

CONTRACT NO. GE/2022/08
GROUND INVESTIGATION – NEW TERRITORIES EAST

Task Order No. GE/2022/08.35A
Agreement No. CE 26/2022 (EP) -
Development of Integrated Waste Management Facilities
Phase 2 - Investigation, Design and Construction

FINAL FIELD WORK REPORT

Checked in accordance with
Contract No. GE/2022/08
requirements and accepted.

Signed ✓ Date 13.3.24

Certified as Checked by



Raymond Chu

Geotechnical Engineer

Date: 29-Feb-2024

Certified as Completed by



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Contractor's Representative

Date: 29-Feb-2024

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CONTRACT DATA SUMMARY

Project Name & No. <i>Ground Investigation - New Territories East</i>	Site Name <i>Task Order No.: GE/2022/08.35A</i> <i>Agreement No. CE 26/2022 (EP) - Development of Integrated Waste Management Facilities Phase 2 - Investigation, Design and Construction</i>	Date: 20/Dec/23 to 29/Feb/24 Official Only G.E.O. Data Bank No.
G.I. Contractor <i>DrilTech Ground Engineering Limited</i>	Client <i>Geotechnical Engineering Office Civil Engineering and Development Department</i>	
Contract No. <i>GE/2022/08</i>	Consulting Engineer <i>Binnies Hong Kong Limited</i>	File Ref.

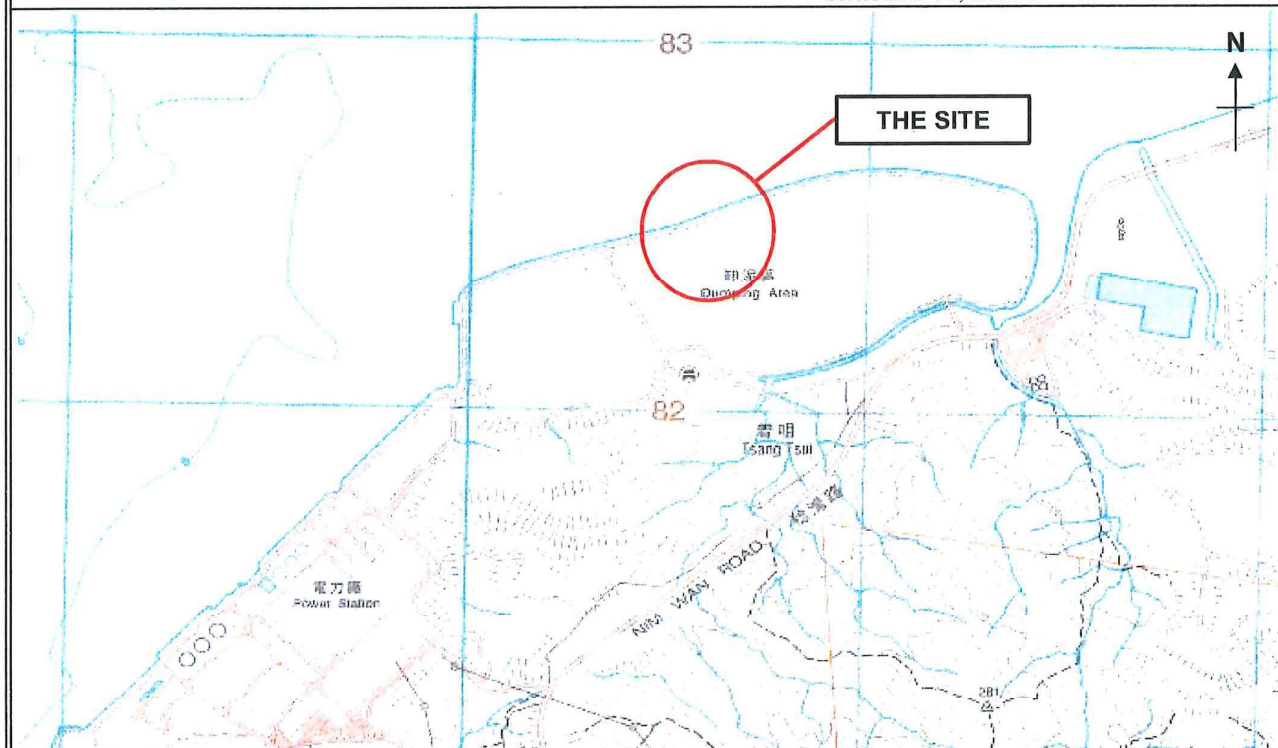
FIELD WORK SUMMARY


Drillhole: No. 1	Method: Rotary Coring	Date: 12/Jan/24 to 29/Feb/24
Trial Pit: No. Nil	Inspection Pit: No. Nil	
Corehole: No. Nil	Stripping: No. Nil	Probe: No. Nil
Piezometer: No. 2	Standpipe: No. Nil	Piezometer Bucket: No. Nil
Insitu Test: No. 12	Type: Standard Penetration Test (8), Pressuremeter Test (2) and Response Test (2)	
Geophysics: No. 1	Type: Acoustic Borehole Televiwer Survey (1)	

LABORATORY TESTING SUMMARY

No. of each type of test:		Date: - to -			
SOIL	Physical Properties	LL -	PL -	PSD -	MC -
		SG		DD -	
	Strength Tests	CUS	NOT APPLICABLE		UU - Shear Box -
	Compaction & CBR Tests	Stan			Proctor - CBR -
	Oedometer & Perm. Tests	Cv -	k -		
	Others	Split Mazier -			
ROCK		Pt Load -	UC -	Shear Box -	US Vel. -

LOCATION PLAN Scale N.T.S. Derived from: Survey & Mapping Office, Lands Department
Series HM20C, Sheet 5



	G. I.	Laboratory	Geotechnical Engineering Office
Contractor	<i>DrilTech Ground Engineering Ltd.</i>	---	 CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT
Task Order No.:	<i>GE/2022/08.35A</i>	---	



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Agreement No. CE 26/2022 (EP) -
Development of Integrated Waste Management Facilities Phase 2 –
Investigation, Design and Construction

FINAL FIELD WORK REPORT

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Drawing No. - D0900/08.35A/GI/D001

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1 Introduction

On 5th August 2022, DRiLTECH Ground Engineering Limited was awarded a Contract from the Geotechnical Engineering Office, Civil Engineering and Development Department of the Government of Hong Kong Special Administrative Region to carry out ground investigation works at any location in Eastern New Territories, including all islands to the east of a line joining Lok Ma Chau and Ting Kau (including Tsing Yi but excluding Lamma Island), and may cover other areas in the territory of Hong Kong including outlying islands as assigned by the *Service Manager*.

This report presents the results of ground investigation works for Agreement No. CE26/2022(EP) - Development of Integrated Waste Management Facilities Phase 2 - Investigation, Design and Construction, under Task Order No. GE/2022/08.35A. The fieldwork was carried out in the period between 12th January 2024 and 29th February 2024 under the supervision of Binnies Hong Kong Limited.

2 Site Location

The exact location of the site is at Ash Lagoon near Tsang Tsui Columbarium and Grade of Remembrance. The investigation station is bounded within the following co-ordinates:

- 809 755E, 831 417N
- 809 756E, 831 417N
- 809 756E, 831 416N
- 809 755E, 831 416N

The location of the investigation station is shown in Ground Investigation Plan with drawing no. D0900/08.35A/GI/D001 and the coordinates and level of the completed investigation station are shown in the survey record of Table 1.

3 Geology

According to the 1:20,000 scale, Sheet 5 of HGM20 Series Solid and Superficial Geology Map published by the Geotechnical Engineering Office and the two memoirs: The Pre-Quaternary Geology of Hong Kong and The Quaternary Geology of Hong Kong published by the Geotechnical Engineering Office, the site may be underlain by bedrock of equigranular to inequigranular two-mica granite (Tsing Shan Granite, Lamma Suite) of Jurassic, Mesozoic.

3 Geology (Cont'd)

The findings of the ground investigation are generally in accordance with the geological map and memoirs. The results of investigation reveal that the site is composed of Superficial Deposits (Fill, Marine Deposit and Alluvium), Soil derived from Insitu Rock Weathering (Completely decomposed Granite) and the bedrock of Granite.

Detailed descriptions of each stratum were given in the logs presented in Appendix C.

The depth and thickness of each stratum encountered during drilling were given in Table 2.

4 Fieldwork

Fieldworks included sampling, field testing and field installation in one (1) drillhole (BH15) with associated in-situ testing were carried out at locations shown in the Ground Investigation Plan with Drawing No. D0900/08.35A/GI/D001 as specified in the Task Order.

4.1 Drillhole

The fieldworks at the drillhole (BH15) were carried out using the hydraulic rotary drilling rig with water as flushing medium. SW, PW and HW sized casings equipped with tungsten carbide cutting shoes were used to advance the hole. The drillhole was terminated at 27.88m depth.

Undisturbed Mazier samples were taken in soil generally at 2.00m intervals at specified depths by using a modified Mazier triple tube retractable core barrel, which was fitted with a detachable 74mm I.D., 1000mm long clear ABS plastic liner. A retractable cutting shoe projecting from the tungsten carbide core bit was used to penetrate the materials being sampled and to protect the sample from being disturbed by the drilling fluid.

The recovered samples were sealed with metal foil disc and wax and protected with rubber caps at both ends. Small disturbed samples were retrieved from the cutting shoes and were kept in airtight jars as jar samples.

Where rock materials were encountered, rock core samples were taken using T2-120 and T2-101 double tubes core barrels.

