.33	98.13	98.30	98.30	98.30
PS 7	102.33	98.13	98.30	98.30	98.30
PS 8	102.33	98.13	98.30	98.30	98.30
PS 9	102.79	98.36	98.49	98.49	98.49
PS 10	102.87	98.36	98.49	98.49	98.49
PS 11	102.87	98.36	98.49	98.49	98.49
PS 12	102.87	98.36	98.49	98.49	98.49
PS 13	102.87	98.36	98.49	98.49	98.49
PS 14	102.87	98.36	98.49	98.49	98.49
PS 15	102.87	98.36	98.49	98.49	98.49
PS 16	102.87	98.36	98.49	98.49	98.49
PS 17	102.87	98.36	98.49	98.49	98.49
PS 18	102.87	98.36	98.49	98.49	98.49
PS 19	102.87	98.36	98.49	98.49	98.49
PS 20	102.87	98.36	98.49	98.49	98.49
PS 21					

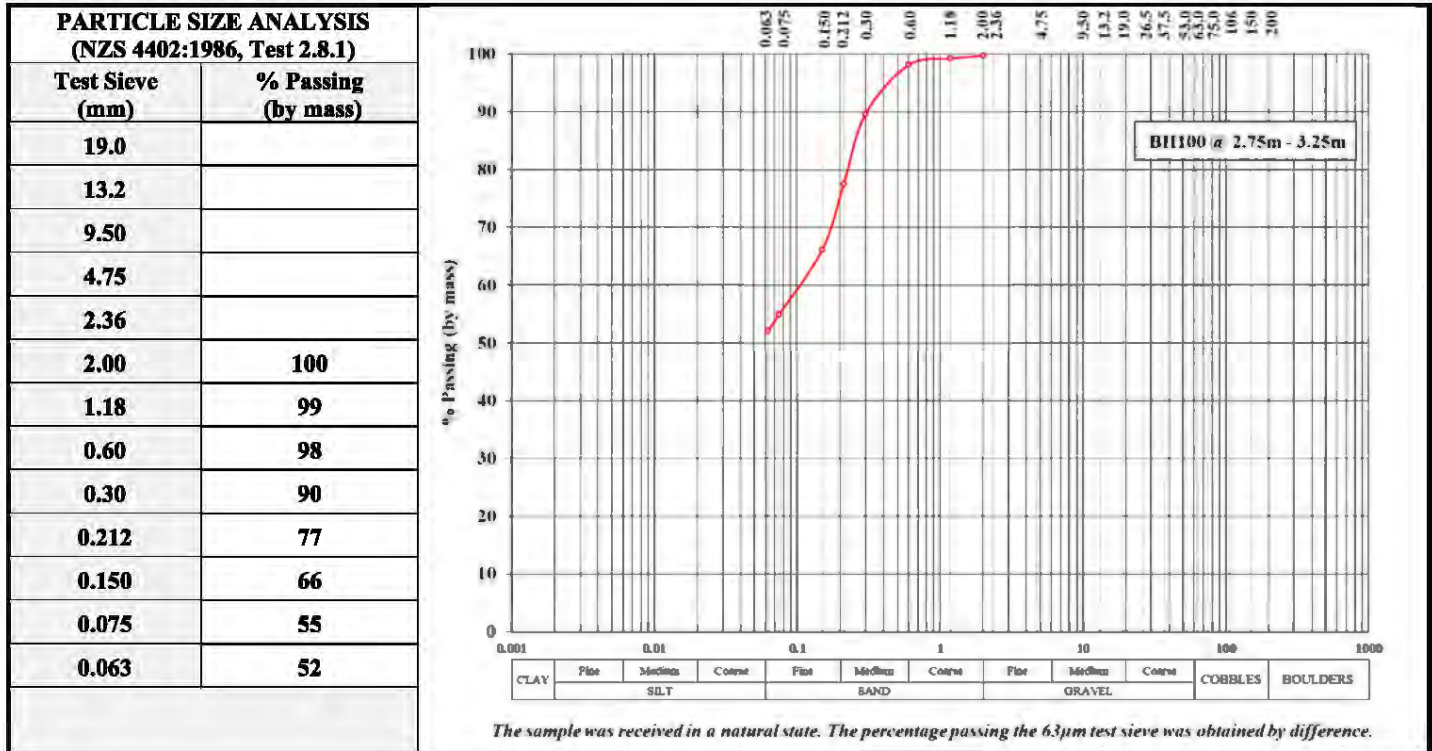
Appendix F

Geotechnical Lab Testing



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY	Client Order No:	Not Stated
Sample Source: (cs)	BH100	Sample Depth: (cs)	2.75m - 3.25m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	44.4 %
Liquid Limit: (LL)	62
Plastic Limit: (PL)	27
Plasticity Index: (PI)	35

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

- Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information (cs) and sampling.
- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

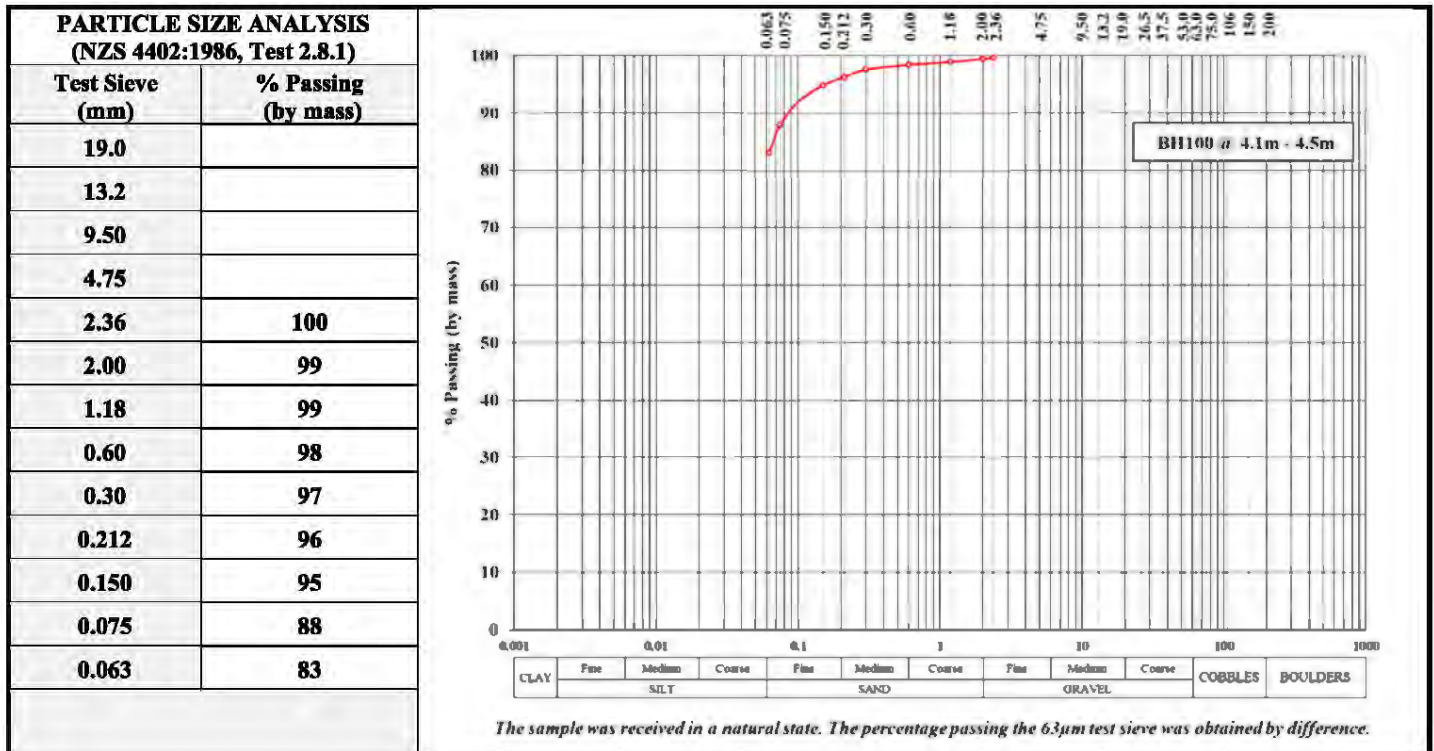


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with some sand and trace of gravel	Client Order No:	Not Stated
Sample Source: ^(cs)	BH100	Sample Depth: ^(cs)	4.1m - 4.5m
Date & Time Sampled:	Unknown	Sampled By: ^(cs)	GHD Staff
Sample Method: ^(cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	20.3 %
Liquid Limit: (LL)	70
Plastic Limit: (PL)	30
Plasticity Index: (PI)	40

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

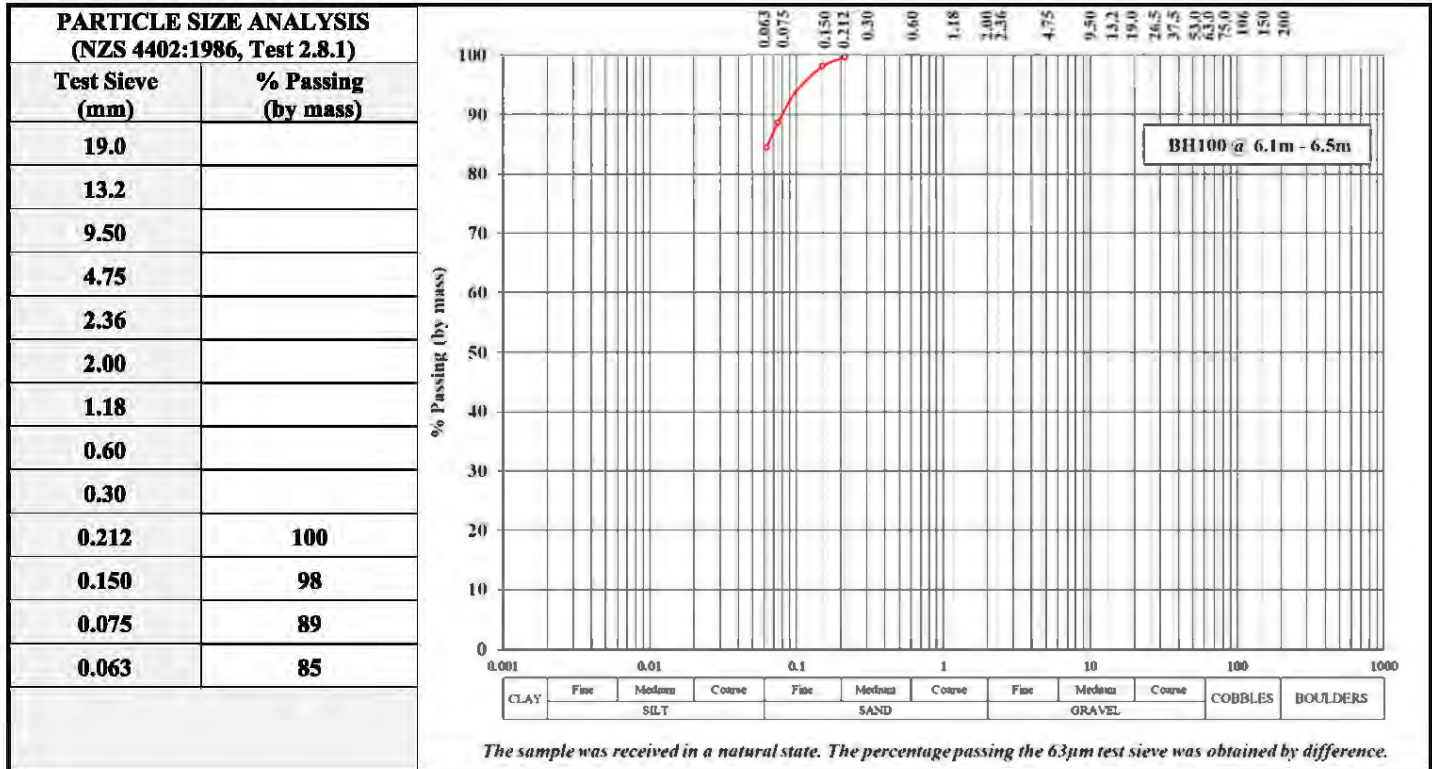


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with some sand	Client Order No:	Not Stated
Sample Source: (cs)	BH100	Sample Depth: (cs)	6.1m - 6.5m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	36.7 %
Liquid Limit: (LL)	53
Plastic Limit: (PL)	24
Plasticity Index: (PI)	29

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

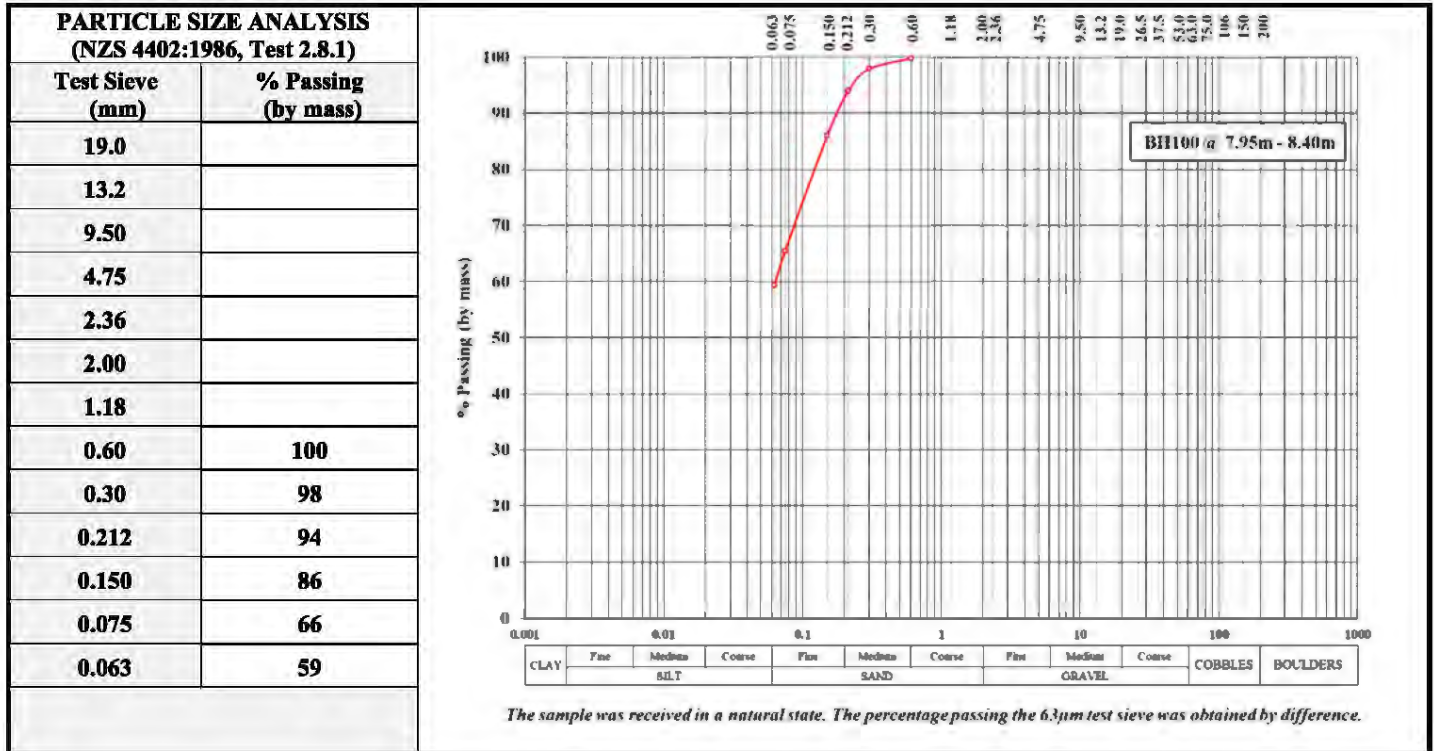


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy SILT with minor clay	Client Order No:	Not Stated
Sample Source: (cs)	BH100	Sample Depth: (cs)	7.95m - 8.40m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	24.6 %
Liquid Limit: (LL)	28
Plastic Limit: (PL)	23
Plasticity Index: (PI)	5

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By: *[Signature]*

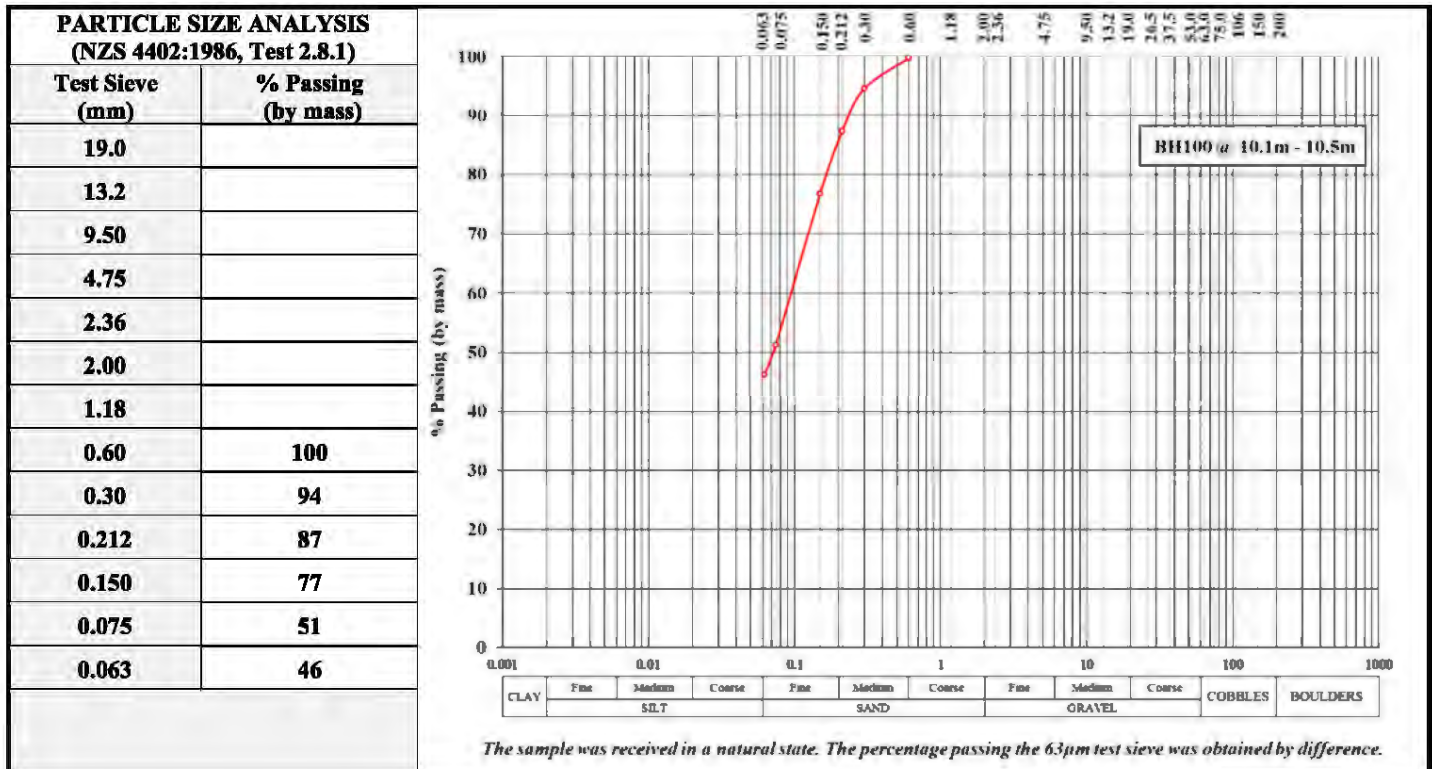


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty SAND with minor clay	Client Order No:	Not Stated
Sample Source: (cs)	BH100	Sample Depth: (cs)	10.1m - 10.5m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	28.5 %
Liquid Limit: (LL)	33
Plastic Limit: (PL)	27
Plasticity Index: (PI)	6