Inspection pit at drillhole location was manually excavated by hand tools to 1.30m depth prior to drilling commencement to ensure that the investigation works would not damage underground utilities.

4.1 Drillhole (Cont'd)

The disturbed and undisturbed samples and rock core samples are reported at relevant depths in the Drillhole Record sheets in Appendix C. Record photographs of the jar samples and core samples are included in Appendix D.

4.2 Field Test

4.2.1 Standard Penetration Test

Standard penetration tests with liner samples were carried out at specified depths. The tests were conducted according to BS1377 (1990 Part 9 Method 3.3) with modifications suggested in Geoguide 2 and the Contract Specification.

The numbers of blows to drive a standard split spoon sampler for the first 150mm penetration (seating drive) in 75mm increments and those for each 75mm penetration for the subsequent 300mm penetration were recorded. The 'N' value was taken as the sum of numbers of blows for the last 300mm penetration. Where the full penetration for seating drive was not achieved after 50 blows, the number of blows and the penetration achieved was recorded. During the test, the water level in the drillhole was maintained at or above the observed ground water level. Disturbed samples were retrieved from the cutting shoes as jar samples.

Liner samples were taken with the SPTs by including a liner sample tube in the split barrel sampler in each test.

The depths of tests and the 'N' values are presented in the Drillhole Record sheets in Appendix C.

4.2.2 Pressuremeter Test

Two (2) pressuremeter tests were carried out in the drillhole at specified depths, using a Menard (G-Am) type equipment. The test pockets were formed by penetrating a Fugro sampler.

The pressuremeter test results including test data and graphic plots are presented in Appendix E.

4.2.3 Digital Acoustic Borehole Televiwer Survey

One (1) acoustic borehole televiwer survey was carried out in drillhole at depths as instructed. The acoustic imaging equipment consists of a centralized sonde, with a rotating transducer and receiver orientated by a magnetometer and inclinometer capable of working in fluid filled holes. The sonde uses a focused ultrasound beam, measured in travel time and amplitude, to scan the borehole wall producing a full 360-degree image. The features azimuth and dip angle are derived by digital cross-referencing of the orientation data. The Travel Time and Amplitude, Joints Interpretation and Stereographic Plots Records are presented in Appendix F.

4.3 Field Installation

4.3.1 Piezometer

Two (2) piezometers of Casagrande type were installed with 25mm I.D. PVC riser pipes in drillhole at depths of 10.00m and 14.00m respectively. The piezometer tip was surrounded by clean sand of grading between 210 and 1,200 microns and was sealed with bentonite pellets to form response zone of specified length.

Response tests were carried out on all piezometers after completion of installation. The details of installations and the response test results are included in Appendix G and a summary of installation is presented in Table 3.

Readings of water levels in all piezometers were taken daily for 7 working days following the completion of response test. The results are presented in Appendix H.

5 Rock and Soil Description

The rocks and soils encountered in the investigation have generally been described according to the Geoguide 3, Guide to Rock and Soil Description, except for the following terms, which are used for the secondary constituents other than clay, silt and sand, in composition of common ground:

- “with occasional” for less than 5%;
- “with some” for between 5% and 20%; and
- “with much or many” for greater than 20%.

5 Rock and Soil Description (Cont'd)

The classification and definitions of the descriptive terms are presented in Appendix A.

The delineation of various strata was primarily based on examination of disturbed samples and core samples recovered from the drillhole. The results are presented in Appendix C in form of Drillhole Record, which have been finalized by incorporating comments provided by Binnies Hong Kong Limited.

The legends used in these records are summarized in Appendix B.

6 Surveying

The location of investigation station was surveyed using the theodolite and the results are related to the Hong Kong Grid System. The co-ordinates and level of the investigation station are presented on the relevant records and are summarized in Table 1.

7 Digital Data Record

The data of the ground investigation works are also provided in an electronic format. The format complies with the 4th edition of the Association of Geotechnical and Geoenvironmental Specialists (AGS) Publication 'Electronic Transfer of Geotechnical and Geoenvironmental Data'.

The final field work report was also created in Acrobat format and stored together with AGS on a CD-ROM in Appendix I.

8 References

1. Geotechnical Engineering Office, Geological Map of Hong Kong HGM20, Sheet 5, (1:20,000) (1988, Edition I)
2. Geotechnical Engineering Office (2000), The Pre-Quaternary Geology of Hong Kong
3. Geotechnical Engineering Office (2000), The Quaternary Geology of Hong Kong
4. Geotechnical Engineering Office, (E-version, 2017), Guide to Rock and Soil Descriptions (Geoguide 3)

8 References (Cont'd)

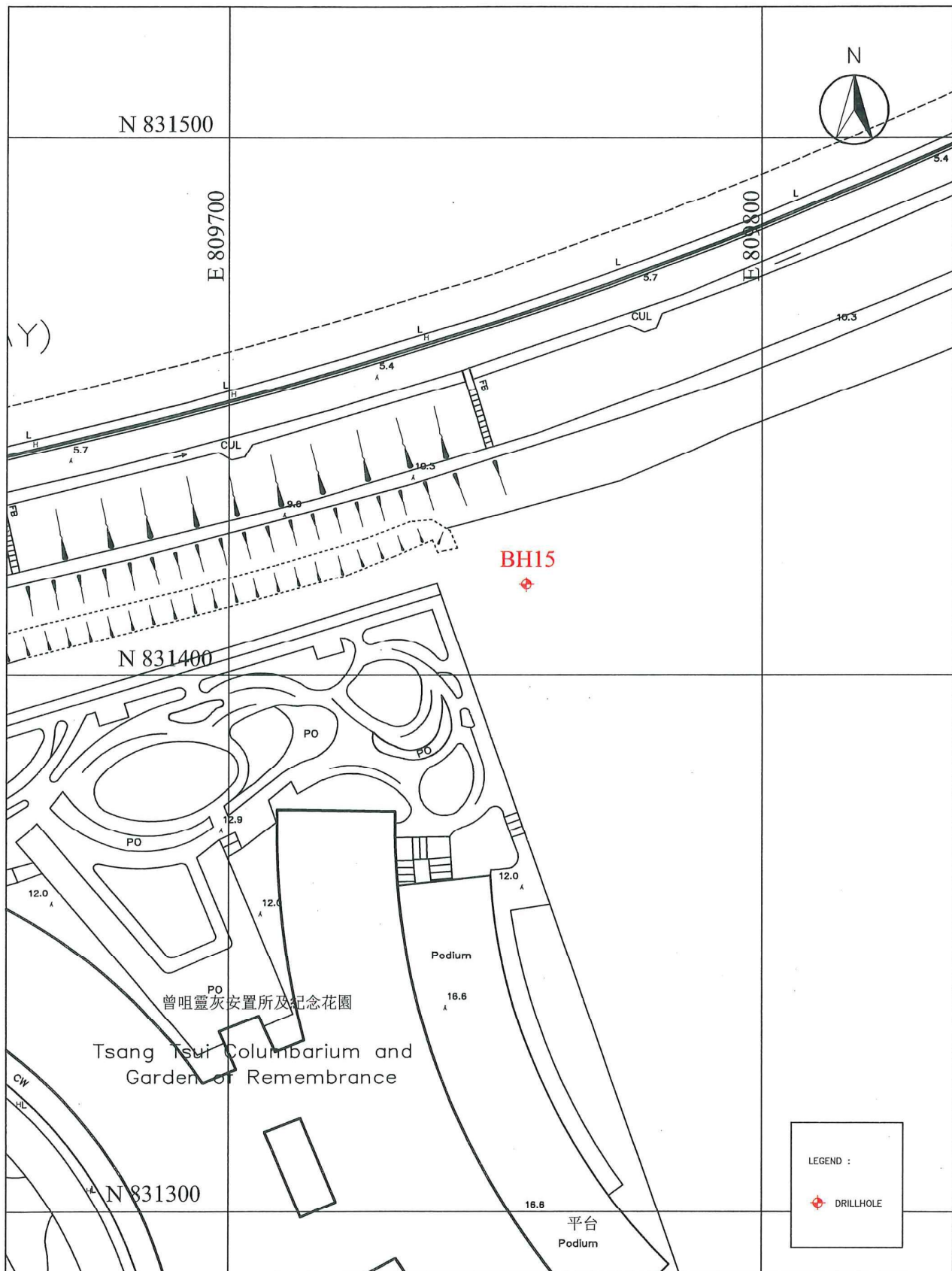
5. Geotechnical Engineering Office, (E-version, 2017), Guide to Site Investigation (Geoguide 2)
6. Association of Geotechnical and Geoenvironmental Specialists (2017), Electronic Transfer of Geotechnical and Geoenvironmental Data, 4th edition
7. BS5930:1981, the “Code of Practice for Site Investigation”



Contract No. GE/2022/08
Ground Investigation - New Territories East

Ground Investigation Plan

(Drawing No. D0900/08.35A/GI/D001)



Ground Investigation Plan

CEDD Contract No. GE/2022/08
 Ground Investigation - New Territories East
 Task Order No. GE/2022/08.35A
 Agreement No. CE 26/2022 (EP), Development of Integrated Waste Management Facilities Phase 2
 - Investigation, Design and Construction

Drawing No. :
 D0900/08.35A/GI/D001

Date : February 2024

Scale 1 : 1000





Contract No. GE/2022/08
Ground Investigation - New Territories East

Tables



Contract No. GE/2022/08
Ground Investigation - New Territories East
Task Order No. GE/2022/08.35A
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Development of Integrated Waste Management Facilities Phase 2 -
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Table 1 - Survey Record

Station No.	Ground Level / Reference Level (mPD)	Easting	Northing	Remark
BH15	+8.91	809755.85	831416.81	Drillhole



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Table 2 - Summary of Rock and Soil Strata in Drillhole

Drillhole No.	Ground Level / Reference Level (mPD)	Fill		Marine Deposit		Alluvium		Grade V to Grade IV Rock		Grade III or better Rock Top Level (mPD)	Rock Type	End of Hole (mPD)	Remark
		Bottom Level (mPD)	Thickness (m)	Bottom Level (mPD)	Thickness (m)	Bottom Level (mPD)	Thickness (m)	Level (mPD)	Thickness (m)				
BH15	+8.91	-3.59	12.50	-6.49	2.90	-12.69	6.20	-12.69 to -13.77	1.08	-13.77	Medium grained GRANITE	-18.97	-

Remarks: 1. Where stratum descriptions straddle two decomposition grades, the most decomposed grade is reported in the above table.



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Table 3 - Summary of Field Testing and Field Installation

Station No.	Type of Test	Test Zone/ Test Depth (m bgl)	Type of Installation	Installation Tip / End Depth (m bgl)	Response Zone (m bgl)	Halcrow Bucket Installation Detail		Remark
						Depth (m bgl)	Spacing (m)	
BH15	PMT	5.40 to 6.40 & 9.50 to 10.50	Piezometer	10.00	9.20 to 10.50	-	-	-
	BHTV	23.00 to 27.77	Piezometer	14.00	13.20 to 14.50	-	-	-
Notes:								
BHTV	-	Digital Acoustic Borehole Televiwer Survey	IPS	-	Impression Packer Survey	SRT	-	In-situ Density Test
CHIPT	-	Constant Head Permeability Test	OPTV	-	Optical Borehole Televiwer Survey	VST	-	Vane Shear Test
FHPT	-	Falling Head Permeability Test	PMT	-	Pressurimeter Test	WAT	-	Water Absorption Test
GCOP	-	Dynamic Probing Test	RHPT	-	Rising Head Permeability Test			



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Ground Investigation - New Territories East

Appendix A

Checklists for Rock and Soil Description

CHECKLIST FOR ROCK DESCRIPTION	GEOTECHNICAL ENGINEERING OFFICE, HKSAR
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1. STRENGTH

Term	Identification
Extremely weak	Easily crumbled by hand; indented deeply by thumbnail.
Very weak	Crumbled with difficulty; scratched easily by thumbnail; peeled easily by pocket knife.
Weak	Broken into pieces by hand; scratched by thumbnail; peeled by pocket knife; deep indentations (to 5 mm) by point of geological pick; hand-held specimen easily broken by single light hammer blow.
Moderately weak	Broken with difficulty in two hands; scratched with difficulty by thumbnail; difficult to peel but easily scratched by pocket knife; shallow indentations easily made by point of pick; hand-held specimen usually broken by single light hammer blow.
Moderately strong	Scratched by pocket knife; shallow indentations made by firm blow with point of pick; hand-held specimen usually broken by single firm hammer blow. Point load strength (PLS) 0.5 - 2 MPa.
Strong	Firm blows with point of pick cause only superficial surface damage; hand-held specimen requires more than one firm hammer blow to break. PLS 2 - 4 MPa.
Very strong	Many hammer blows required to break specimen. PLS 4 - 8 MPa.
Extremely strong	Specimen only chipped by hammer blows. PLS > 8 MPa.

2. COLOUR

Parameter	Terms
Value	Light, Dark
Chroma	Pinkish, Reddish, Yellowish, Orangish, Brownish, Greenish, Bluish, Purplish, Greyish
Hue	Pink, Red, Yellow, Orange, Brown, Green, Blue, Purple, White, Grey, Black

For uniform colour distribution, choose a hue, supplemented by a value and/or chroma if necessary.

For non-uniform distribution, repeat this procedure using one of the following descriptors: spotted, mottled, dappled, streaked, striped (e.g. light pinkish grey spotted with black).

State whether sample was wet or dry when described.

3. TEXTURE/FABRIC

Texture Terms (Applicable Mainly to Igneous Rocks)
Equigranular, Inequigranular, Megacrystic, Porphyritic, Crystalline, Cryptocrystalline, Aphanitic

Fabric
Describe preferred orientation of grains/crystals where apparent.

Describe intensity, spacing, continuity and any preferred orientation of microfractures where apparent.

4. MATERIAL WEATHERING/ALTERATION

Decomposition Term	Grade Symbol	Typical Characteristics
Residual Soil	VI	Original rock texture completely destroyed; can be crumbled by hand and finger pressure into constituent grains.
Completely Decomposed	V	Original rock texture preserved; can be crumbled by hand and finger pressure into constituent grains; easily indented by point of geological pick; slakes in water; completely discoloured compared with fresh rock.
Highly Decomposed	IV	Can be broken by hand into smaller pieces; makes a dull sound when struck by hammer; not easily indented by point of pick; does not slake in water; completely discoloured compared with fresh rock.
Moderately Decomposed	III	Cannot usually be broken by hand; easily broken by hammer; makes a dull or slight ringing sound when struck by hammer; completely stained throughout.
Slightly Decomposed	II	Not broken easily by hammer; makes a ringing sound when struck by hammer; fresh rock colours generally retained but stained near joint surfaces.
Fresh Rock	I	Not broken easily by hammer; makes a ringing sound when struck by hammer; no visible signs of decomposition (i.e. no discolouration).

This classification is applicable to igneous and volcanic rocks and other rocks of equivalent strength in fresh state.

Disintegration
Describe small-scale cracking and fracturing caused by mechanical weathering, where apparent.

Alteration
Describe state of alteration (e.g. mineralised, kaolinised) where apparent.

5. ROCK NAME (Including Grain Size)

Igneous	: Coarse- (6-20 mm), Medium- (2-6 mm) & Fine- (0.06-2 mm) grained GRANITE; GRANODIORITE. Very Fine-grained (< 0.06 mm) RHYOLITE; BASALT. (Common types only, see Geoguide 3 for others).
Pyroclastic	: PYROCLASTIC BRECCIA (> 60 mm), Lapilli TUFF (2-60 mm), Coarse ash TUFF (0.06-2 mm), Fine ash TUFF (< 0.06 mm).
Metamorphic	: Foliated - SCHIST (> 0.06 mm), PHYLLITE (< 0.06 mm). Non-foliated - MARBLE, QUARTZITE, FAULT BRECCIA.
Sedimentary	: CONGLOMERATE, BRECCIA (> 2 mm), SANDSTONE (0.06-2 mm), MUDSTONE (< 0.06 mm) = SILTSTONE (0.002-0.06 mm) + CLAYSTONE (< 0.002 mm). (Common types only).

If rock name cannot be identified, describe grain size quantitatively, including textural term where appropriate.

6. STRUCTURE

Structural Term	Rock Type
Bedded, Laminated, Massive	Sedimentary
Massive, Flow-banded	Igneous, Pyroclastic
Foliated, Banded, Cleaved	Metamorphic
<u>Spacing of Planar Structures</u>	
Very thick (> 2 m), Thick (0.6-2 m), Medium (200-600 mm), Thin (60-200 mm), Very thin (20-60 mm), Thickly-laminated (Sedimentary) (6-20 mm) or Narrow (Igneous, Metamorphic) (6-20 mm), Thinly-laminated (Sedimentary) (< 6 mm) or Very narrow (Igneous, Metamorphic) (< 6 mm).	
Examples: Thickly-bedded SANDSTONE. Narrowly flow-banded RHYOLITE.	

7. DISCONTINUITIES

Nature (Type of Discontinuity)			
Fault zone	Cleavage	Fissure	Bedding
Fault	Schistosity	Tension crack	
Joint	Shear plane	Foliation	

Location and Orientation
Record location as co-ordinates or relative position along datum line, preferably on map or plan.

Record orientation as dip direction/dip in degrees (e.g. 032/55).

Spacing
Extremely widely-spaced (> 6 m), Very widely-spaced (2-6 m), Widely-spaced (0.6-2 m), Medium-spaced (200-600 mm), Closely-spaced (60-200 mm), Very closely-spaced (20-60 mm), Extremely closely-spaced (< 20 mm).

In exposures, supplement spacing with description of rock block shape where possible. Descriptors: Blocky, Tabular, Columnar, Polyhedral.

Persistence (Areal extent or size of a discontinuity within a plane)
Measured maximum persistence dimension should be used where possible (e.g. the discontinuity trace length on the surfaces of rock exposures). For general descriptions of different discontinuity sets, relative terms should be used.

Roughness
Waviness (large-scale): Estimate/measure wavelength and amplitude in metres.
Unevenness (small-scale), use one term from the following:
Rough stepped Smooth stepped Slickensided stepped
Rough undulating Smooth undulating Slickensided undulating
Rough planar Smooth planar Slickensided planar

Aperture Size
Wide (> 200 mm), Moderately wide (60-200 mm), Moderately narrow (20-60 mm), Narrow (6-20 m), Very narrow (2-6 mm), Extremely narrow (> 0-2 mm), Tight (zero).

Infilling (Nature)	Surface staining	Decomposed/
Clean		disintegrated rock
Non-cohesive soil	Cohesive soil	Quartz
Calcite	Manganese	Kaolin
Other (Specify)		

Give full description of Infill materials/minerals where appropriate.