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

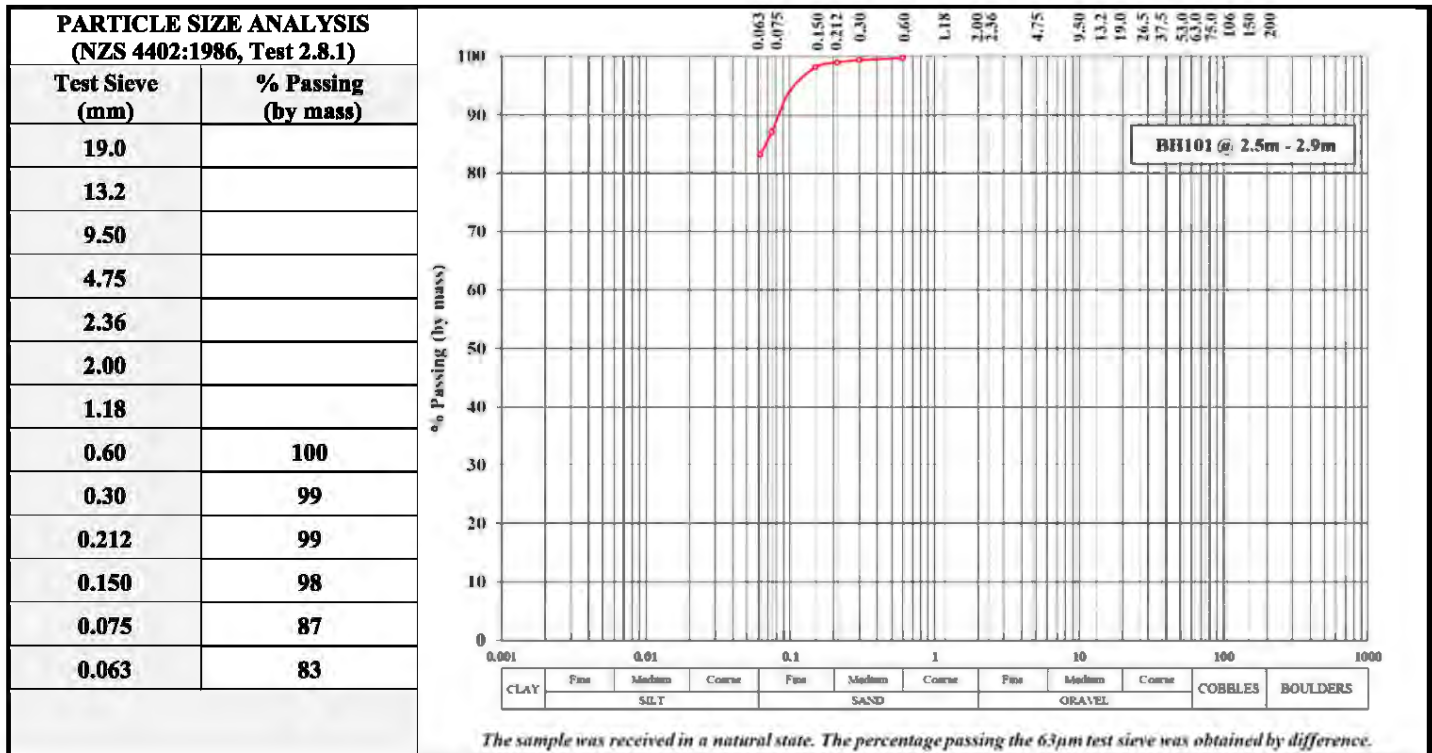


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	SILT with some sand and minor clay	Client Order No:	Not Stated
Sample Source: (cs)	BH101	Sample Depth: (cs)	2.5m - 2.9m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4

Water Content: (As Received)	35.8 %
Liquid Limit: (LL)	39
Plastic Limit: (PL)	28
Plasticity Index: (PI)	11

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

- Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information (cs) and sampling.
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Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:



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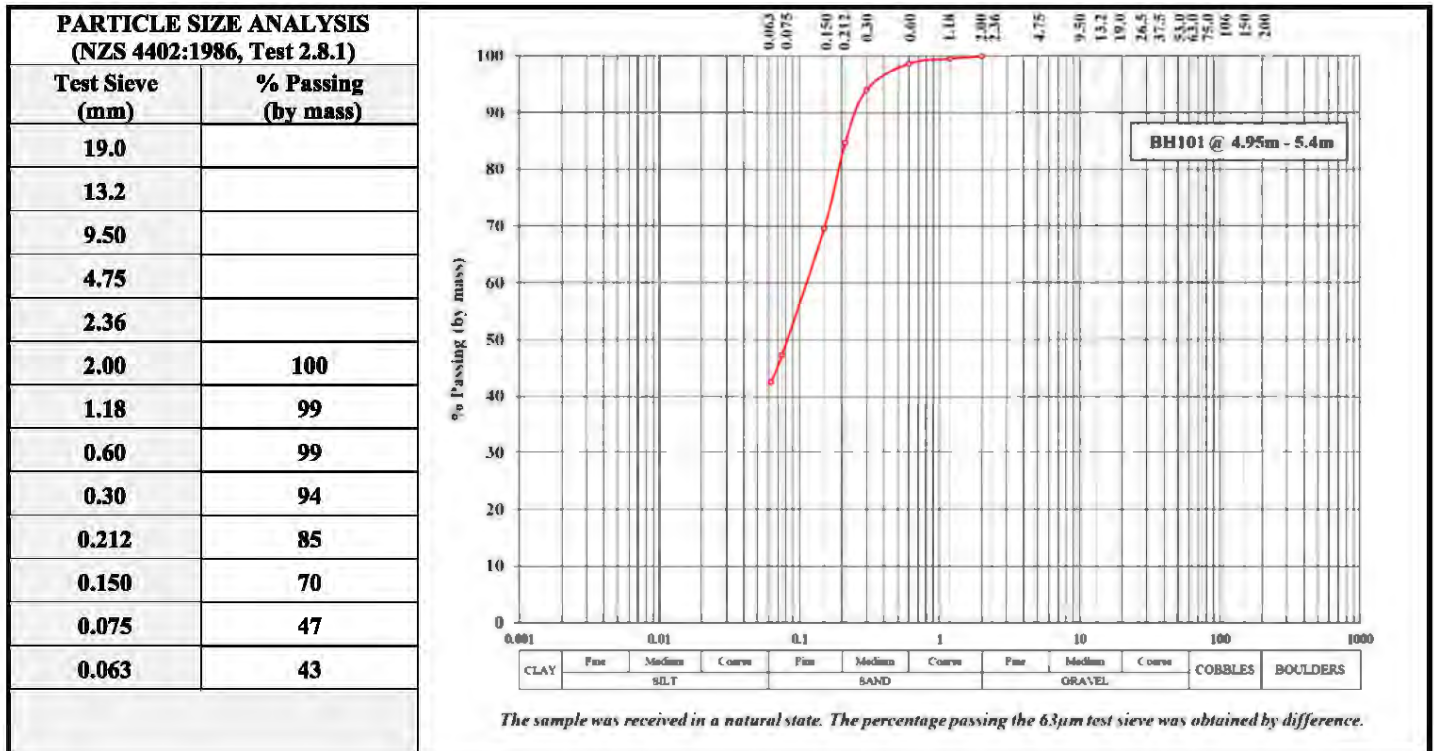
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY	Client Order No:	Not Stated
Sample Source: (cs)	BH101	Sample Depth: (cs)	4.95m - 5.4m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	66.2 %
Liquid Limit: (LL)	79
Plastic Limit: (PL)	30
Plasticity Index: (PI)	49

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

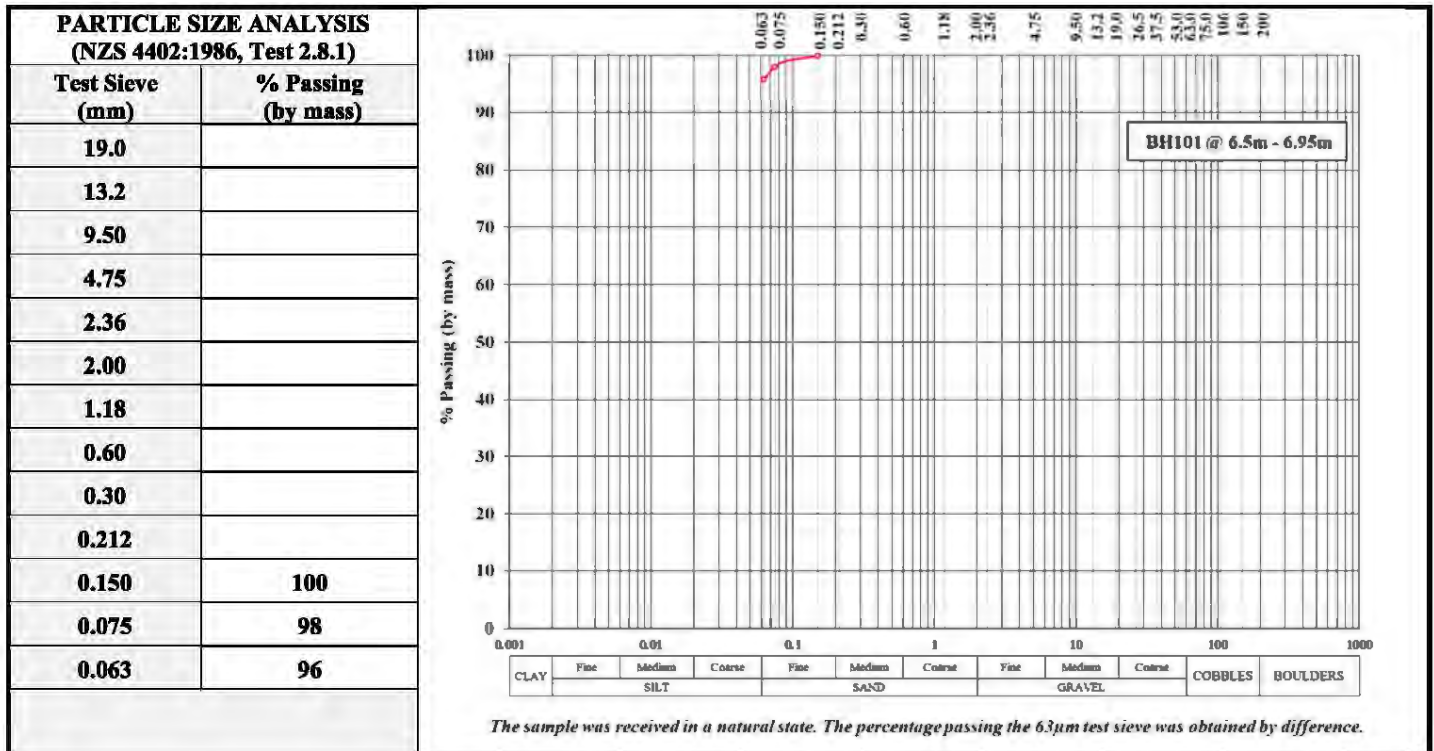


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with trace of sand	Client Order No:	Not Stated
Sample Source: ^(cs)	BH101	Sample Depth: ^(cs)	6.5m – 6.95m
Date & Time Sampled:	Unknown	Sampled By: ^(cs)	GHD Staff
Sample Method: ^(cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	40.7 %
Liquid Limit: (LL)	59
Plastic Limit: (PL)	27
Plasticity Index: (PI)	32

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

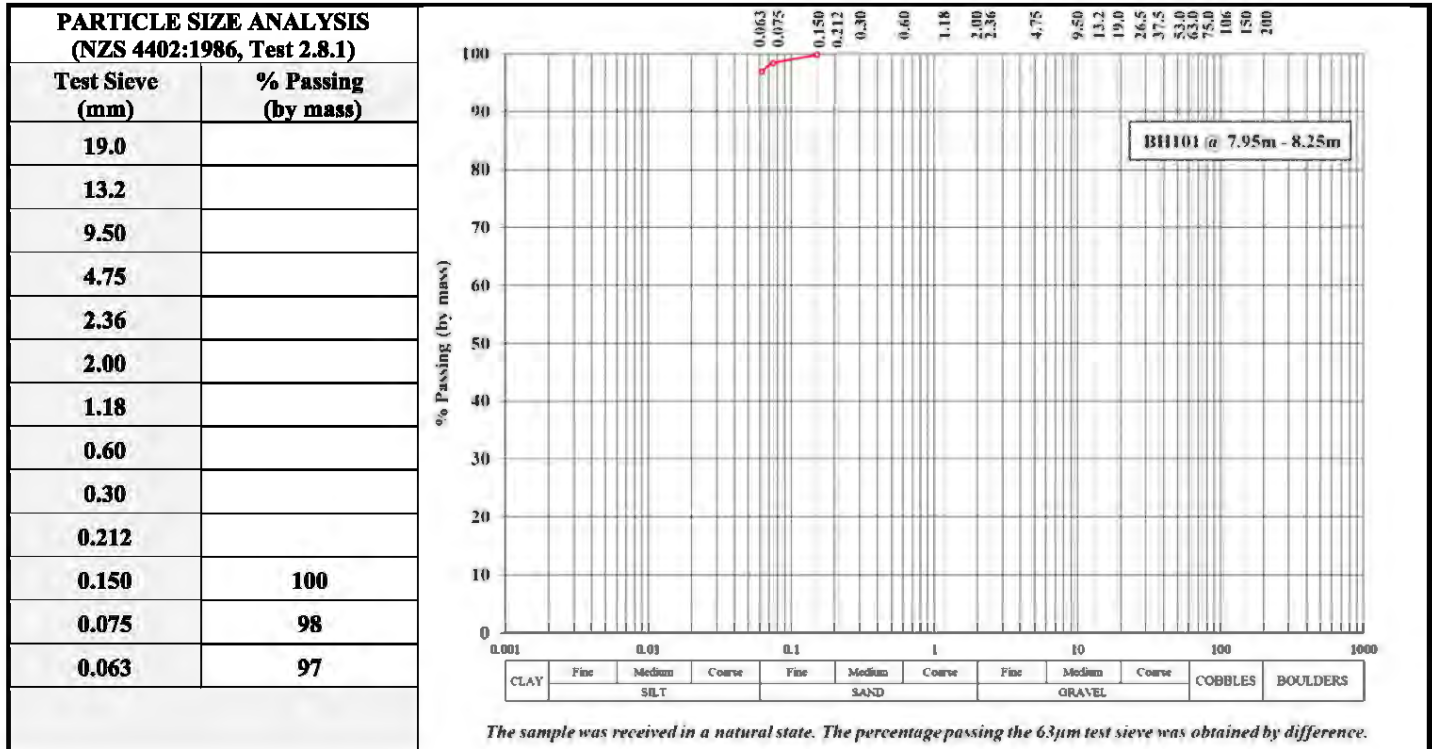


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with trace of sand	Client Order No:	Not Stated
Sample Source: (cs)	BH101	Sample Depth: (cs)	7.95m - 8.25m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	31.5 %
Liquid Limit: (LL)	48
Plastic Limit: (PL)	23
Plasticity Index: (PI)	25

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

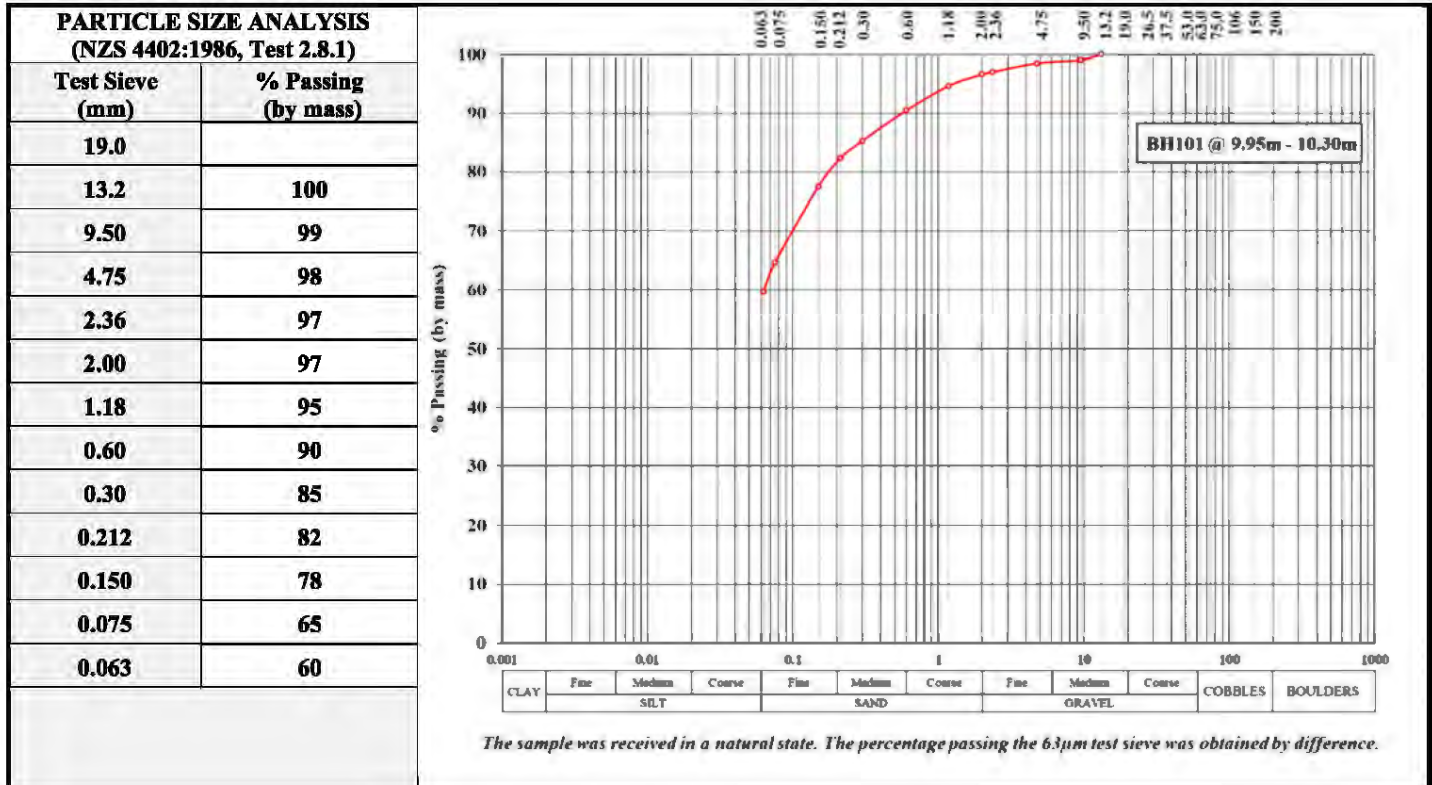


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY	Client Order No:	Not Stated
Sample Source: (cs)	BH101	Sample Depth: (cs)	9.95m - 10.30m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	21.8 %
Liquid Limit: (LL)	35
Plastic Limit: (PL)	21
Plasticity Index: (PI)	14