Seepage
Dry Damp/wet Seepage present (estimate quantity in 1/sec or 1/min)

Fracture State
In borehole cores, measure the following: Total Core Recovery (TCR), Solid Core Recovery (SCR), Rock Quality Designation (RQD), Fracture Index (FI). See Geoguide 3 for definitions.

8. MASS WEATHERING

Term	Zone Symbol	Typical Characteristics
Residual Soil	RS	Residual soil derived from Insitu weathering; mass structure and material texture/fabric completely destroyed; 100% soil
Partially Weathered Rock	PW 0/30	Less than 30% rock Soil retains original mass structure and material texture/fabric (i.e. saprolite) Rock content does not affect shear behaviour of mass, but relict discontinuities in soil may do so.
	PW 30/50	30% to 50% rock Both rock content and relict discontinuities may affect shear behaviour of mass.
	PW 50/90	50% to 90% rock Interlocked structure.
	PW 90/100	Greater than 90% rock Small amount of the material converted to soil along discontinuities.
	Unweathered Rock UW	100% rock May show slight discolouration along discontinuities.

9. ADDITIONAL GEOLOGICAL INFORMATION

Record geological formation name if known. Avoid conjecture. Refer to HKGS maps & memoirs for further information.

NOTES:

- Rock material description normally includes: strength, colour, texture/fabric, material weathering/alteration and ROCK NAME.
- Rock mass description normally includes: strength, colour, structure, mass weathering, ROCK NAME, discontinuities and additional geological information. Can be supplemented with more detailed information on texture/fabric and material weathering/alteration of different materials within the mass where necessary.

CHECKLIST FOR SOIL DESCRIPTION	GEOTECHNICAL ENGINEERING OFFICE, HKSAR
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1. STRENGTH (Compactness & Consistency)

Soil Type	Term	Identification
Very Coarse (COBBLES & BOULDERS)	Loose	By inspection of voids and particle packing in the field.
	Dense	
	Very loose	SPT 'N' value 0-4.
Coarse (SANDS & GRAVELS)	Loose	SPT 4-10; can be excavated with spade; 50 mm peg easily driven.
	Medium dense	SPT 10-30.
	Dense	SPT 30-50; requires pick for excavation; 50 mm peg hard to drive.
	Very dense	SPT > 50.
Fine (CLAYS & SILTS)	Very soft	Undrained shear strength (USS) < 20 kPa; exudes between fingers when squeezed in hand.
	Soft	USS 20-40 kPa; moulded by light finger pressure.
	Firm	USS 40-75 kPa; can be moulded by strong finger pressure.
	Stiff	USS 75-150 kPa; cannot be moulded by fingers; can be indented by thumb.
	Very stiff or hard	USS > 150 kPa; can be indented by thumbnail.
Organic (ORGANIC CLAYS, SILTS SANDS & PEATS)	Compact	Fibres already compressed together.
	Spongy	Very compressible and open structure.
	Plastic	Can be moulded in hand and smears fingers.

Terms applicable only to transported soils. For soils derived from insitu rock weathering, record actual values of quantitative tests (e.g. SPT 'N' value) as part of the description, where appropriate.

2. COLOUR

Parameter	Terms
Value	Light, Dark
Chroma	Pinkish, Reddish, Yellowish, Orangish, Brownish, Greenish, Bluish, Purplish, Greyish
Hue	Pink, Red, Yellow, Orange, Brown, Green, Blue, Purple, White, Grey, Black

For uniform colour distribution, choose a hue, supplemented by a value and/or chroma if necessary.

For non-uniform distribution, repeat this procedure using one of the following descriptors: spotted, mottled, dappled, streaked, striped (e.g. light yellowish brown mottled with red).

State whether sample was wet or dry when described.

3. PARTICLE SHAPE & COMPOSITION

Characteristic	Terms
Form	Equidimensional, Flat, Elongate, Flat & Elongate
Angularity	Angular, Subangular, Subrounded, Rounded
Surface Texture	Smooth, Rough, Glassy, Honeycombed, Pitted, Striated

Describe composition of coarse particles where appropriate. Gravel and larger particles are usually rock fragments (e.g. granite, tuff); sand particles are usually individual minerals (e.g. quartz, feldspar).

4. STRUCTURE

Soil Type	Term	Identification
Coarse & Fine	Homogenous	Deposit consists essentially of one type.
	Interstratified (Interbedded or Interlaminated)	Alternating layers of varying types or with bands or lenses of other materials.
Coarse	Heterogenous	A mixture of types.
Fine	Fissured	Breaks into polyhedral fragments along fissures.
	Intact	No fissures.
Organic	Fibrous	Plant remains recognizable & retain some strength.
	Amorphous	No recognizable plant remains.

Describe spacing of bedding planes, fissures, shell bands, etc using the spacing terms given in Items 6 & 7 for rock description (see other side).

Above terms applicable only to transported soils. For soils derived from insitu rock weathering, describe relict structures in accordance with item 6 of rock description (see other side).

5. WEATHERING

Soils Derived from Insitu Weathering of Rocks

There are two main types: saprolites (rock texture/structure retained) and residual soils (rock texture/structure completely destroyed). Describe state of weathering in accordance with items 4 & 8 for rock description (see other side).

Sedimentary (Transported) Soils

Coarse soils: Describe overall discolouration of soil and degree of decomposition of gravel and larger particles (see item 4, other side). Also note any signs of disintegration of large particles where apparent.

Fine Soils: Describe overall discolouration of soil where apparent.

6. SOIL NAME

A. Basic Soil Types			Identification
Soil Type	Particle Sizes (mm)		
BOULDERS	—	> 200	Only seen complete in pits or exposures.
COBBLES	—	60 - 200	Often difficult to recover from boreholes.
GRAVELS	Coarse	20 - 60	Easily visible to naked eye; particle shape and grading can be described.
	Medium	6 - 20	Well-graded: wide range of grain sizes.
	Fine	2 - 6	Poorly-graded: not well-graded (split further into uniform or gap-graded).
SANDS	Coarse	0.6 - 2	Visible to naked eye; very little or no cohesion; grading can be described.
	Medium	0.2 - 0.6	May be well-graded or poorly-graded (uniform or gap-graded) as for gravel.
	Fine	0.06 - 0.2	Only coarse silt barely visible to naked eye; exhibits little plasticity and marked dilatancy; slightly granular or silky to the touch. Disintegrates in water; lumps dry quickly; possesses cohesion but can be powdered easily between fingers.
SILTS	Coarse	0.02 - 0.06	Dry lumps can be broken by hand but not powdered between the fingers. Disintegrates in water more slowly than silt; smooth to the touch; exhibits plasticity but no dilatancy; sticks to the fingers and dries slowly; shrinks appreciably on drying, usually showing cracks. These properties more noticeable with increasing plasticity.
	Medium	0.006 - 0.02	
	Fine	0.002 - 0.006	
CLAYS	—	< 0.002	
ORGANIC CLAYS, SILTS OR SANDS	—	varies	Contains much organic vegetable matter; often has a noticeable smell and changes colour on oxidation.
PEATS	—	varies	Predominantly plant remains; usually dark brown or black in colour, often with distinctive smell; low bulk density.

B. Composite Soil Types (Mixtures of Basic Types)

Principal Soil Type	Terminology Sequence	Term for Secondary Constituent	% of Secondary Constituent
Very coarse (BOULDERS & COBBLES) (> 50% of soil > 60 mm)	Secondary constituents (finer material) ▲ after principal	With a little	< 5
		With some	5 - 20
		With much	20 - 50
		Slightly (silty, clayey or silty/clayey) *	< 5
		- (silty, clayey or silty/clayey) *	5 - 15
Coarse (GRAVELS & SANDS) (> 65% gravel & sand sizes)	Secondary constituents before principal (excluding cobbles & boulders) +	Very (silty, clayey or silty/clayey) *	15 - 35
		AND/OR Slightly (gravely or sandy) *	< 5
		- (gravely or sandy) *	5 - 20
		Very (gravely or sandy) *	20 - 50
		Slightly (gravely or sandy or both) *	< 35
Fine (SILTS & CLAYS) (> 35% silt & clay sizes)	Secondary constituents before principal (excluding cobbles & boulders) +	- (gravely or sandy) *	35 - 65

- ▲ Full name of finer material should be given (see examples below).
- * Secondary soil type as appropriate; use 'silty/clayey' when a distinction cannot be made between the two.
- + If cobbles or boulders are also present in a coarse or fine soil, this can be indicated by using one of the following terms relating to the very coarse fraction after the principal: 'with occasional' (< 5), 'with some' (5-20), 'with many' (20-50), where figures in brackets are % very coarse material expressed as a fraction of the whole soil (see examples below).

Examples: Slightly silty/clayey, sandy GRAVEL. Slightly gravely, sandy SILT. Very gravely SAND. Sandy GRAVEL with occasional boulders. BOULDERS with much finer material (silty/clayey, very sandy gravel).

For fine soils, plasticity terms should also be described where possible, viz: 'non-plastic' (generally silts), 'intermediate plasticity' (lean clays), 'high plasticity' (fat clays).

7. DISCONTINUITIES

Full description of discontinuities, where necessary, should be made using the methods and terms given in item 7 for rock description (see other side).

8. ADDITIONAL GEOLOGICAL INFORMATION

Record geological name which indicates geological origin or soil type (e.g. Alluvium, Colluvium, Marine sand etc.). Refer to HKGS maps & memoirs for further information.

NOTES:

- Mass characteristics of soils (i.e. structure, weathering, discontinuities) can only be described satisfactorily in undisturbed field exposures or large undisturbed samples.
- For full descriptions of soils derived from insitu rock weathering:
 - saprolites - describe as rocks, supplemented by soil strength and soil name terms in brackets,
 - residual soils - describe as soils, supplemented by name of parent rock where apparent from field evidence.



Contract No. GE/2022/08
Ground Investigation - New Territories East

Appendix B

Legends for Use on Drillhole Record

List of Material Names for the Legend Graphics on the Logging Records

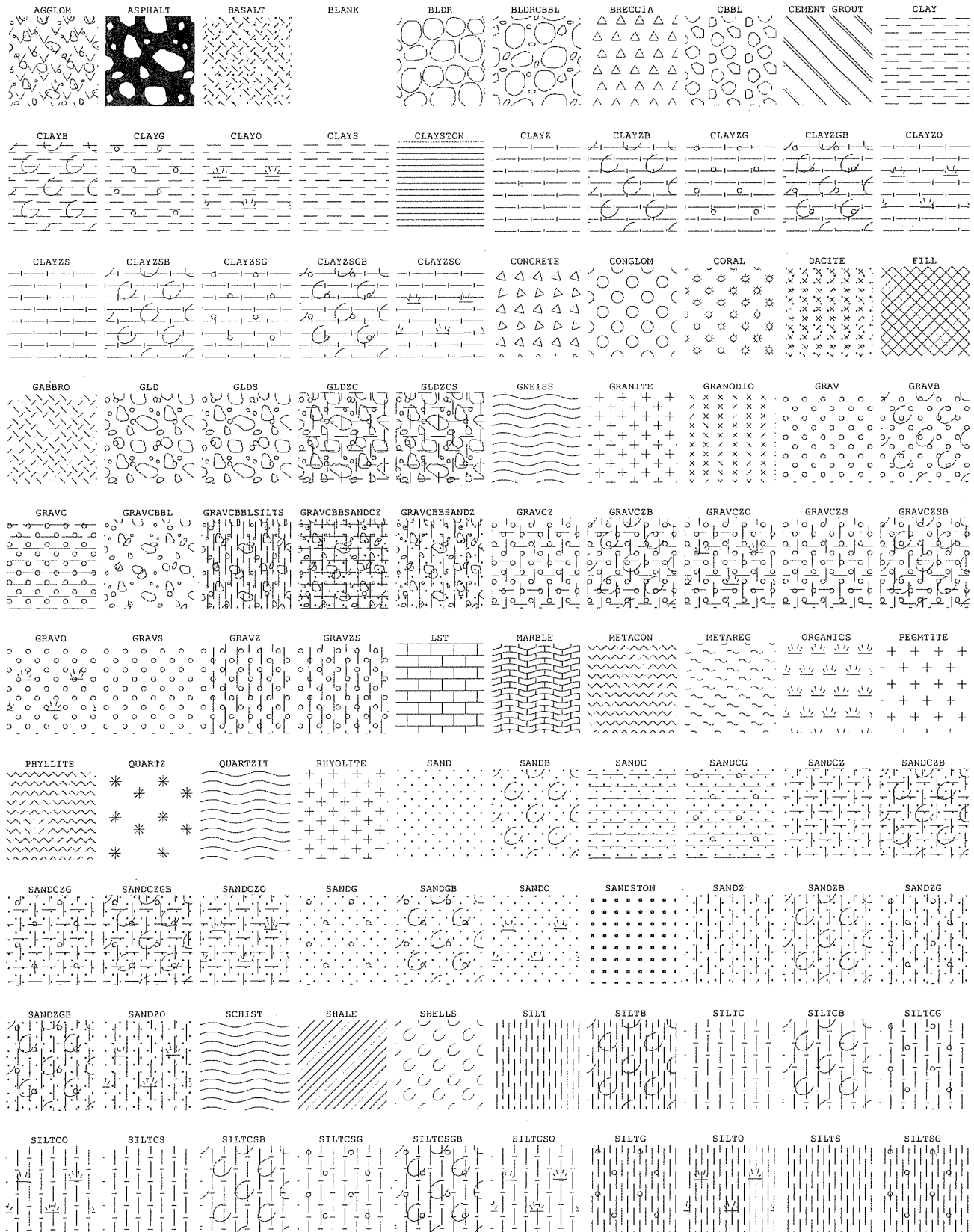
Page 1 of 2

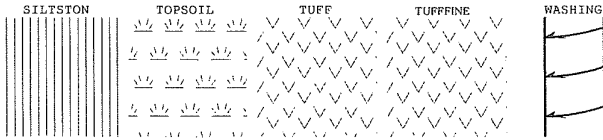
Name	Description
AGGLOM	PYROCLASTIC BRECCIA
ASPHALT	ASPHALT
BASALT	BASALT
BLANK	NO RECOVERY
BLDR	BOULDER
BLDRCBBL	BOULDER and COBBLE
BRECCIA	SEDIMENTARY BRECCIA
CBBL	COBBLE
CEMENT GROUT	CEMENT GROUT
CLAY	CLAY
CLAYB	CLAY with shell
CLAYG	Gravelly CLAY
CLAYO	CLAY with peat
CLAYS	Sandy CLAY
CLAYSTON	CLAYSTONE / MUDSTONE
CLAYZ	Silty CLAY
CLAYZB	Silty CLAY with shell
CLAYZG	Silty CLAY with gravel
CLAYZGB	Silty CLAY with gravel and shell
CLAYZO	Silty CLAY with peat
CLAYZS	Sandy silty CLAY
CLAYZSB	Sandy silty CLAY with shell
CLAYZSG	Sandy silty CLAY with gravel
CLAYZSGB	Sandy silty CLAY with gravel and shell
CLAYZSO	Sandy silty CLAY with peat
CONCRETE	CONCRETE
CONGLOM	CONGLOMERATE
CORAL	CORAL
DACITE	DACITE / LATITE / ANDESITE / TRACHYTE / TRACHYANDESITE
FILL	FILL (made ground)
GABBRO	GABBRO / LAMPROPHYRE
GLD	GRAVEL, COBBLE and BOULDER
GLDS	GRAVEL, COBBLE and BOULDER with sand
GLDZC	GRAVEL, COBBLE and BOULDER with silt and clay
GLDZCS	GRAVEL, COBBLE and BOULDER with sand, silt and clay
GNEISS	GNEISS
GRANITE	GRANITE
GRANODIO	GRANODIORITE / SYENITE / MONZONITE
GRAV	GRAVEL
GRAVB	GRAVEL with shell
GRAVC	Clayey GRAVEL
GRAVCBBL	GRAVEL and COBBLE
GRAVCBBLSILTS	GRAVEL & COBBLE in sandy silt
GRAVCBBSANDCZ	GRAVEL & COBBLE in clayey silty sand
GRAVCBBSANDZ	GRAVEL & COBBLE in silty sand
GRAVCZ	Silty clayey GRAVEL
GRAVCZB	Silty clayey GRAVEL with shell
GRAVCZO	Silty clayey GRAVEL with peat
GRAVCZS	Sandy silty clayey GRAVEL
GRAVCZSB	Sandy silty clayey GRAVEL with shell
GRAVO	GRAVEL with peat
GRAVS	Sandy GRAVEL
GRAVZ	Silty GRAVEL
GRAVZS	Sandy silty GRAVEL
LST	LIMESTONE

List of Material Names for the Legend Graphics on the Logging Records

Page 2 of 2

Name	Description
MARBLE	MARBLE
METACON	METAMORPHIC ROCK - Contact
METAREG	METAMORPHIC ROCK - Regional
ORGANICS	PEAT
PEGMTITE	PEGMATITE, Coarse-grained GRANITE
PHYLLITE	PHYLLITE / MYLONITE
QUARTZ	QUARTZ
QUARTZIT	QUARTZITE
RHYOLITE	RHYOLITE
SAND	SAND
SANDB	SAND with shell
SANDC	Clayey SAND
SANDCG	Clayey SAND with gravel
SANDCZ	Silty, clayey SAND
SANDCZB	Silty, clayey SAND with shell
SANDCZG	Silty, clayey SAND with gravel
SANDCZGB	Silty, clayey SAND with gravel and shell
SANDCZO	Silty, clayey SAND with peat
SANDG	Gravelly SAND
SANDGB	Gravelly SAND with shell
SANDO	SAND with peat
SANDSTON	SANDSTONE
SANDZ	Silty SAND
SANDZB	Silty SAND with shell
SANDZG	Silty SAND with gravel
SANDZGB	Silty SAND with gravel and shell
SANDZO	Silty SAND with peat
SCHIST	SCHIST
SHALE	SHALE
SHELLS	SHELL
SILT	SILT
SILTB	SILT with shell
SILTC	Clayey SILT
SILTCB	Clayey SILT with shell
SILTCG	Clayey SILT with gravel
SILTCO	Clayey SILT with peat
SILTCs	Sandy Clayey SILT
SILTCsB	Sandy Clayey SILT with shell
SILTCsG	Sandy Clayey SILT with gravel
SILTCsGB	Sandy Clayey SILT with gravel and shell
SILTCsO	Sandy Clayey SILT with peat
SILTG	Gravelly SILT
SILTO	SILT with peat
SILTS	Sandy SILT
SILTSG	Gravelly sandy SILT
SILTSTON	SILTSTONE
TOPSOIL	TOPSOIL
TUFF	Coarse ash TUFF, Lapilli TUFF
TUFFFINE	Fine ash TUFF
WASHING	WASH BORING