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

- Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information^(cs) and sampling.
- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:



Test results indicated as not accredited are outside the scope of the laboratory's accreditation

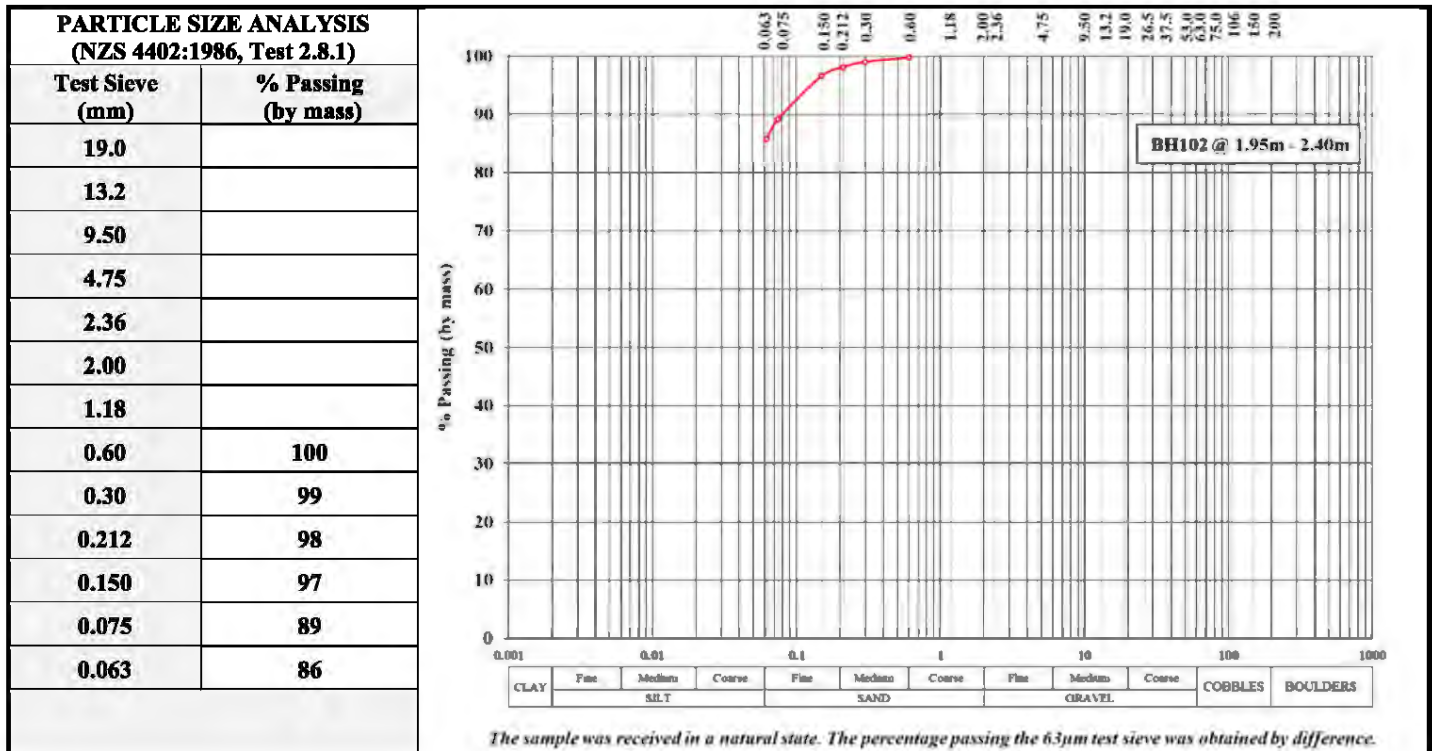
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with some sand	Client Order No:	Not Stated
Sample Source: (cs)	BH102	Sample Depth: (cs)	1.95m – 2.40m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	40.0 %
Liquid Limit: (LL)	53
Plastic Limit: (PL)	22
Plasticity Index: (PI)	31

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

- Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information (cs) and sampling.
- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:


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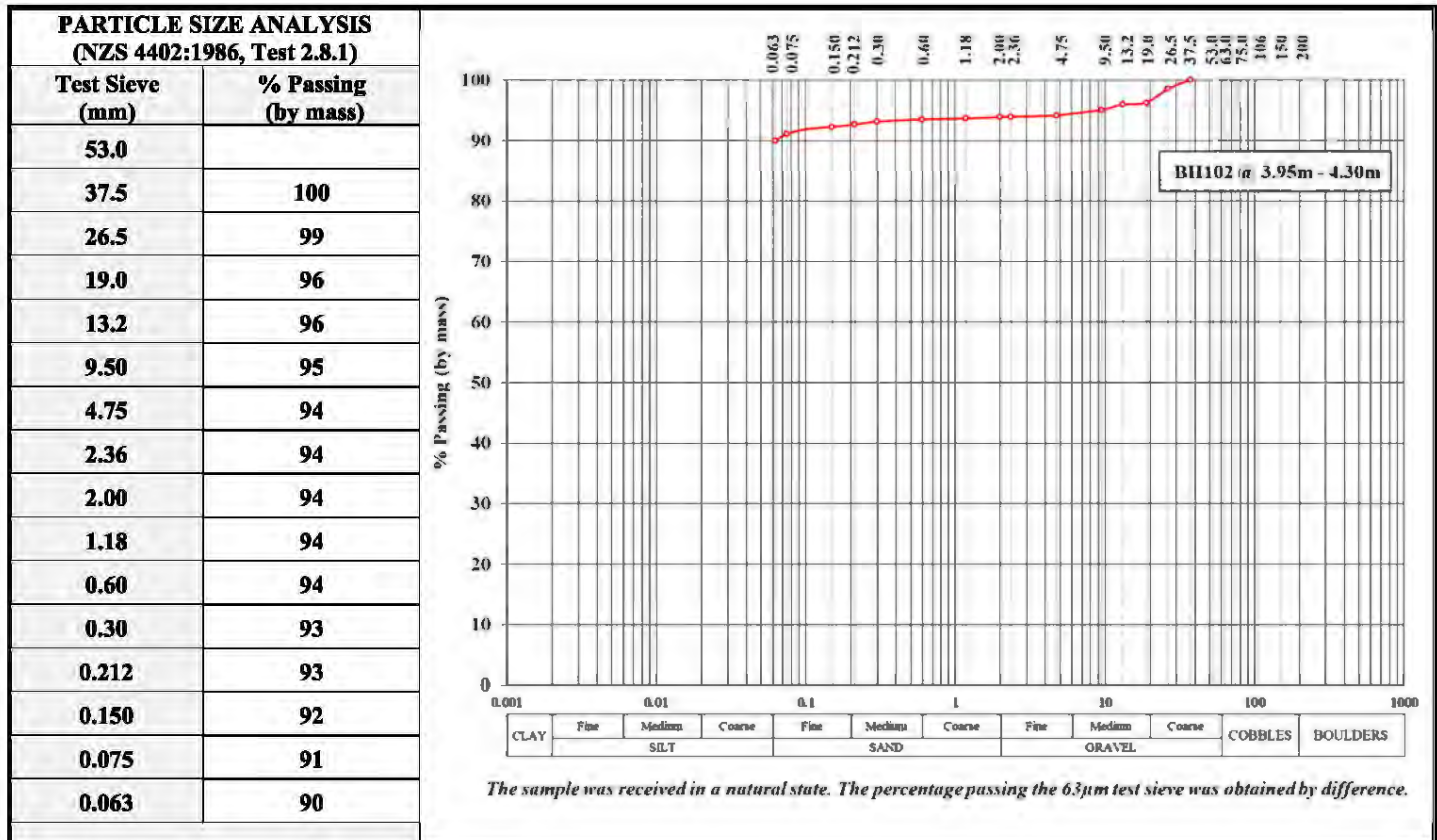
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	SILT with minor gravel, minor clay and trace of sand	Client Order No:	Not Stated
Sample Source: ^(ca)	BH102	Sample Depth: ^(ca)	3.95m – 4.30m
Date & Time Sampled:	Unknown	Sampled By: ^(ca)	GHD Staff
Sample Method: ^(ca)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	40.8 %
Liquid Limit: (LL)	43
Plastic Limit: (PL)	34
Plasticity Index: (PI)	9

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

- Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information ^(ca) and sampling.
- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

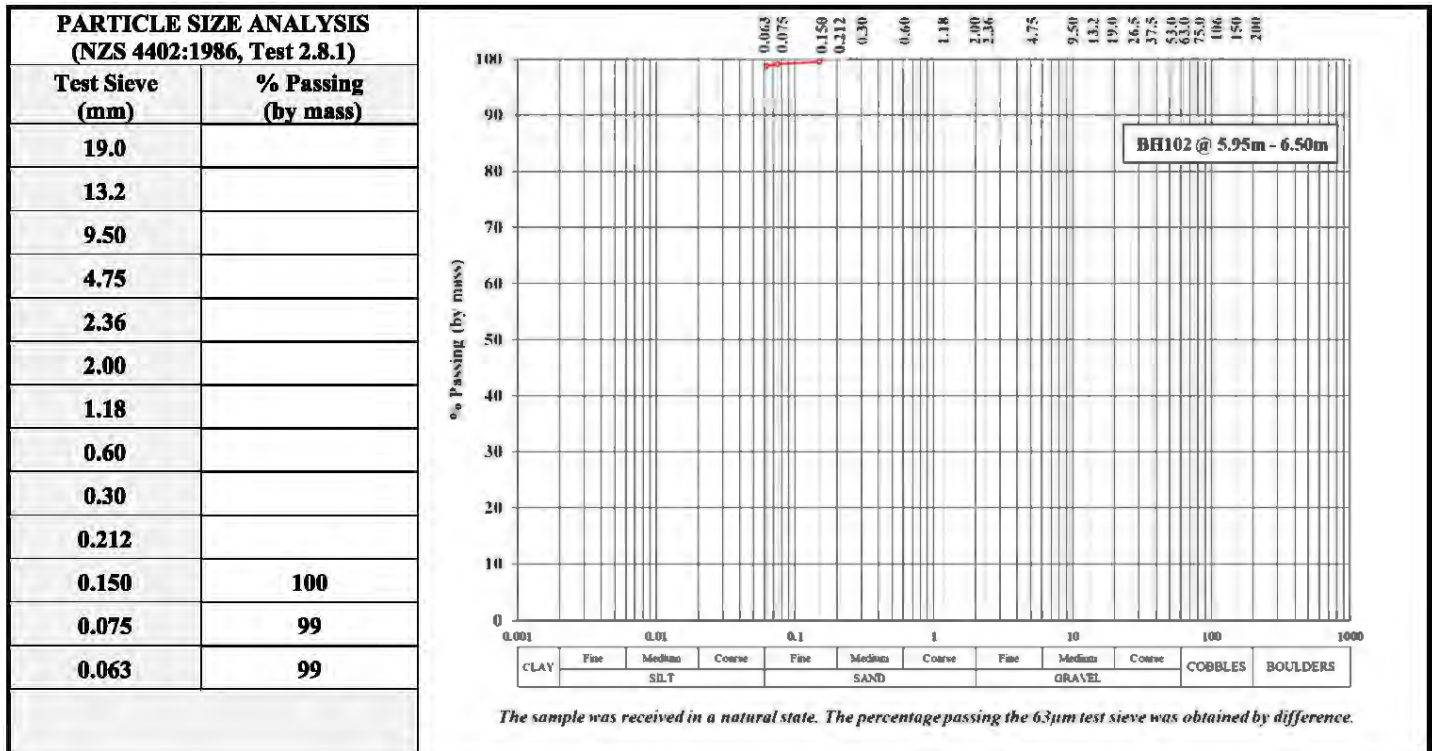


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with trace of sand	Client Order No:	Not Stated
Sample Source: (cs)	BH102	Sample Depth: (cs)	5.95m - 6.50m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	99.5 %
Liquid Limit: (LL)	125
Plastic Limit: (PL)	39
Plasticity Index: (PI)	86

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:



Test results indicated as not accredited are outside the scope of the laboratory's accreditation

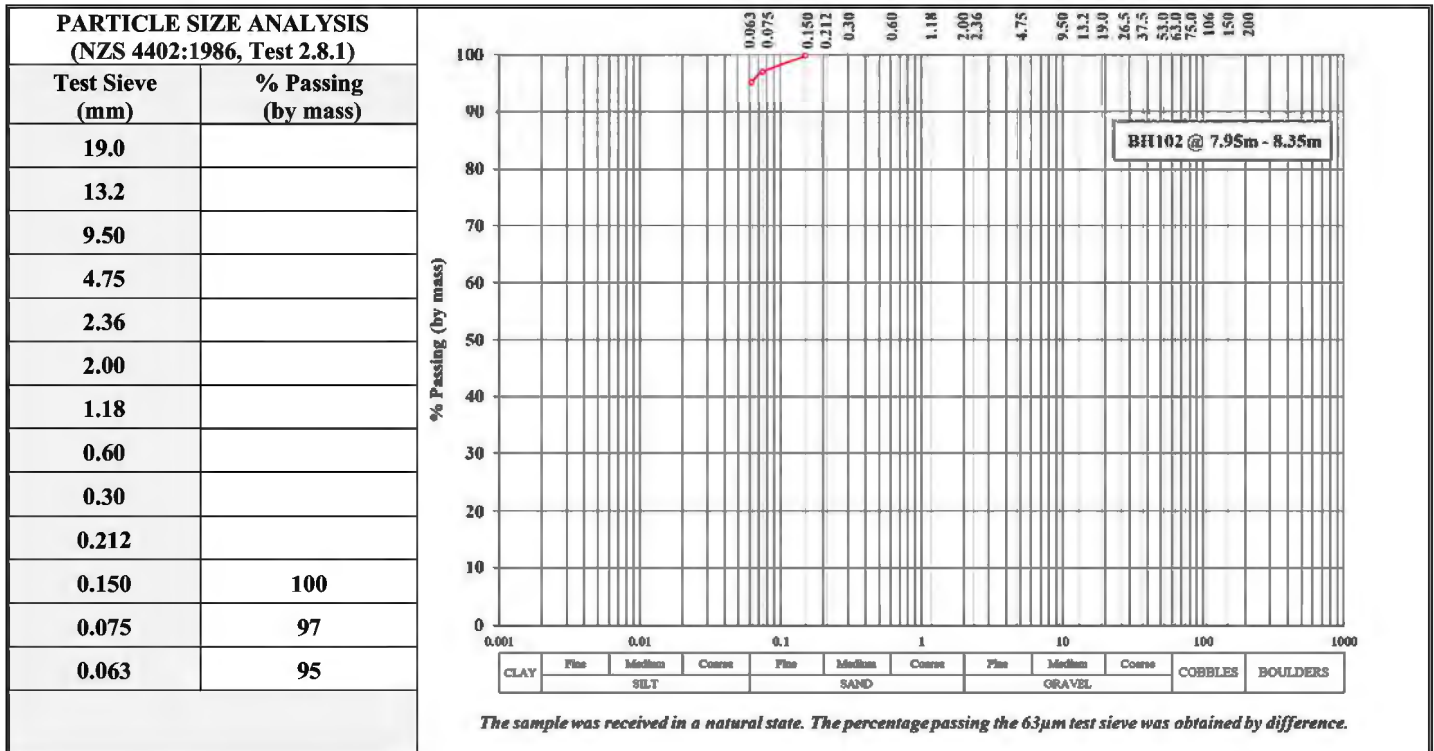
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with trace of / minor sand	Client Order No:	Not Stated
Sample Source: (cs)	BH102	Sample Depth: (cs)	7.95m - 8.35m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	41.7 %
Liquid Limit: (LL)	59
Plastic Limit: (PL)	26
Plasticity Index: (PI)	33

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

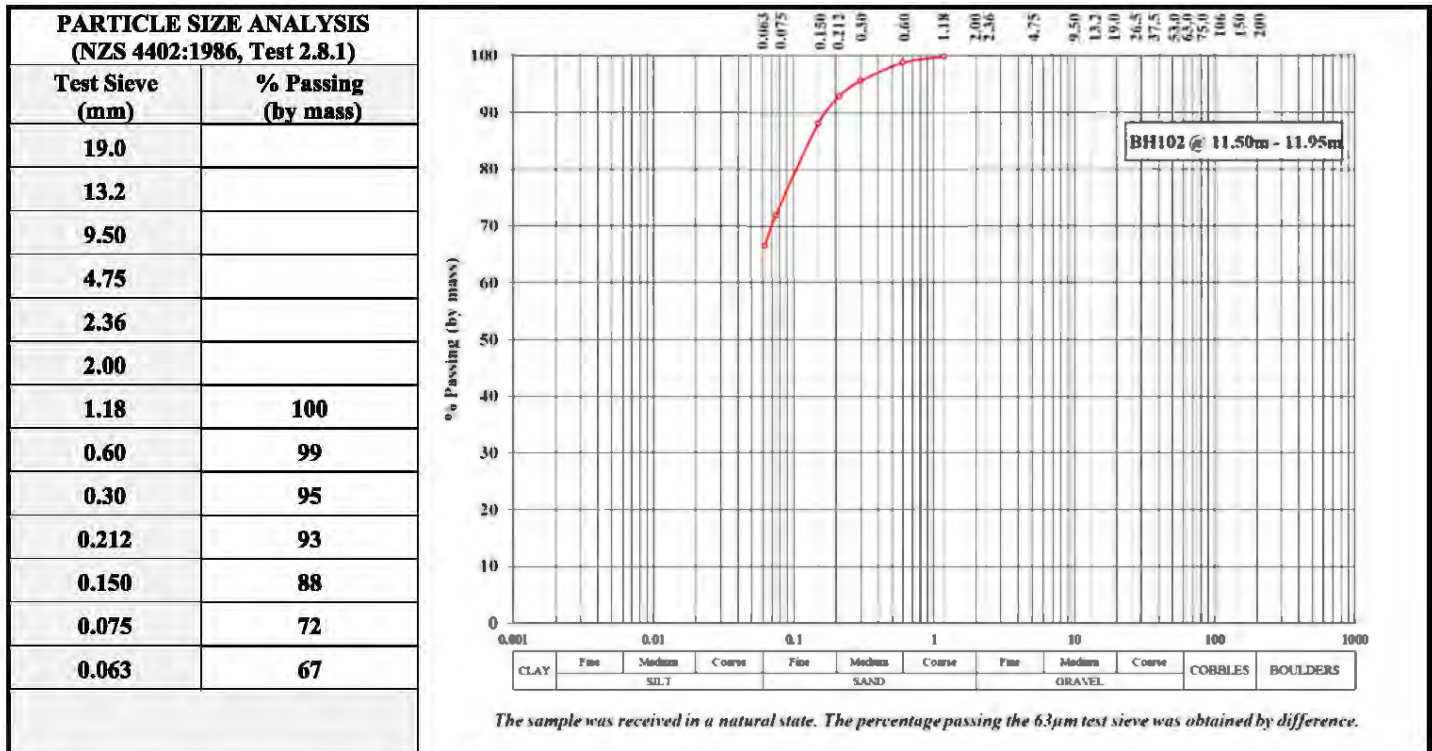


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Clayey SILT / Sandy Silty CLAY	Client Order No:	Not Stated
Sample Source: (cs)	BH102	Sample Depth: (cs)	11.50m - 11.95m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	29.5 %
Liquid Limit: (LL)	42
Plastic Limit: (PL)	25
Plasticity Index: (PI)	17