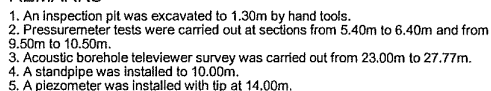




































Contract No. GE/2022/08
Ground Investigation - New Territories East









Appendix C









Drillhole Record



		DRILLHOLE RECORD CONTRACT NO. GE/2022/08		HOLE NO. BH15											
				SHEET 2 of 3											
PROJECT Ground Investigation - New Territories East, Agreement No. CE 26/2022 (EP), Development of Integrated Waste Management Facilities Phase 2 - Investigation, Design and Construction															
METHOD ROTARY		CO-ORDINATES E 809755.85 N 831416.81		TASK ORDER NO. GE/2022/08.35A											
MACHINE SD53				DATE 12.01.2024 to 15.01.2024											
FLUSHING MEDIUM WATER		ORIENTATION VERTICAL		GROUND LEVEL +8.91 mPD											
Drilling Progress	Casing Size	Water Level (m) Shift Start/End	Water Return%	TCR%	SCR%	RQD%	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description	
11								 1.0 1,1,1 N=4	 17  18  19	10.65 10.60 10.90			As sheet 1 of 3.		
12			60	100					 20	11.40					
13								 1.1 2,2,3,3 N=10	 21  22  23	12.40 12.50 12.90			Stiff, greenish grey (5GY 5/1), silty CLAY with occasional shell fragments. (MARINE DEPOSIT)		
14			60	95					 24	13.40					
15								 1.0 1,1,0,1 N=3	 25  26	14.40 14.50 14.90			From 14.50m to 15.40m: Soft.		
16			60	100					 27	15.40				Light grey (5Y 7/1), clayey silty fine to coarse SAND with much subangular fine gravel. (ALLUVIUM)	
17								 1.2 7,7,4,6 N=24	 28  29  30	16.40 16.50 16.90			Very stiff, yellow (2.5Y 7/6), clayey sandy SILT with much subangular fine gravel. (ALLUVIUM)		
18			60	100					 31	17.40				Very stiff, grey (5Y 5/1) and yellow (10YR 7/6), silty CLAY. (ALLUVIUM)	
19								 1.1 2,2,2,2 N=8	 32  33  34	18.40 18.50 18.90			Firm to stiff, grey (5Y 5/1), slightly sandy very clayey SILT with some subangular fine to medium gravel. (ALLUVIUM)		
20			60	0					 35	19.40				Firm, pale yellow (5Y 7/4), silty sandy CLAY with much subangular fine gravel. (ALLUVIUM)	
43.04.2024 15.01.2024		2.55 at 1800 3.20 at 0800													
LEGEND								LOGGED C. Chan		REMARKS					
↓ SMALL DISTURBED SAMPLE ↓ LARGE DISTURBED SAMPLE  U78 SAMPLE  PISTON SAMPLE (76mm)  MAZIER SAMPLE  SPT LINER SAMPLE  WATER SAMPLE  U100 SAMPLE								↓ STANDARD PENETRATION TEST ✓ IN-SITU VANE SHEAR TEST ⊥ PACKER TEST ⊥ PERMEABILITY TEST ⊥ PRESSUREMETER TEST ⊥ BOREHOLE TELEVIEWER ⊥ PIEZOMETER TIP ⊥ STANDPIPE TIP						DATE 26.01.2024	
								CHECKED R. Chu						DATE 31.01.2024	

<div>  <div> DRILLHOLE RECORD CONTRACT NO. GE/2022/08 </div> </div>										HOLE NO. BH15				
										SHEET 3 of 3				
PROJECT Ground Investigation - New Territories East, Agreement No. CE 26/2022 (EP), Development of Integrated Waste Management Facilities Phase 2 - Investigation, Design and Construction														
METHOD ROTARY							CO-ORDINATES E 809755.85 N 831416.81		TASK ORDER NO. GE/2022/08.35A					
MACHINE SD53									DATE 12.01.2024 to 15.01.2024					
FLUSHING MEDIUM WATER							ORIENTATION VERTICAL		GROUND LEVEL +8.91 mPD					
Drilling Progress	Casing Size	Water Level (m) Shift Start/End	Water Return%	TCR%	SCR%	RQD%	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
21			60	23					35 36	20.40 20.50	-11.59 20.50			As sheet 2 of 3.
22								↓ 14,10 15,17,19,21 N=72	37 38 39	21.50 21.60 21.70	-12.69 21.60		V	Very stiff, light grey (5Y 7/1), slightly sandy silty CLAY with occasional subangular fine gravel. (ALLUVIUM)
23	PW 22.68m HW 23.01m		60	0					40 T2-120	22.50 22.58 22.68	-13.77 22.68 -13.89 22.80		III	Extremely weak, yellow (2.5Y 7/8) and light grey (5Y 7/2) spotted white, completely decomposed, medium grained GRANITE. (Very stiff, slightly sandy clayey SILT with much angular fine gravel)
24			60	100	79	79	2.5		T2-101	23.01	-14.44 23.35 -14.64 23.55		III II	Moderately weak to moderately strong, light yellowish brown mottled light grey, moderately decomposed, medium grained GRANITE. Joints are extremely closely to very closely spaced, rough undulating, iron oxide stained, dipping at 40° to 50°.
25			60	100	96	89			T2-101	24.31	-15.74 24.65 -15.99 24.90 -16.22 25.13 -16.33 25.24		III II III II	Strong to very strong, pale pink streaked green, dappled light grey, chloritised, slightly decomposed, medium grained GRANITE. Joints are closely to medium spaced, occasionally very closely spaced, rough planar and rough undulating, iron oxide stained and chlorite coated, dipping at 5° to 15°, 15° to 25°, 30° to 40°, 40° to 50°, 50° to 60° and subvertically from 24.95m to 25.72m, 26.61m to 27.40m and 27.66m to 27.88m.
26			60	100	95	89	4.4		T2-101	25.79	-16.69 25.60 -16.94 25.85 -17.24 26.15 -17.45 26.36 -17.63 26.54		III II III II III II	From 23.35m to 23.55m, 24.65m to 24.90m, 25.13m to 25.24m, 25.60m to 25.85m, 26.15m to 26.36m and 26.54m to 26.80m: Moderately strong and moderately decomposed.
27			60	100	97	92			T2-101	26.69 26.80	-17.89 26.80		III II	
28	4.37 at 1800		60	100	91	91	6.7		T2-101	27.31	-18.97 27.88		III II	End of hole at 27.88 m.
29														
30														

 SMALL DISTURBED SAMPLE
 LARGE DISTURBED SAMPLE
 U76 SAMPLE
 PISTON SAMPLE (76mm)
 MAZIER SAMPLE
 SPT LINER SAMPLE
 WATER SAMPLE
 U100 SAMPLE

 STANDARD PENETRATION TEST
 IN-SITU VANE SHEAR TEST
 PACKER TEST
 PERMEABILITY TEST
 PRESSUREMETER TEST
 BOREHOLE TELEVIEWER
 PIEZOMETER TIP
 STANDPIPE TIP

LOGGED C. Chan
DATE 26.01.2024
CHECKED R. Chu
DATE 31.01.2024

REMARKS



Contract No. GE/2022/08
Ground Investigation – New Territories East

Appendix D

Core Box Photographs of Drillhole



DRiLTECH GROUND ENG. LTD.



CIVIL ENGINEERING AND DEVELOPMENT
DEPARTMENT

CEDD CONTRACT NO. : GE/2022/08
GROUND INVESTIGATION - NEW
TERRITORIES EAST

TASK ORDER NO. : GE/2022/08.35A

JOB TITLE : CE 26/2022 (EP) -
Development of Integrated
Waste Management Facilities
Phase 2 - Investigation,
Design and Construction

HOLE NO. : BH15

BOX NO. : 1 OF 4

DEPTH : 0.00 m TO 10.50 m

DATE OF PHOTOGRAPH : 16 / 1 / 2024



0m

1.0m

1

0.00

0.50

1.30

10.50





DRiLTECH GROUND ENG. LTD.



CIVIL ENGINEERING AND DEVELOPMENT
DEPARTMENT

CEDD CONTRACT NO. : GE/2022/08
GROUND INVESTIGATION - NEW
TERRITORIES EAST

TASK ORDER NO. : GE/2022/08.35A

JOB TITLE : CE 26/2022 (EP) -
Development of Integrated
Waste Management Facilities
Phase 2 - Investigation,
Design and Construction

HOLE NO. : BH15

BOX NO. : 2 OF 4

DEPTH : 10.50 m TO 23.01 m

DATE OF PHOTOGRAPH : 16 / 1 / 2024



0m

1.0m





DRiLTECH GROUND ENG. LTD.



CIVIL ENGINEERING AND DEVELOPMENT
DEPARTMENT

CEDD CONTRACT NO. : GE/2022/08
GROUND INVESTIGATION - NEW
TERRITORIES EAST

TASK ORDER NO. : GE/2022/08.35A

JOB TITLE : CE 26/2022 (EP) -
Development of Integrated
Waste Management Facilities
Phase 2 - Investigation,
Design and Construction

HOLE NO. : BH15

BOX NO. : 3 OF 4

DEPTH : 23.01 m TO 25.79 m

DATE OF PHOTOGRAPH : 16 / 1 / 2024



0m

1.0m





DRiLTECH GROUND ENG. LTD.



CIVIL ENGINEERING AND DEVELOPMENT
DEPARTMENT

CEDD CONTRACT NO. : GE/2022/08
GROUND INVESTIGATION - NEW
TERRITORIES EAST

TASK ORDER NO. : GE/2022/08.35A
JOB TITLE : CE 26/2022 (EP) -
Development of Integrated
Waste Management Facilities
Phase 2 - Investigation,
Design and Construction

HOLE NO. : BH15

BOX NO. : 4 OF 4

DEPTH : 25.79 m TO 27.88 m

DATE OF PHOTOGRAPH : 16 / 1 / 2024



0m

1.0m

25.79

27.31

27.88
END





Contract No. GE/2022/08
Ground Investigation – New Territories East

Appendix E

Pressuremeter Test Results



FT Laboratories Ltd
科達測檢試驗所有限公司



Reference No.: (A13E1701)

Job No.: (51566080)

Pressuremeter Test at

Contract No. : GE/2022/08 Ground Investigation - New Territories East

Contract No. : GE/2022/08

Borehole No.: BH15

Test Zone : 5.40m-6.40m



FT Laboratories Ltd.
科達測檢試驗所有限公司

PART I

HOKLAS Test Report



PRESSUREMETER TEST REPORT

Test Reference No.	: 51566080 - A13E1701
Laboratory	: FT Laboratories Ltd.
Address	: Lot No. DD77 Section 1552 S.Ass 1RP, Ng Chow South Road, Ping Che, Fanling, N.T.
Telephone	: (852) 2758 4861
Facsimile	: (852) 2758 8962
Client	: Driltech Ground Engineering Ltd.
Address	: Blocks A & B, 8/F., Hong Kong Spinners Industrial Building Phase 6, 481-483 Castle Peak Road, Kowloon, Hong Kong
Contract No	: GE/2022/08
Project Title	: Contract No. : GE/2022/08 Ground Investigation - New Territories East
Test Method	: ASTM D 4719-00 Standard Test Method for Prebored Pressuremeter Testing in Soils.
Date of order received	: 13-Jan-24
Date of test conducted	: 13-Jan-24
Location of Test	: Lung Kwu Tan
Test Results	: The test results are detailed in the subsequent page(s) (The values given in this Test Report only relate to the unit-under-test and the values measured at the time of the test.)

Test performed and Reported by

KWONG Chun Leung

Report Certified by

☐ HO Tak Cho, Eric (Technical Manager)

☒ WONG Chun Hing (Asst. Operation Manager)

(HOKLAS Approved Signatory)

Date :

17/1/2024

Notes:

- (1) The results shown in this report were determined by this laboratory in accordance with its terms of accreditation.
- (2) This report shall not be reproduced, except in full, without the written approval of FT Laboratories Ltd.

FT Laboratories Ltd

Pressuremeter Test

Project : Contract No. : GE/2022/08 Ground Investigation - New Territories East
Site Location : Lung Kwu Tan
Client : Driltech Ground Engineering Ltd.
Contractor : N/A
Sub-Contractor : N/A
Test Date : 13-Jan-24
Weather : Fine
Operator : KWONG Chun Leung

* Drillhole information

Hole No. : BH15
Test Depth below ground level : 5.40m-6.40m
Drilling tool diameter : 63mm
Drilling tool : Drilling Rig
Drilling Fluid : Water
Soil Description : N/A
GWL Measured Below Ground Level : N/A m

Pressuremeter Setting

Gauge no. : FT/INS/4.1
FT/INS/4.2
FT/INS/4.3
Probe no. : FT/INS/4.7
Probe Diameter : 58mm
Probe Calibration Date : 20-Dec-23
Gauge height : 1 m AGL
Pocket length : 1000mm
Type of protective sheath : Rubber
Type of inner membrane : Rubber
Initial Volume (Vo) : 520 cm³

Calibration and Correction Factors

Volume Correction : 0.25 cm³/bar
Gauge Correction Factor : 1
Gauge Height : 1 m
GWL Measured Below Ground Level : N/A m
Pressure Difference between Guard cells & Central cells : -0.41 bar

* Information provided by customer.

FT Laboratories Ltd
SUMMARY OF PRESSUREMETER TEST RESULTS

Project : Contract No. : GE/2022/08 Ground Investigation - New Territories East

Site Location : Lung Kwu Tan
Client : Driltech Ground Engineering Ltd.
Contractor : N/A
Sub-Contractor : N/A
Test Date : 13-Jan-24

Limit Pressure : 0.40 MPa

Drillhole No.	Test Depth (m)	Volume Range ¹ (cm ³) (Initial)		Shear Modulus (MPa)	Pressuremeter Modulus (MPa)
		(V ₀)	(V ₁)		
		99.88	379.75		
		Pressure Range (Bar) (Initial)			
BH15	5.40m-6.40m	(P ₀)	(P ₁)	0.38	1.01
		1.03	2.43		

Remarks : N/A



FT Laboratories Ltd

Project : Contract No. : GE/2022/08 Ground Investigation - New Territories East

Site Location : Lung Kwu Tan

Client : Driltech Ground Engineering Ltd.

Contractor : N/A

Sub-Contractor : N/A

Test Date : 13-Jan-24

Hole No. : BH15

Test Depth below ground level : 5.40m-6.40m

Field Data Summary

Gauge Pressure	Volume Change cm ³				
KPa($\times 10^2$)	15s	30s	60s	90	120s
0.0	0	0	0	0	0
0.25	21	31	35	40	44
0.50	58	69	76	90	100
0.75	125	140	163	200	229
1.0	270	293	326	355	380
1.1	433	455	490	511	530
1.5	589	613	642	670	698



PART II

This part of report contain opinion of the laboratory
and
is not covered under the HOKLAS accreditation

While this part of report has been prepared based on information provided by the customer, whether verbally or in writing, we accept no liability for any loss or expense whatsoever which may arise from any use of this report or any part thereof whether or not due to errors in the report or the information on which the report has been based.



FT Laboratories Ltd

Project : Contract No. : GE/2022/08 Ground Investigation - New Territories East

Site Location : Lung Kwu Tan

Client : Driltech Ground Engineering Ltd.