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 10 to 22-Nov-22

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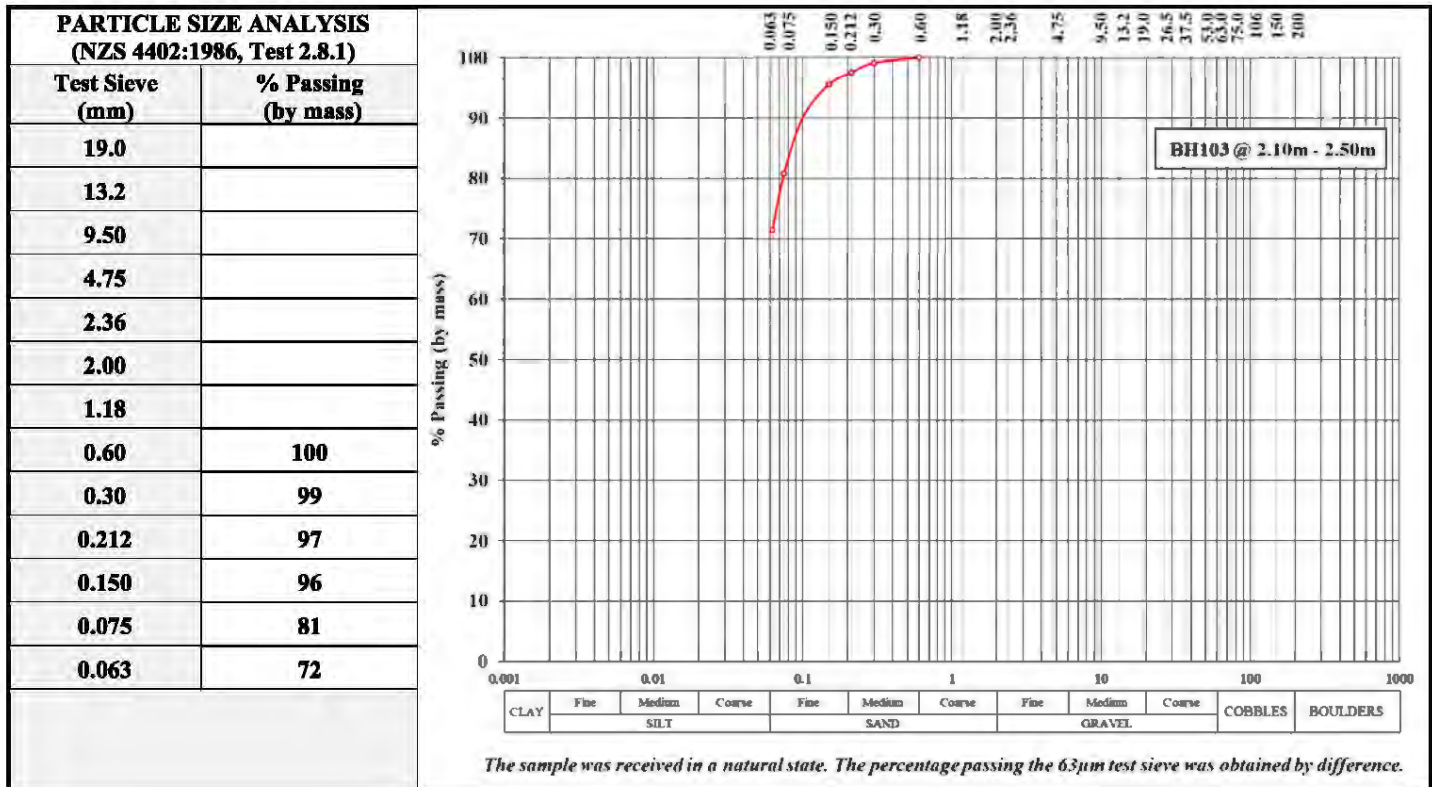


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Clayey SILT	Client Order No:	Not Stated
Sample Source: (cs)	BH103	Sample Depth: (cs)	2.10m - 2.50m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4

Water Content: (As Received)	16.8 %
Liquid Limit: (LL)	42
Plastic Limit: (PL)	29
Plasticity Index: (PI)	13

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

- Information contained in this report which is Not IANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information^(cs) and sampling.
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Date: 10 to 22-Nov-22

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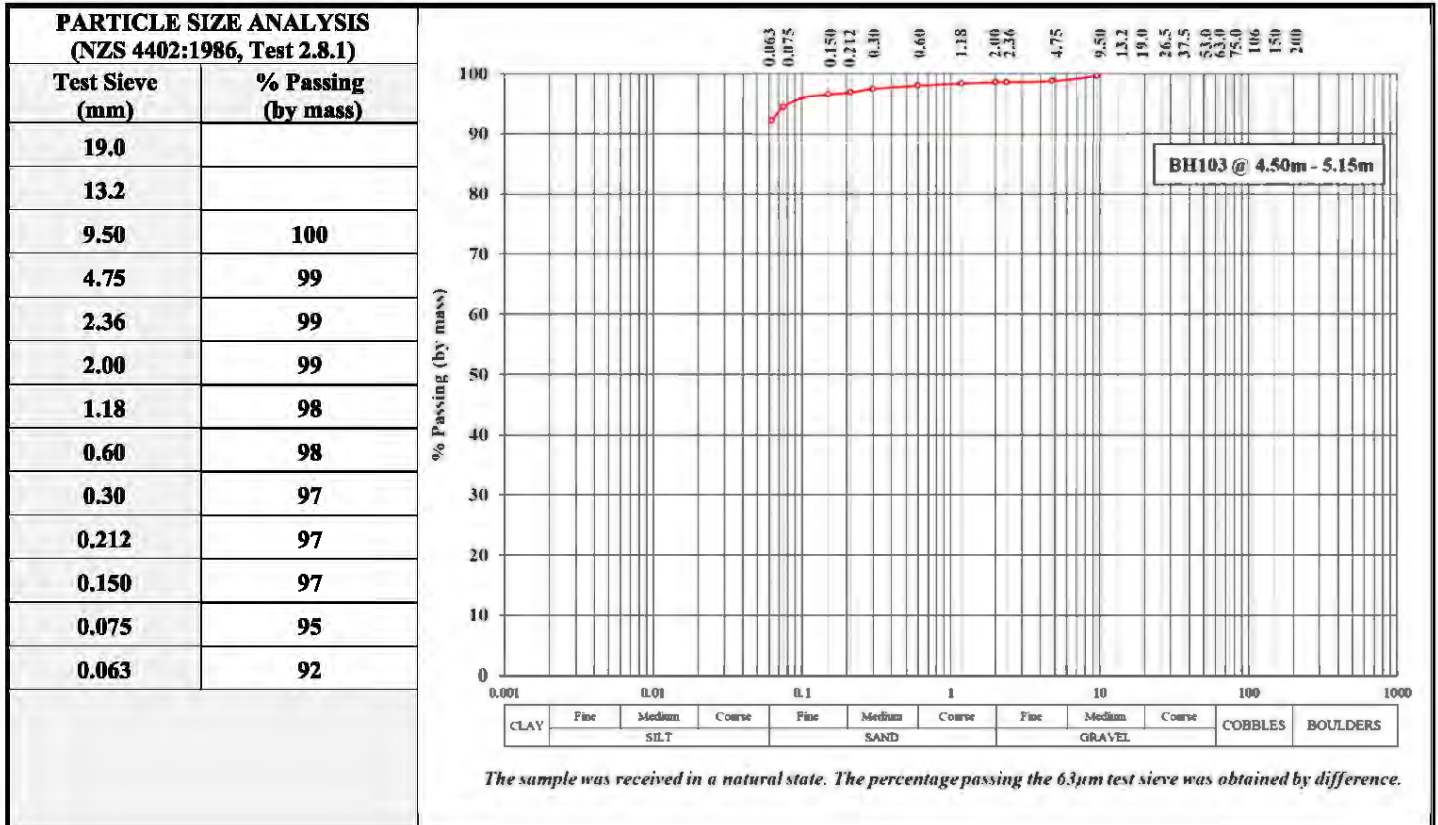
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with minor sand	Client Order No:	Not Stated
Sample Source: (cs)	BH103	Sample Depth: (cs)	4.50m - 5.15m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	91.3 %
Liquid Limit: (LL)	99
Plastic Limit: (PL)	30
Plasticity Index: (PI)	69

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 10 to 22-Nov-22

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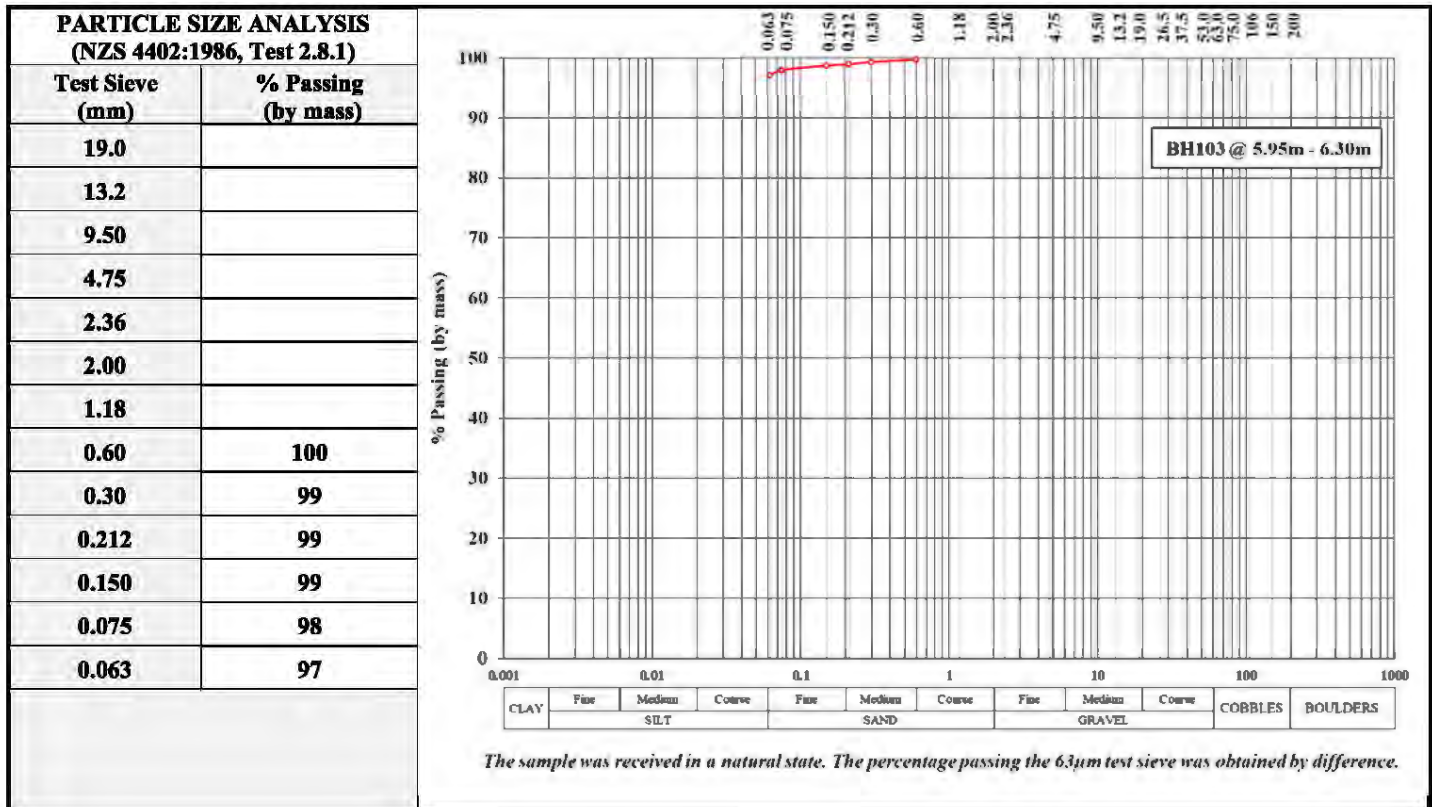


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with trace of sand	Client Order No:	Not Stated
Sample Source: ^(cs)	BH103	Sample Depth: ^(cs)	5.95m - 6.30m
Date & Time Sampled:	Unknown	Sampled By: ^(cs)	GHD Staff
Sample Method: ^(cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	92.3 %
Liquid Limit: (LL)	107
Plastic Limit: (PL)	34
Plasticity Index: (PI)	73

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Date: 10 to 22-Nov-22

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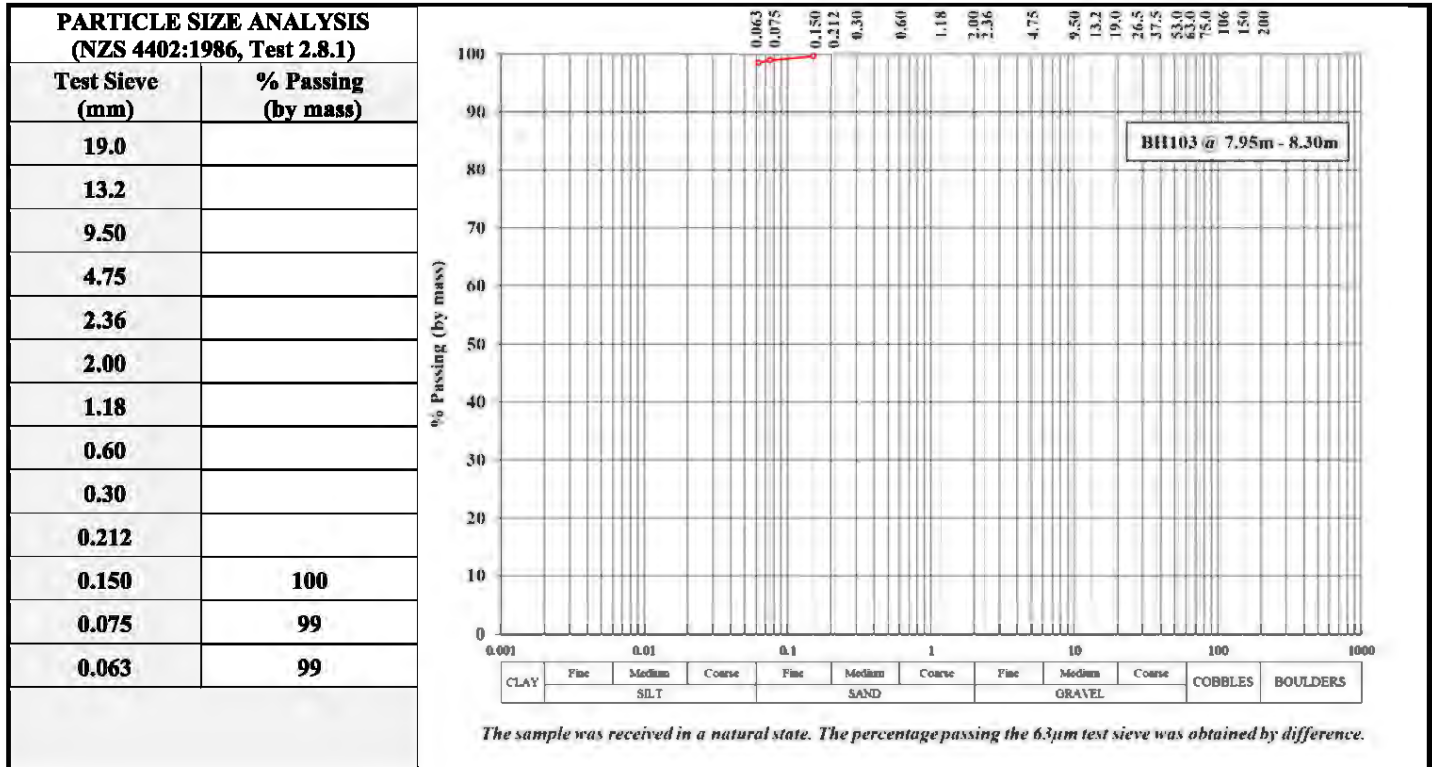
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with trace of sand	Client Order No:	Not Stated
Sample Source: (cs)	BH103	Sample Depth: (cs)	7.95m - 8.30m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	72.8 %
Liquid Limit: (LL)	135
Plastic Limit: (PL)	40
Plasticity Index: (PI)	95

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

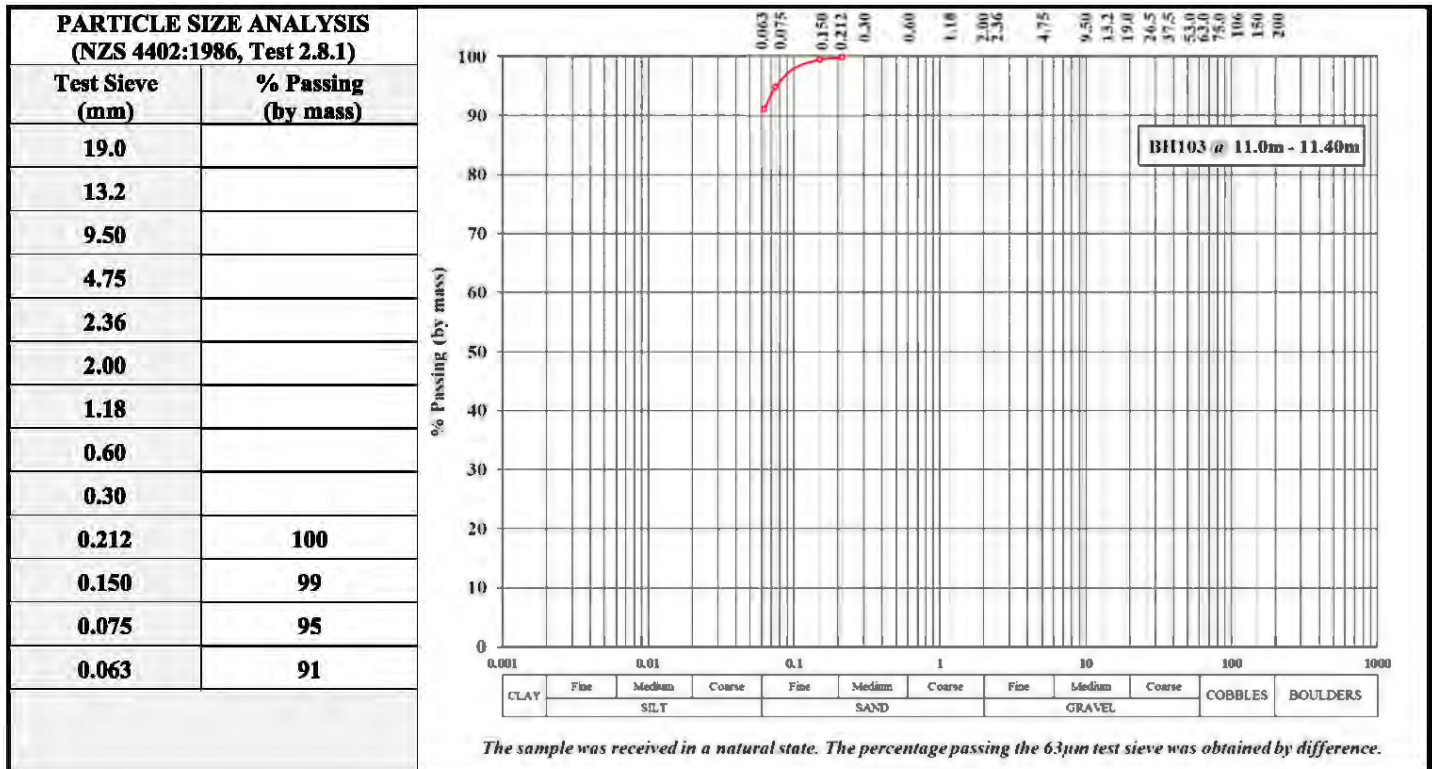


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	J. Kim
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with minor sand	Client Order No:	Not Stated
Sample Source: (cs)	BH103	Sample Depth: (cs)	11.0m - 11.40m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	9-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	50.6 %
Liquid Limit: (LL)	33
Plastic Limit: (PL)	23
Plasticity Index: (PI)	10

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 10 to 22-Nov-22

Checked By:

Approved Signatory

A.P. Julius
Laboratory Manager

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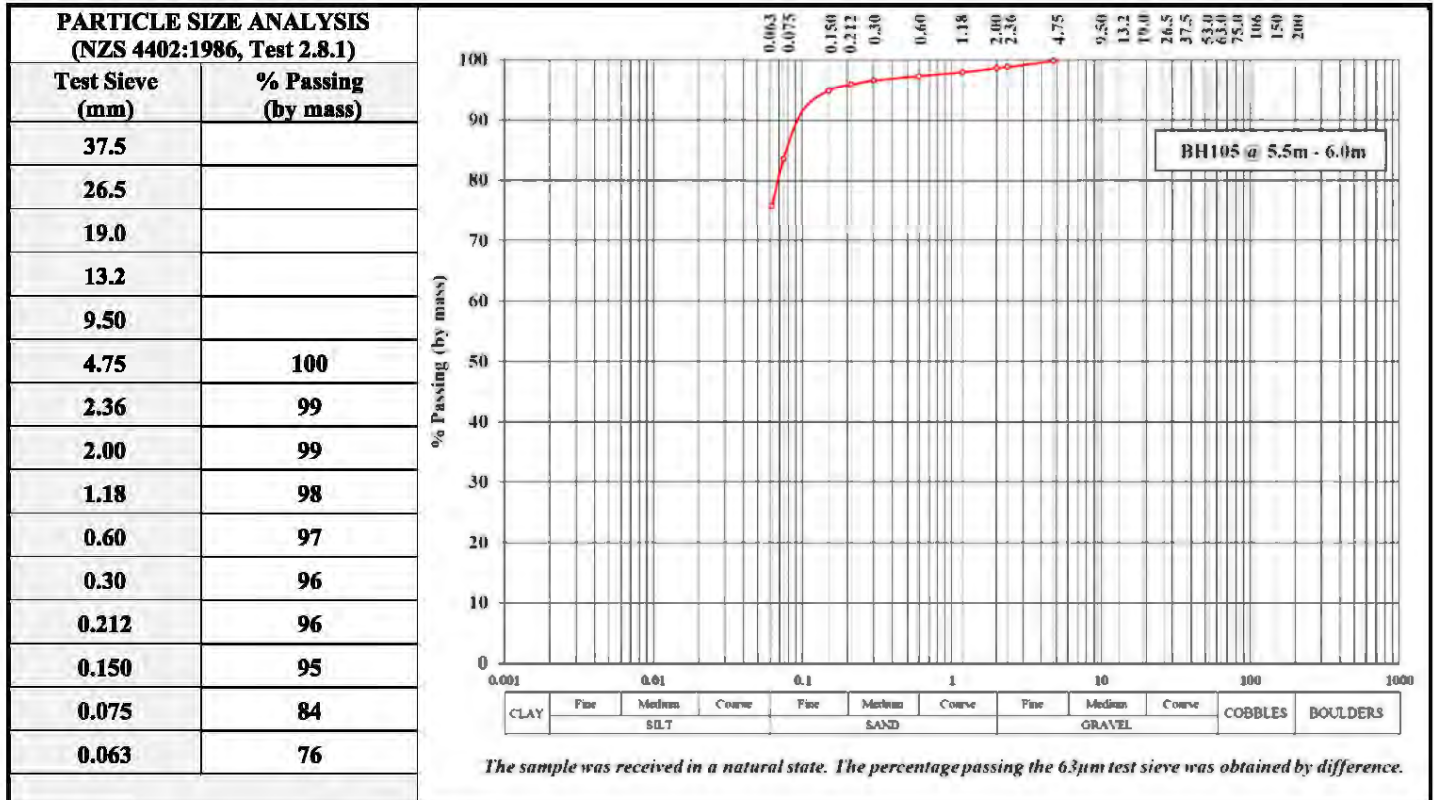
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy SILT with minor clay and trace of gravel (contaminated)	Client Order No:	Not Stated
Sample Source: (cs)	BH105	Sample Depth: (cs)	5.5m - 6.0m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	36.9 %
Liquid Limit: (LL)	41
Plastic Limit: (PL)	27
Plasticity Index: (PI)	14

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Date: 22 to 29-Nov-22

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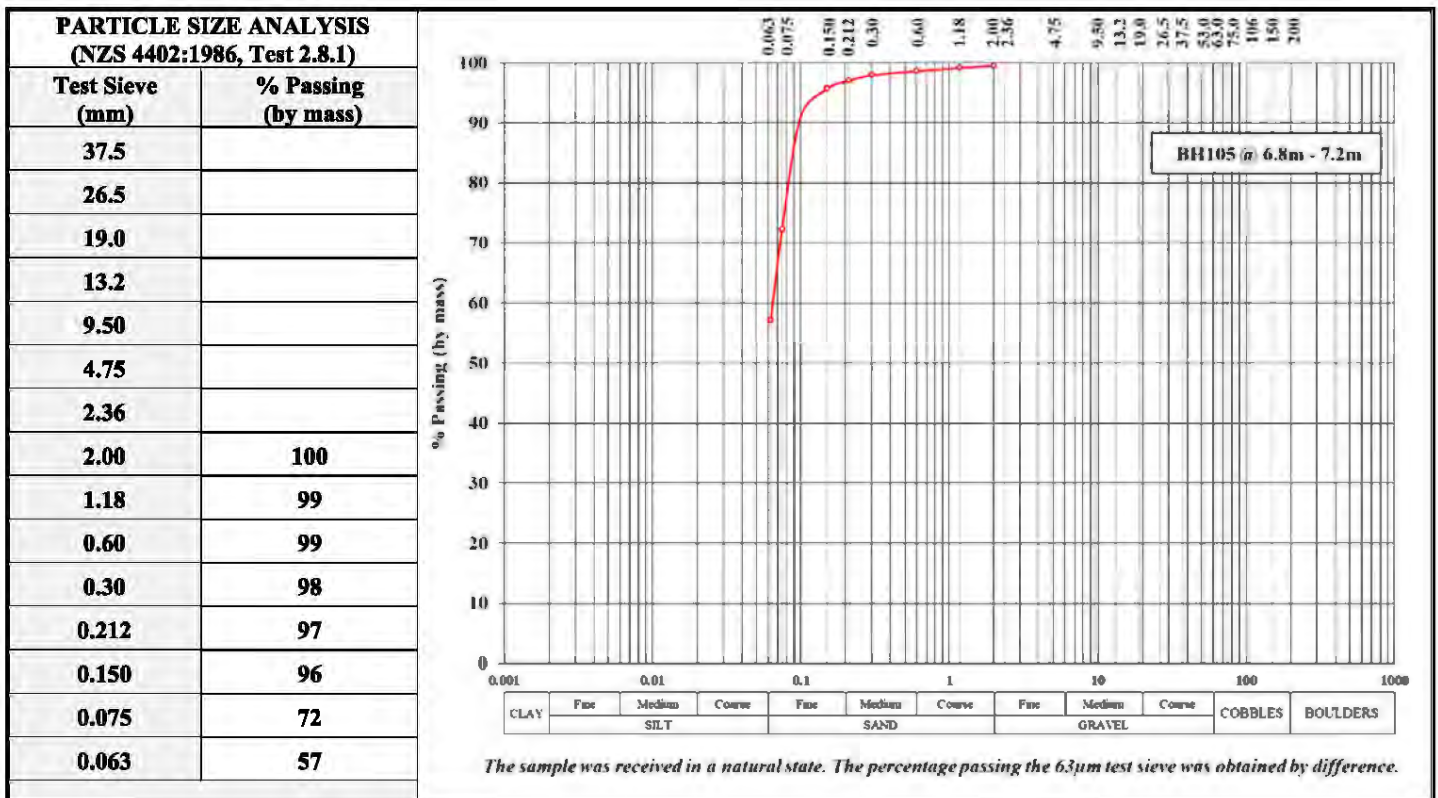
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy SILT with trace of clay (contaminated)	Client Order No:	Not Stated
Sample Source: (ca)	BH105	Sample Depth: (ca)	6.8m - 7.2m
Date & Time Sampled:	Unknown	Sampled By: (ca)	GHD Staff
Sample Method: (ca)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	30.2 %
Liquid Limit: (LL)	37
Plastic Limit: (PL)	32
Plasticity Index: (PI)	5

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Date: 22 to 29-Nov-22

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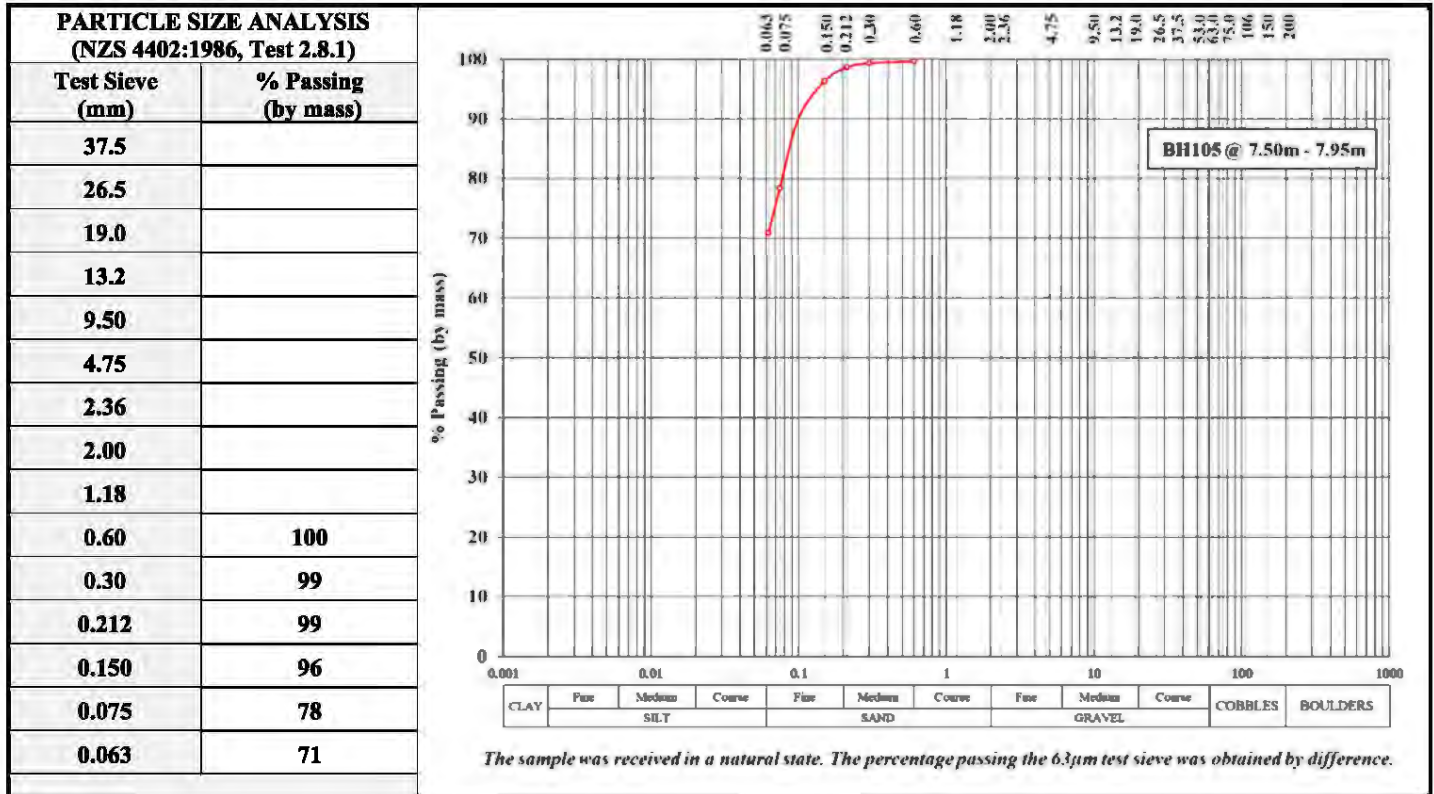


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy SILT with minor clay	Client Order No:	Not Stated
Sample Source: (cs)	BH105	Sample Depth: (cs)	7.50m - 7.95m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	43.7 %
Liquid Limit: (LL)	48
Plastic Limit: (PL)	27
Plasticity Index: (PI)	21

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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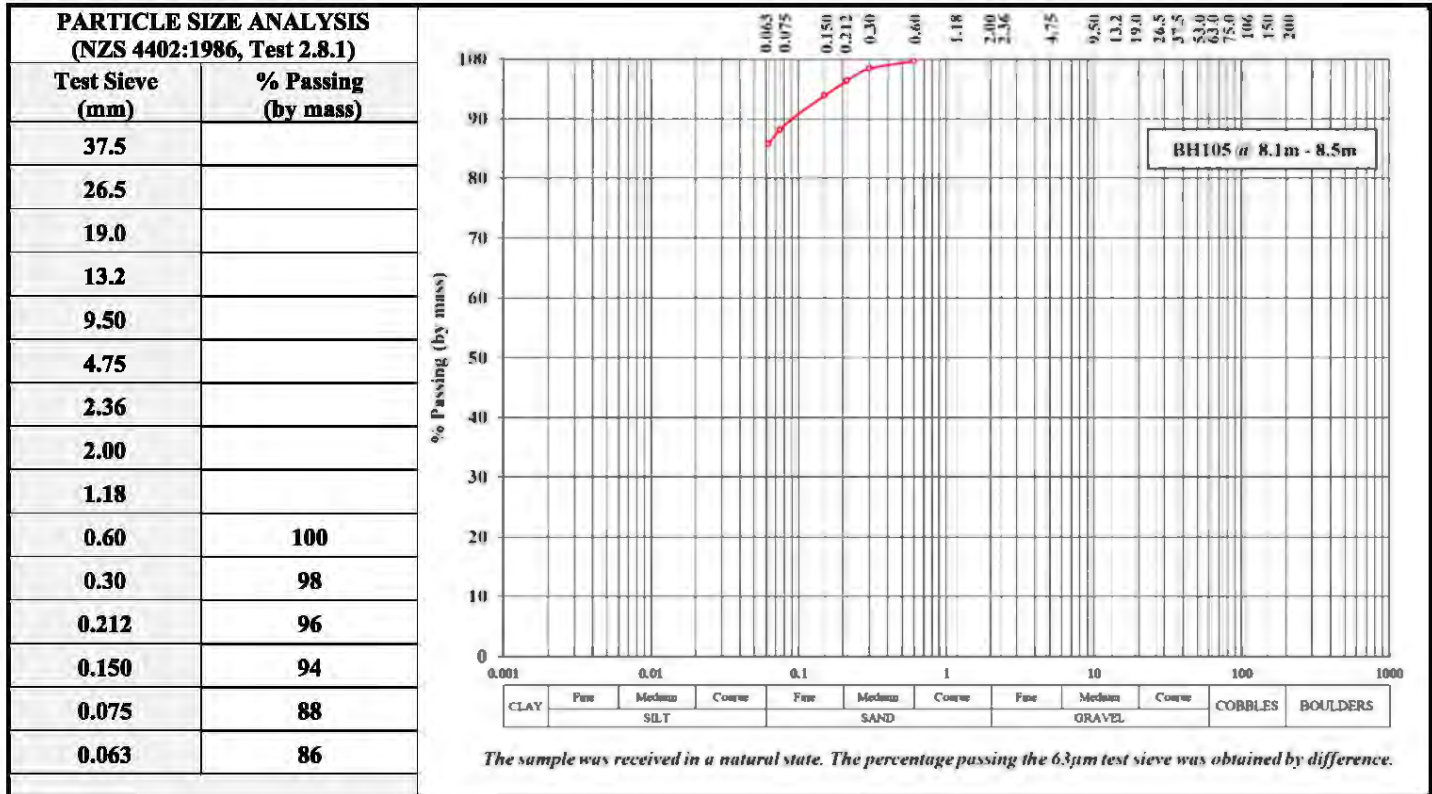


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with some sand	Client Order No:	Not Stated
Sample Source: (cs)	BH105	Sample Depth: (cs)	8.1m - 8.5m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	24.7 %
Liquid Limit: (LL)	56
Plastic Limit: (PL)	19
Plasticity Index: (PI)	37

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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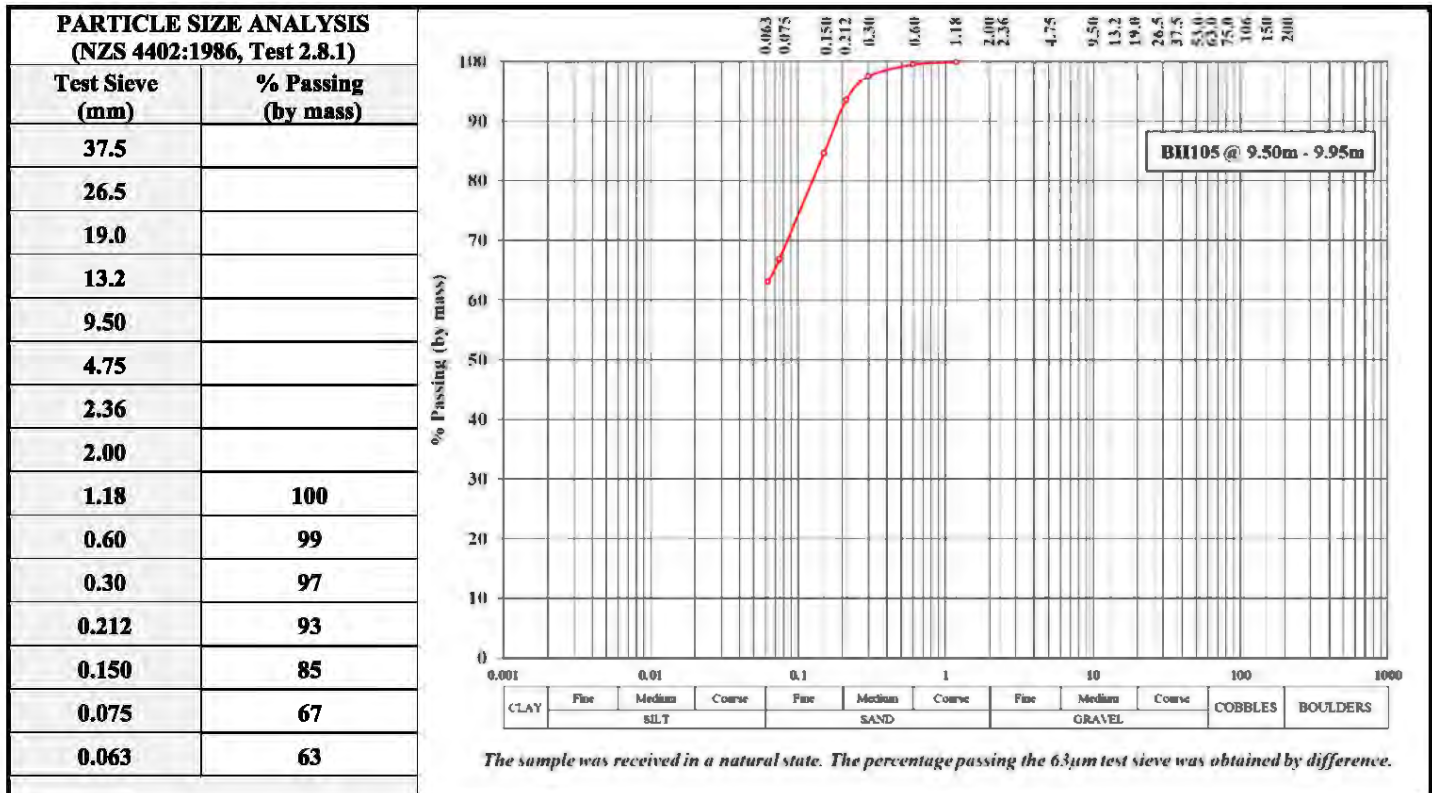


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY	Client Order No:	Not Stated
Sample Source: (cs)	BH105	Sample Depth: (cs)	9.50m - 9.95m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	25.9 %
Liquid Limit: (LL)	37
Plastic Limit: (PL)	20
Plasticity Index: (PI)	17

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

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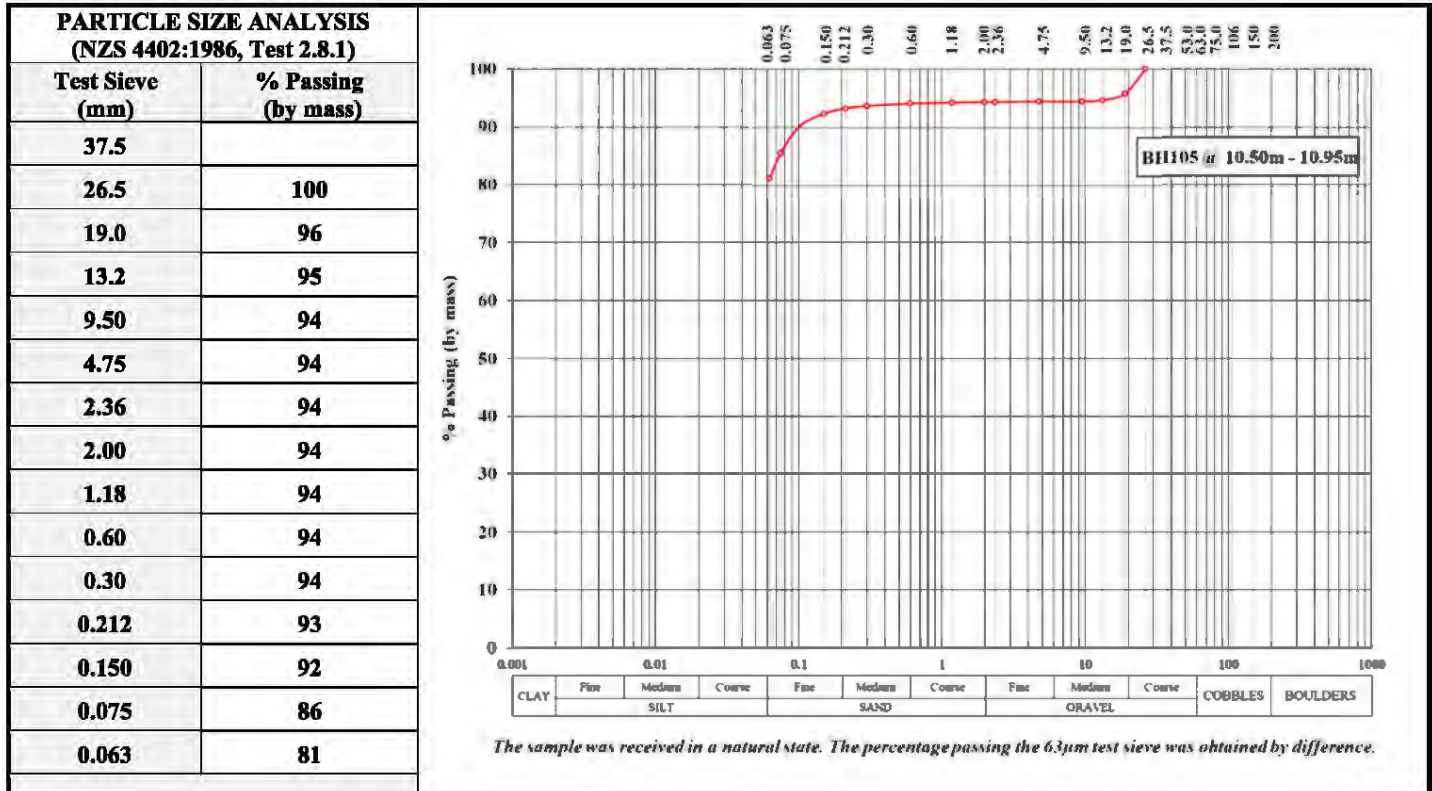
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with some sand and minor gravel	Client Order No:	Not Stated
Sample Source: (cs)	BH105	Sample Depth: (cs)	10.50m - 10.95m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	26.3 %
Liquid Limit: (LL)	45
Plastic Limit: (PL)	22
Plasticity Index: (PI)	23

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

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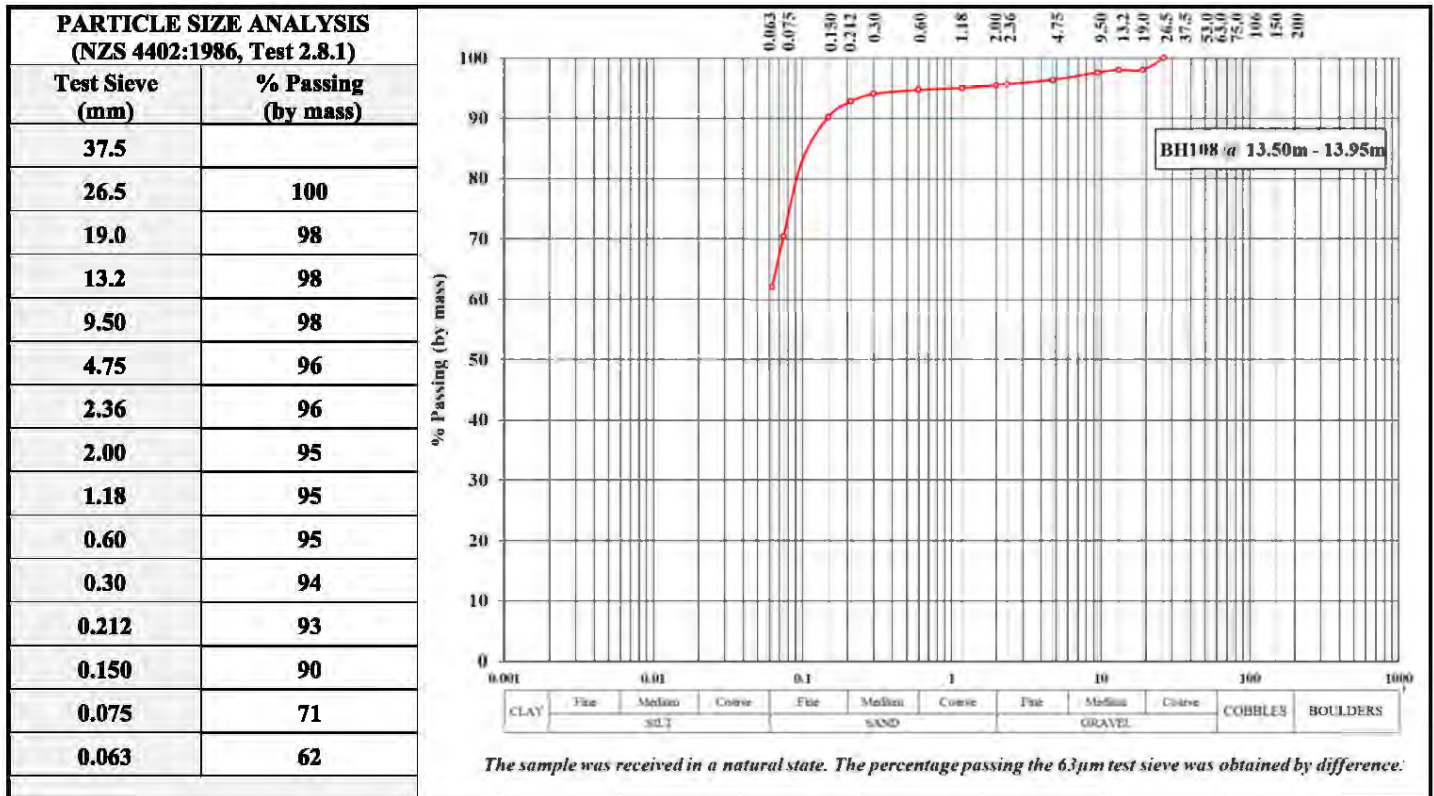
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY with trace of / minor gravel (contaminated)	Client Order No:	Not Stated
Sample Source: (cs)	BH108	Sample Depth: (cs)	13.50m - 13.95m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4

Water Content: (As Received)	37.5 %
Liquid Limit: (LL)	50
Plastic Limit: (PL)	26
Plasticity Index: (PI)	24

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

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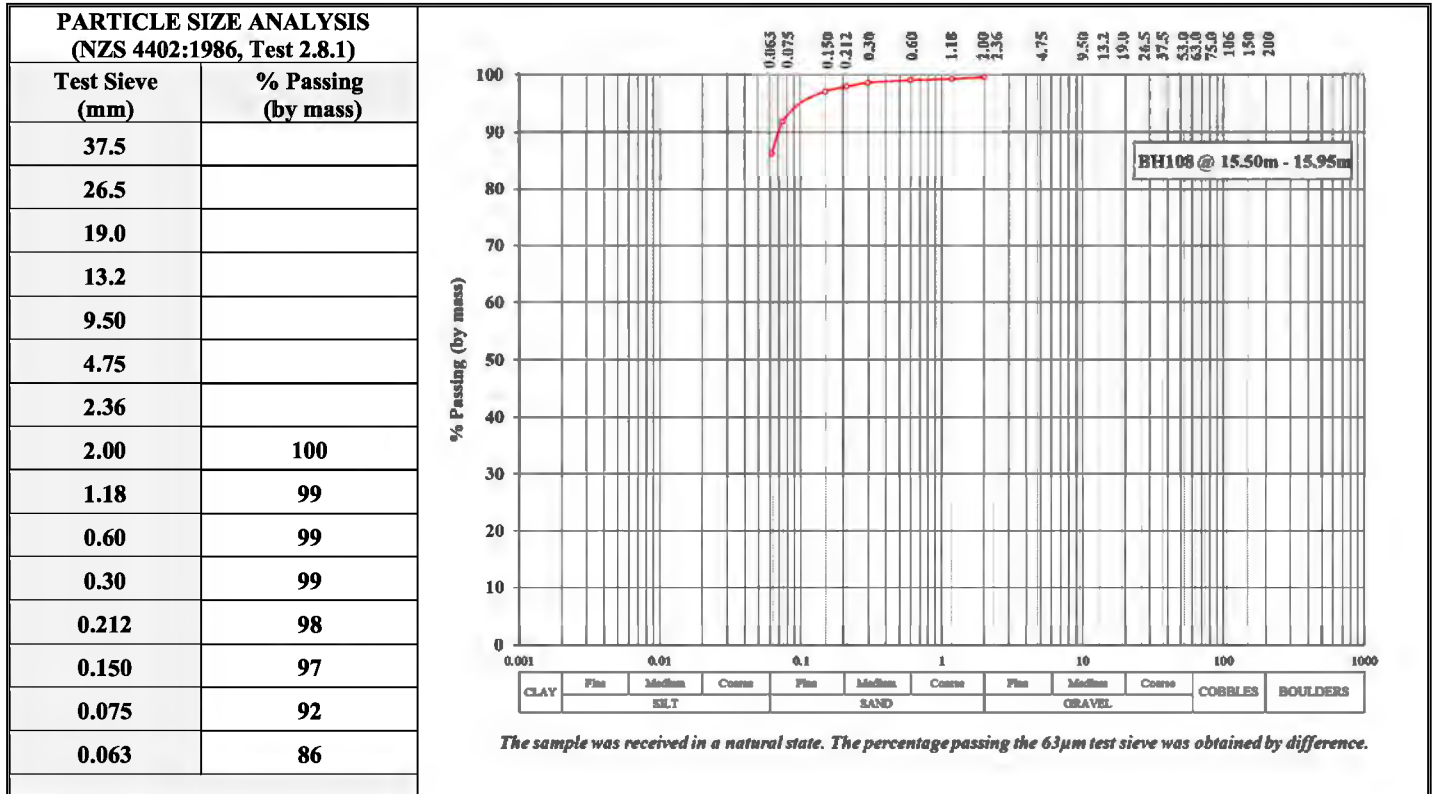
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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with some sand (contaminated)	Client Order No:	Not Stated
Sample Source: (cs)	BH108	Sample Depth: (cs)	15.50m - 15.95m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	41.3 %
Liquid Limit: (LL)	55
Plastic Limit: (PL)	23
Plasticity Index: (PI)	32

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

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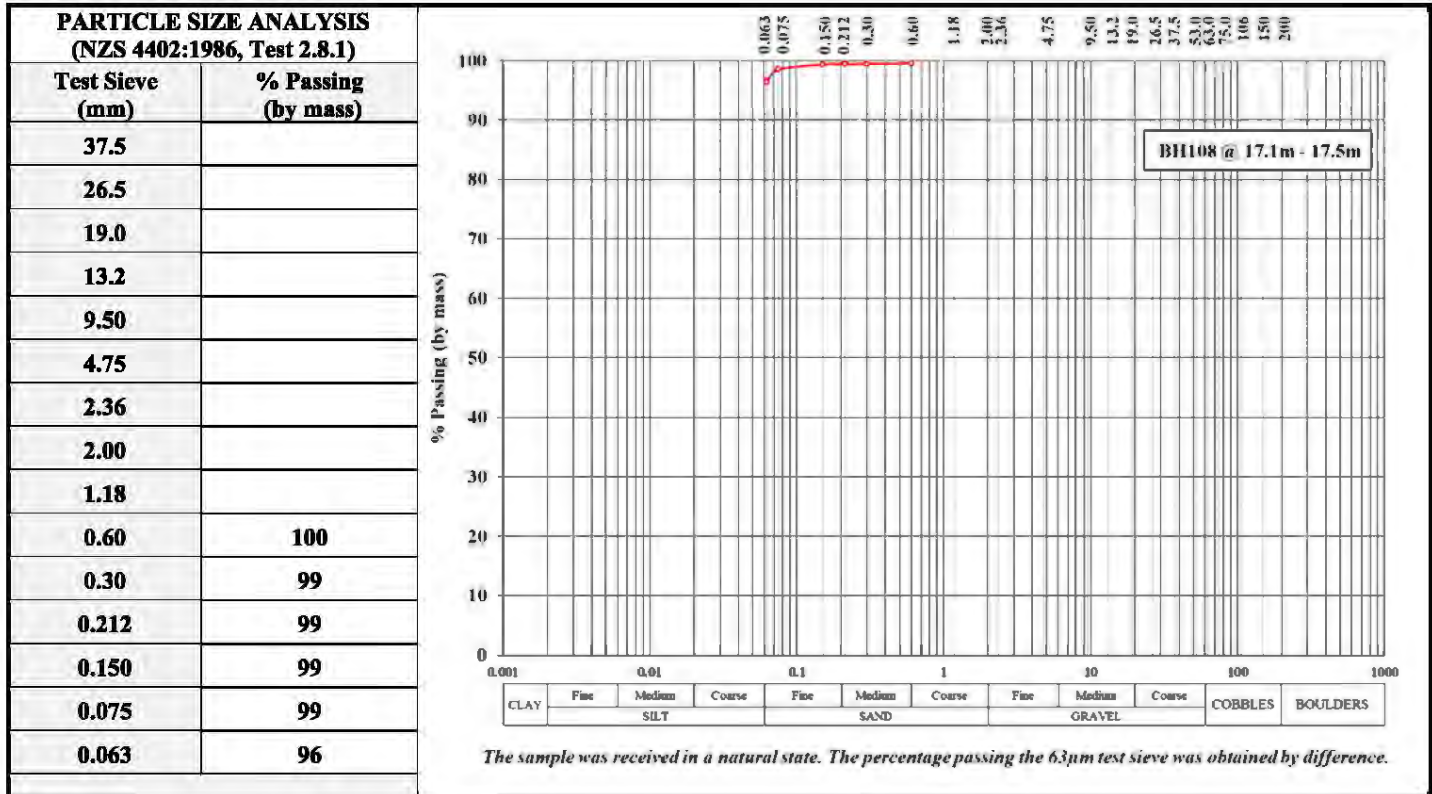


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with trace of sand	Client Order No:	Not Stated
Sample Source: (cs)	BH108	Sample Depth: (cs)	17.1m - 17.5m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4

Water Content: (As Received)	28.6 %
Liquid Limit: (LL)	64
Plastic Limit: (PL)	23
Plasticity Index: (PI)	41

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

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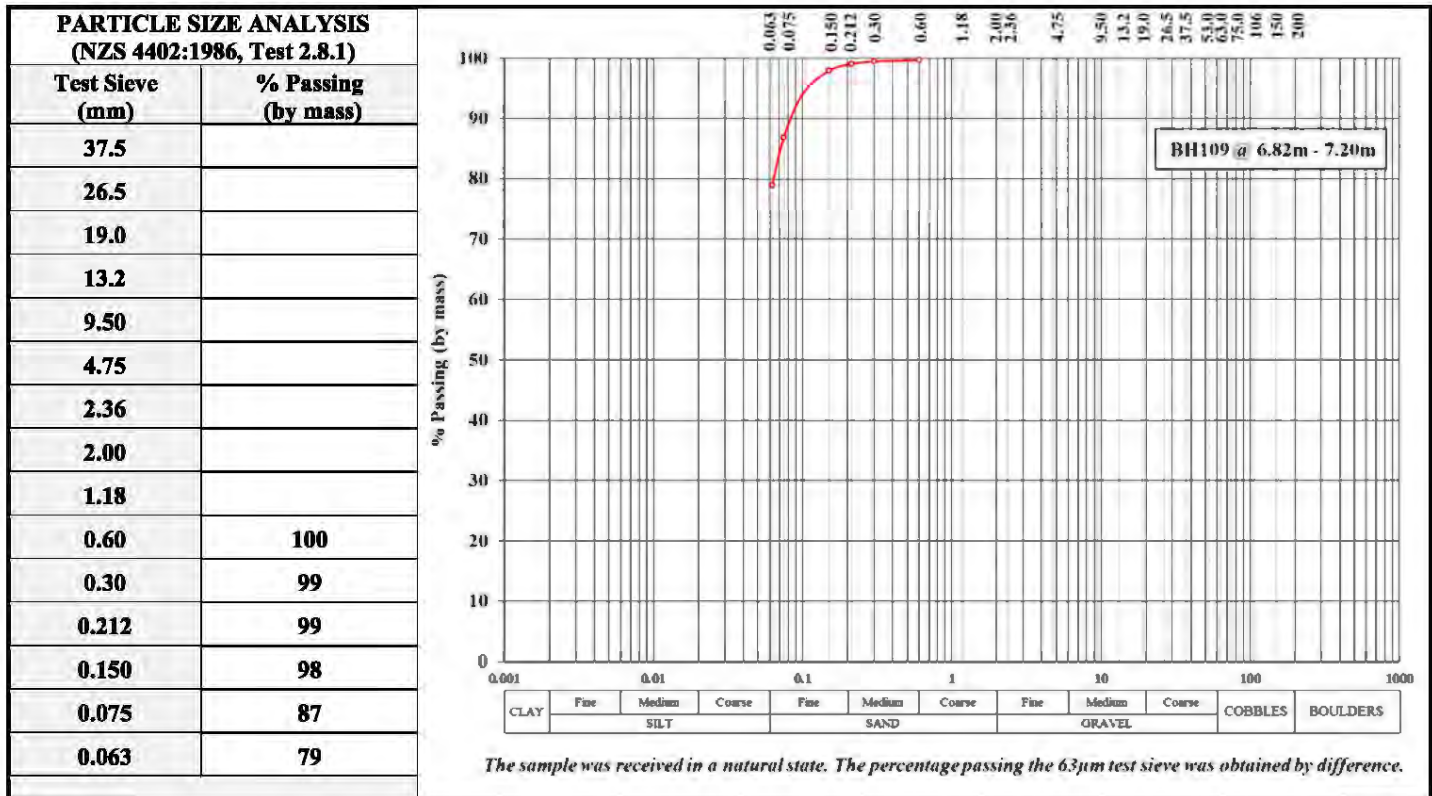


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy SILT with minor / some clay (contaminated)	Client Order No:	Not Stated
Sample Source: (cs)	BH109	Sample Depth: (cs)	6.82m - 7.20m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4

Water Content: (As Received)	32.5 %
Liquid Limit: (LL)	40
Plastic Limit: (PL)	28
Plasticity Index: (PI)	12

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

Checked By:

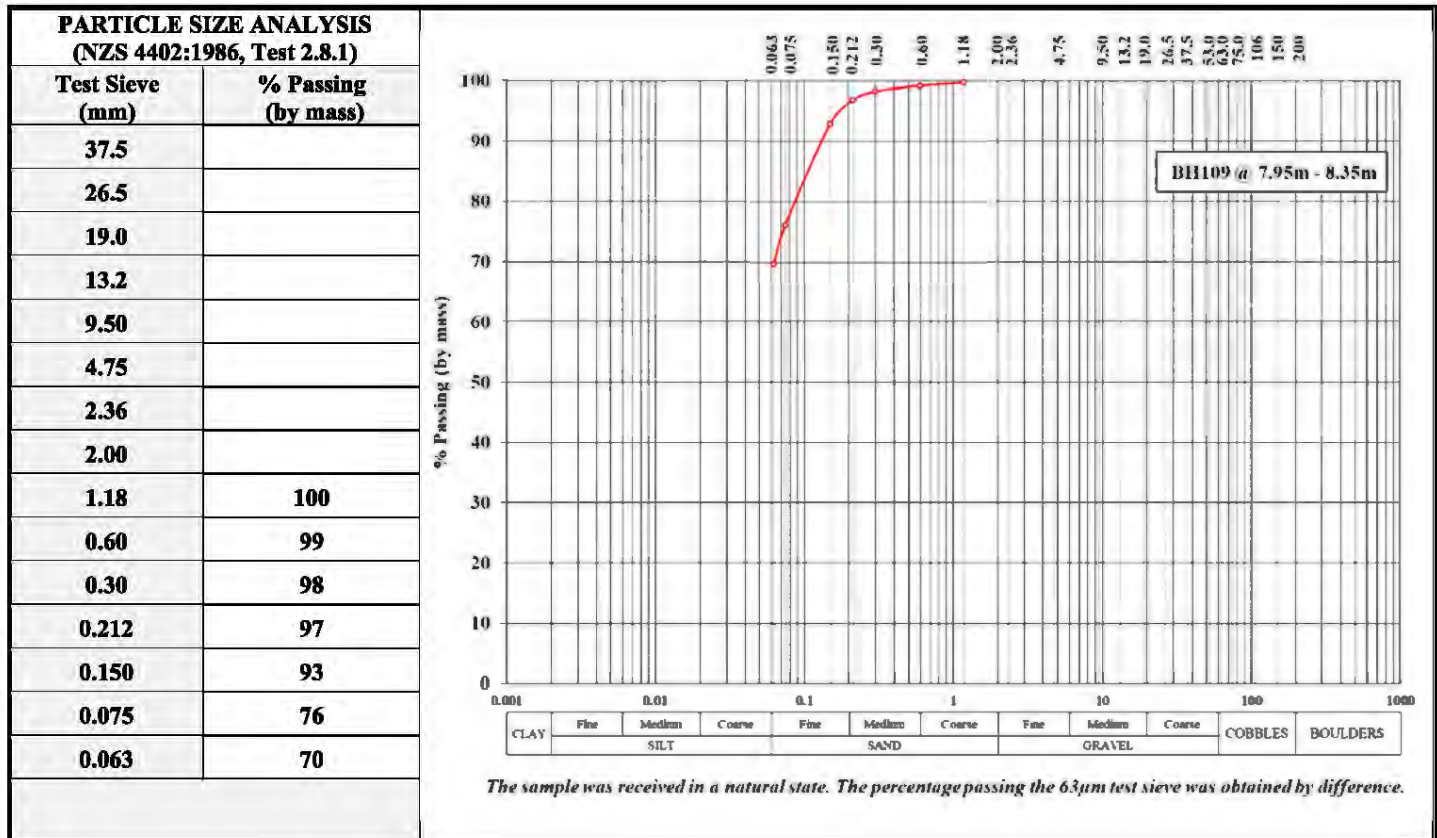


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY (contaminated)	Client Order No:	Not Stated
Sample Source: ^(ca)	BH109	Sample Depth: ^(ca)	7.95m - 8.35m
Date & Time Sampled:	Unknown	Sampled By: ^(ca)	GHD Staff
Sample Method: ^(ca)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	46.7 %
Liquid Limit: (LL)	61
Plastic Limit: (PL)	28
Plasticity Index: (PI)	33

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

- Information contained in this report which is Not LANZ Accredited relates to the sample descriptions based on NZ Geotechnical Society Guidelines 2005, the client supplied information ^(ca) and sampling.
- This report may not be reproduced except in full.

Tested By: L.T. Smith

Date: 22 to 29-Nov-22

Checked By:

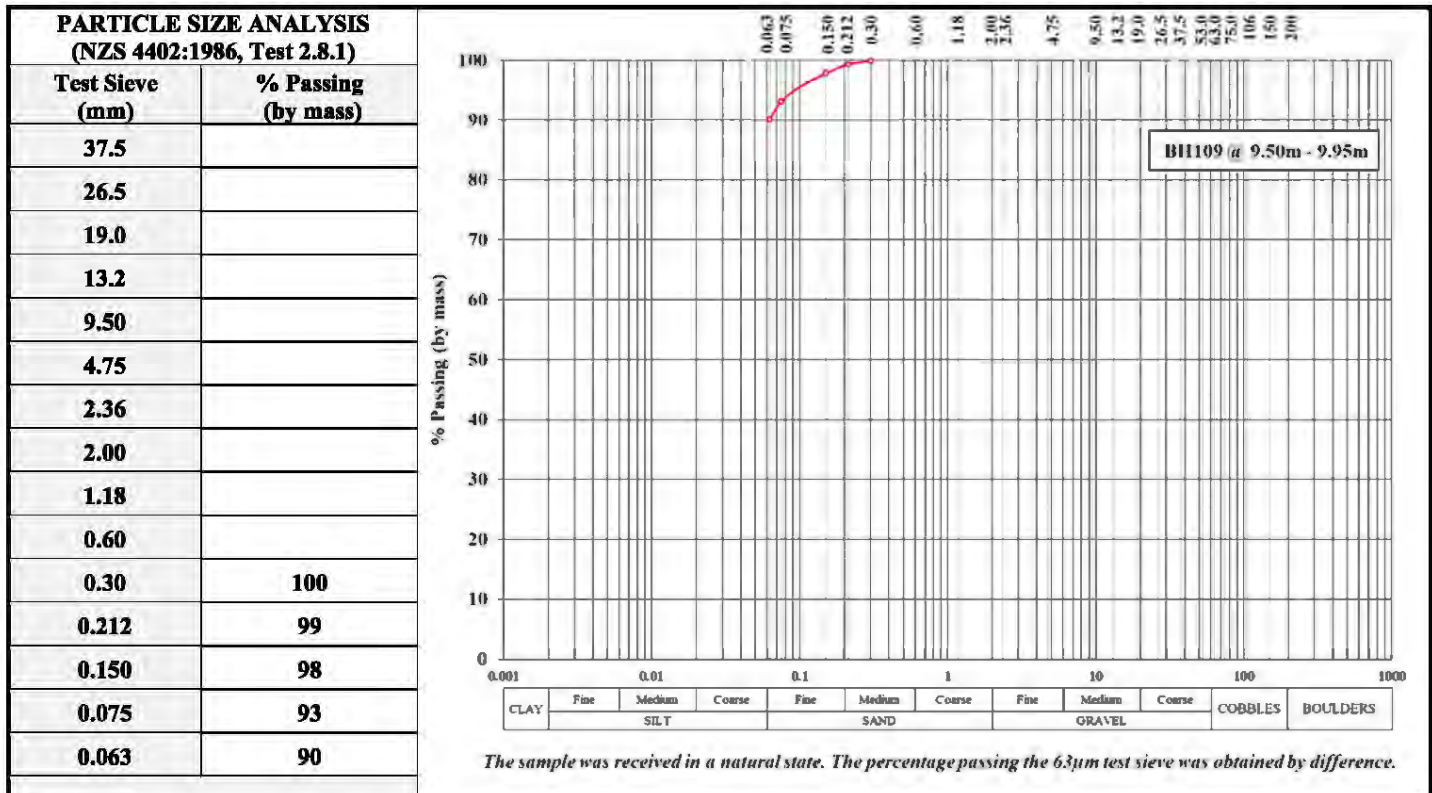


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with minor sand	Client Order No:	Not Stated
Sample Source: (cs)	BH109	Sample Depth: (cs)	9.50m - 9.95m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	27.2 %
Liquid Limit: (LL)	43
Plastic Limit: (PL)	21
Plasticity Index: (PI)	22

Note: The sample was received in a natural state. The plasticity index material tested was whole soil.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

Checked By:

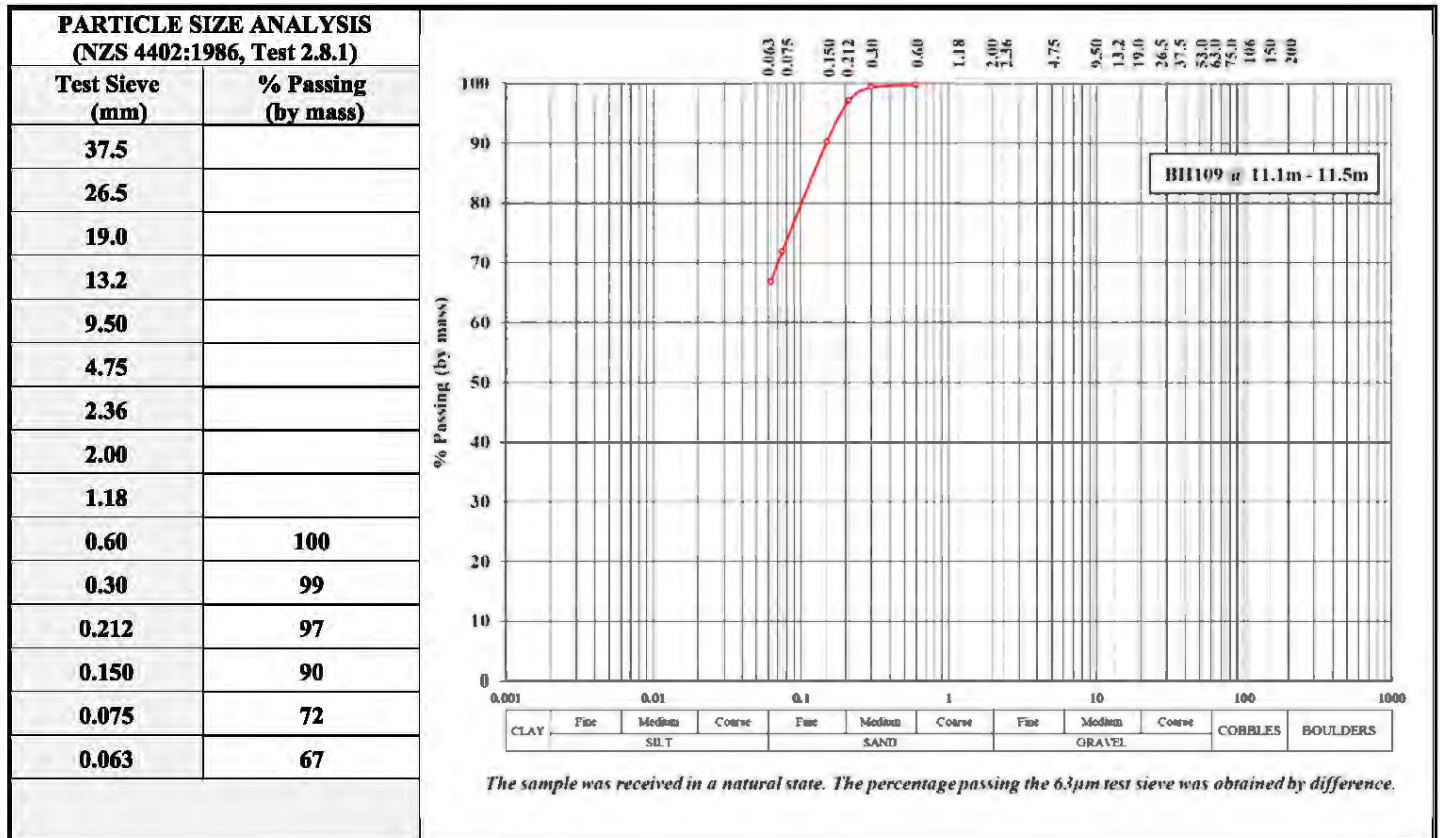


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY	Client Order No:	Not Stated
Sample Source: (ca)	BH109	Sample Depth: (ca)	11.1m - 11.5m
Date & Time Sampled:	Unknown	Sampled By: (ca)	GHD Staff
Sample Method: (ca)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	24.1 %
Liquid Limit: (LL)	43
Plastic Limit: (PL)	19
Plasticity Index: (PI)	24

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

Checked By:

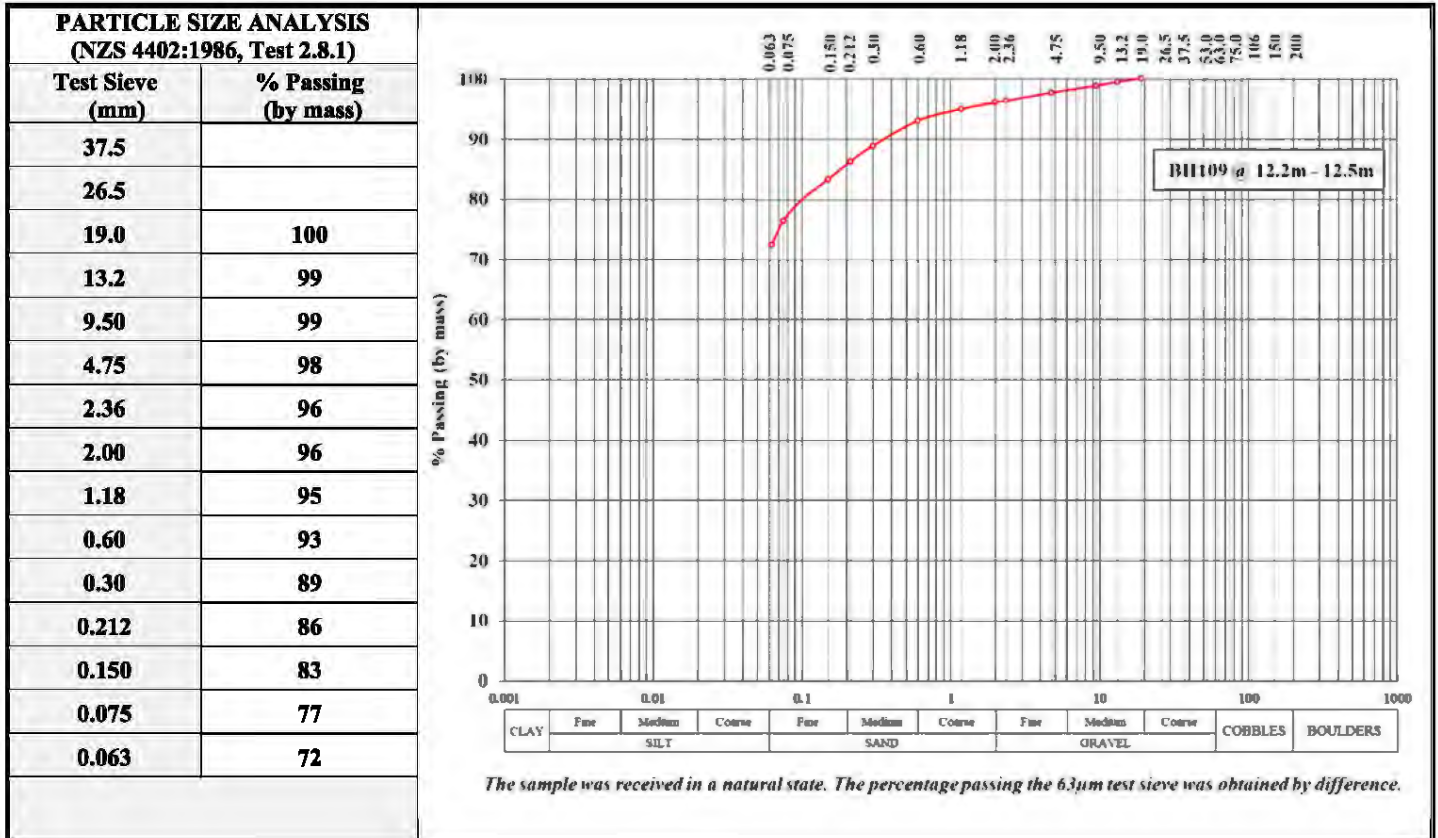


Test results indicated as not accredited are outside the scope of the laboratory's accreditation



TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY with trace of gravel	Client Order No:	Not Stated
Sample Source: ^(ca)	BH109	Sample Depth: ^(ca)	12.2m - 12.5m
Date & Time Sampled:	Unknown	Sampled By: ^(ca)	GHD Staff
Sample Method: ^(ca)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	33.0 %
Liquid Limit: (LL)	55
Plastic Limit: (PL)	22
Plasticity Index: (PI)	33

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

Checked By:

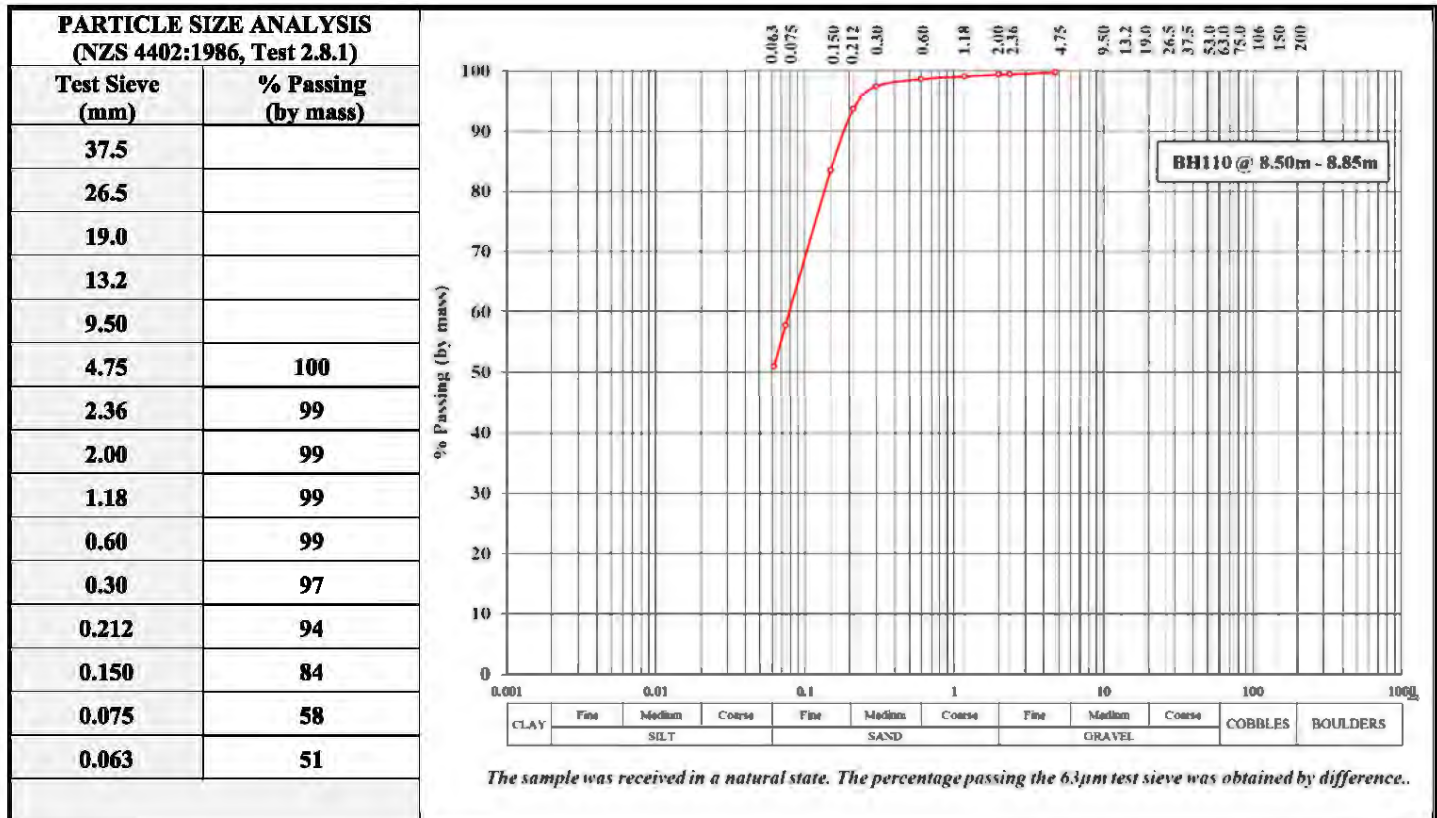


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	SILT & SAND with minor clay (contaminated)	Client Order No:	Not Stated
Sample Source: (ca)	BH110	Sample Depth: (ca)	8.50m - 8.85m
Date & Time Sampled:	Unknown	Sampled By: (ca)	GHD Staff
Sample Method: (ca)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4

Water Content: (As Received)	31.0 %
Liquid Limit: (LL)	33
Plastic Limit: (PL)	27
Plasticity Index: (PI)	6

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

Checked By:

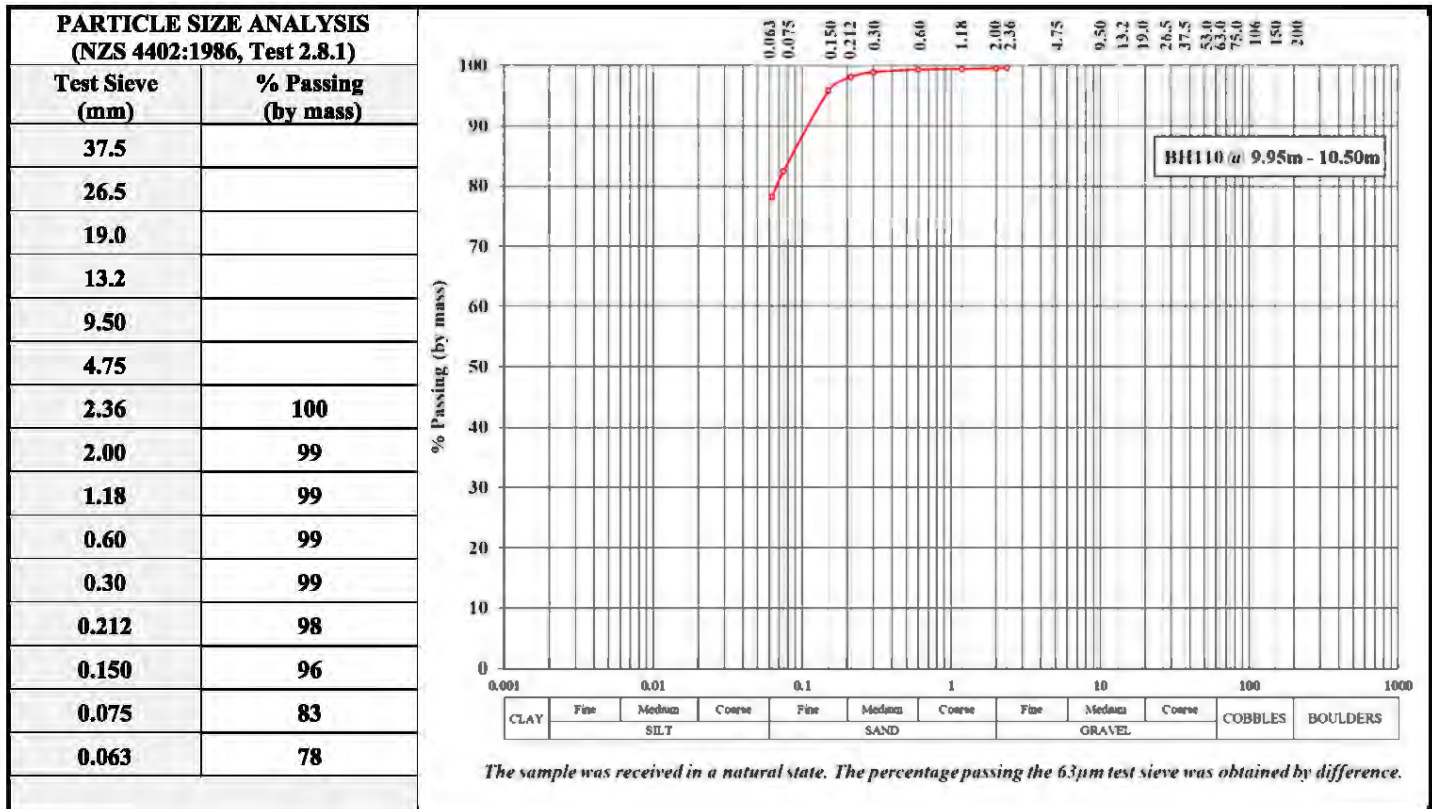


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY with trace of gravel	Client Order No:	Not Stated
Sample Source: (cs)	BH110	Sample Depth: (cs)	9.95m - 10.50m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	54.6 %
Liquid Limit: (LL)	87
Plastic Limit: (PL)	33
Plasticity Index: (PI)	54

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

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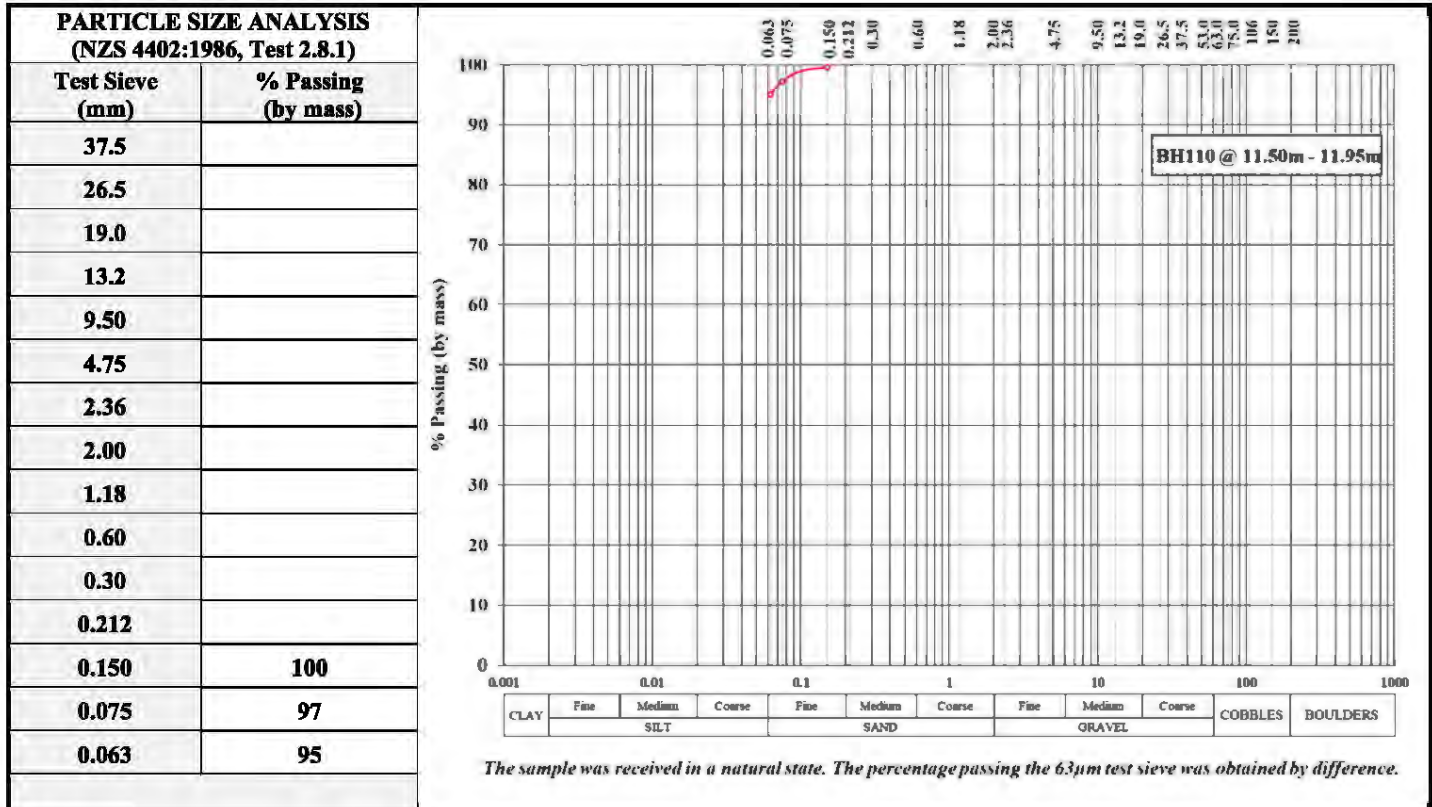


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Silty CLAY with trace of / minor sand	Client Order No:	Not Stated
Sample Source: (cs)	BH110	Sample Depth: (cs)	11.50m - 11.95m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	33.6 %
Liquid Limit: (LL)	58
Plastic Limit: (PL)	25
Plasticity Index: (PI)	33

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

Checked By:

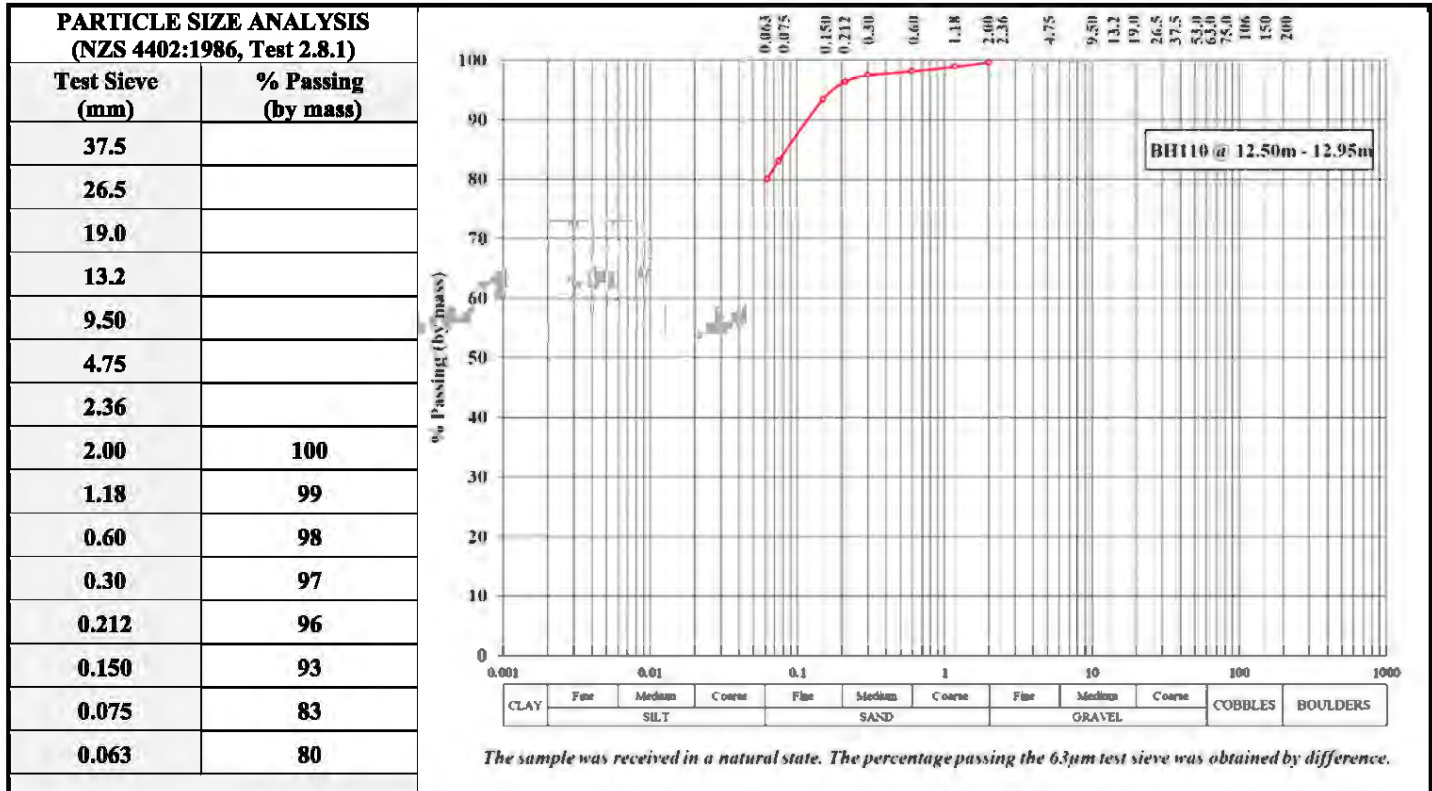


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TEST REPORT – GREEN ISLAND LANDFILL INVESTIGATIONS

Client Details:	GHD, P.O. Box 13 468, Christchurch	Attention:	K. Tang
Job Description:	Green Island Landfill Investigations		
Sample Description:	Sandy Silty CLAY	Client Order No:	Not Stated
Sample Source: (cs)	BH110	Sample Depth: (cs)	12.50m - 12.95m
Date & Time Sampled:	Unknown	Sampled By: (cs)	GHD Staff
Sample Method: (cs)	Borehole	Date Received:	14-Nov-22



WATER CONTENT & PLASTICITY INDEX RESULTS - NZS 4402:1986, Test 2.1, 2.2, 2.3 & 2.4	
Water Content: (As Received)	21.9 %
Liquid Limit: (LL)	38
Plastic Limit: (PL)	20
Plasticity Index: (PI)	18

Note: The sample was received in a natural state. The plasticity index material tested was the fraction passing the 425 µm test sieve.

Notes:

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Tested By: L.T. Smith

Date: 22 to 29-Nov-22

Checked By:

Approved Signatory

A.P. Julius
Laboratory Manager

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