Contractor : N/A

Sub-Contractor : N/A

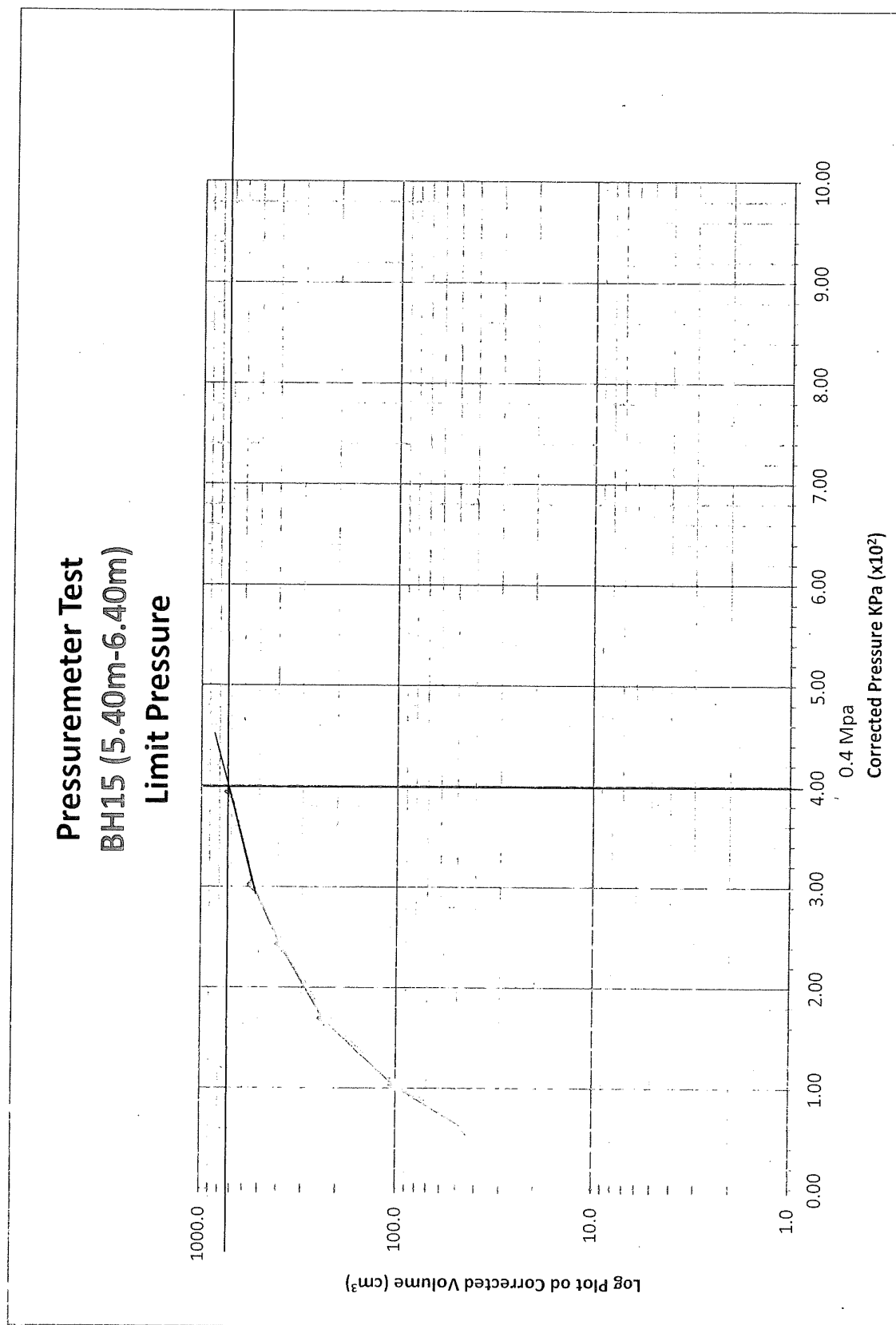
Test Date : 13-Jan-24

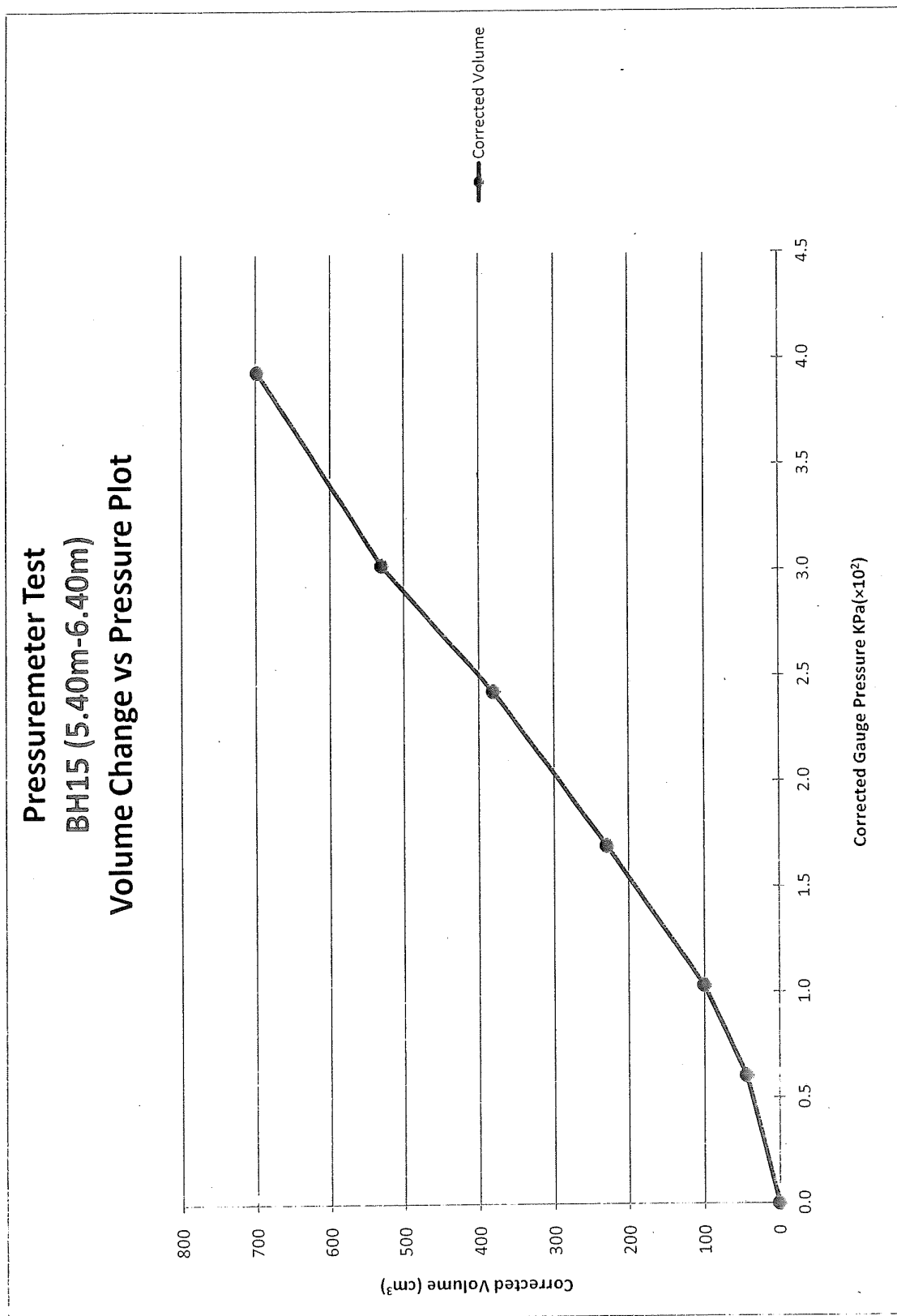
Hole No. : BH15

Test Depth below ground level 5.40m-6.40m

Gauge Pressure	Time	Meas'd Vol.	Vol. at 120s	Creep Volume	Volume Correction	Corrected Volume	Probe Correction	Corrected Pressure	Corrected Volume Ratio
KPa($\times 10^2$)	(s)	(cm ³)	(cm ³)	(cm ³)	(cm ³)	(cm ³)	KPa($\times 10^2$)	KPa($\times 10^2$)	
0	0	0	0	0	0	0	0.00	0.00	0.000
0.25	15	21	44	13	0.06	43.94	-0.06	0.60	0.078
	30	31							
	60	35							
	90	40							
	120	44							
0.5	15	58	100	31	0.13	99.88	0.12	1.03	0.161
	30	69							
	60	76							
	90	90							
	120	100							
0.75	15	125	229	89	0.19	228.81	0.53	1.69	0.306
	30	140							
	60	163							
	90	200							
	120	229							
1	15	270	380	87	0.25	379.75	1.02	2.43	0.422
	30	293							
	60	326							
	90	355							
	120	380							
1.12	15	433	530	75	0.28	529.72	1.49	3.02	0.505
	30	455							
	60	490							
	90	511							
	120	530							
1.5	15	589	698	85	0.38	697.63	2.03	3.94	0.573
	30	613							
	60	642							
	90	670							
	120	698							

Comment : N/A







Appendix A: **Calibration Certificate**



FT Laboratories Ltd

Pressure Losses Calibration Record

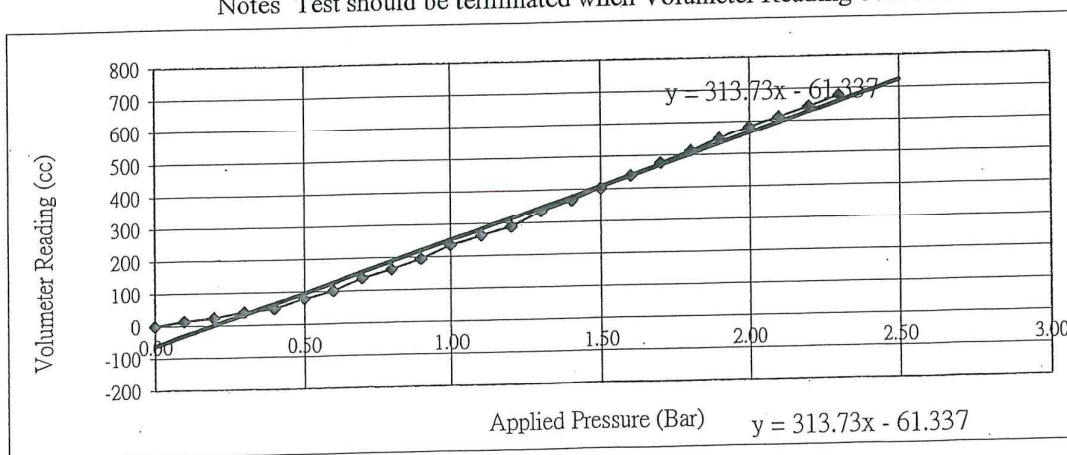
Item Calibrated	Name / Description : <u>Pressuremeter</u>	<u>Pressuremeter</u>	<u>50m Twin</u>	<u>Pressure</u>	<u>Pressure</u>	<u>Pressure</u>
	<u>Control</u>	<u>Test Probe</u>	<u>High</u>	<u>Gauges</u>	<u>Gauges</u>	<u>Gauges</u>
	<u>Unit</u>		<u>Pressure</u>			
			<u>Leads</u>			
Ept. No :	INS/4	INS/4.7	INS/4.12	INS/4.1	INS/4.2	INS/4.3
Manufacturer :	Apageo Segelm	Apageo Segelm	Apageo Segelm	Blondelle S.A.	Blondelle S.A.	Blondelle S.A.

Date of Calibration : 20-Dec-23

Calibration Procedure : The pressuremeter probe was pressurised in small increments and allowed to inflate under atmospheric conditions. Volume change was recorded against pressure. The pressure correction at a certain volume change represents the interior of probe.

Applied Pressure (Bar)	0.00	0.10	0.20	0.30	0.40	0.50	0.60
Volumeter Reading after 1-min holding (cc)	0	13	23	39	49	78	102
Applied Pressure (Bar)	0.70	0.80	0.90	1.00	1.10	1.20	1.30
Volumeter Reading after 1-min holding (cc)	138	164	194	235	263	288	335
Applied Pressure (Bar)	1.40	1.50	1.60	1.70	1.80	1.90	2.00
Volumeter Reading after 1-min holding (cc)	367	403	439	477	512	549	584
Applied Pressure (Bar)	2.10	2.20	2.30				
Volumeter Reading after 1-min holding (cc)	613	644	678				

Notes Test should be terminated when Volumeter Reading over 700cc.



Calibrated By : NG Yat Hong

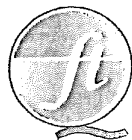
Certified By : WONG Chun Hing

Date :

20-Dec-23

Date :

20-Dec-23



FT Laboratories Ltd

Volume Losses Calibration Record

Item Calibrated: Name / Description : Pressuremeter Control Unit Pressuremeter Test Probe 50m Twin High Pressure Leads Pressure Gauges Pressure Gauges Pressure Gauges

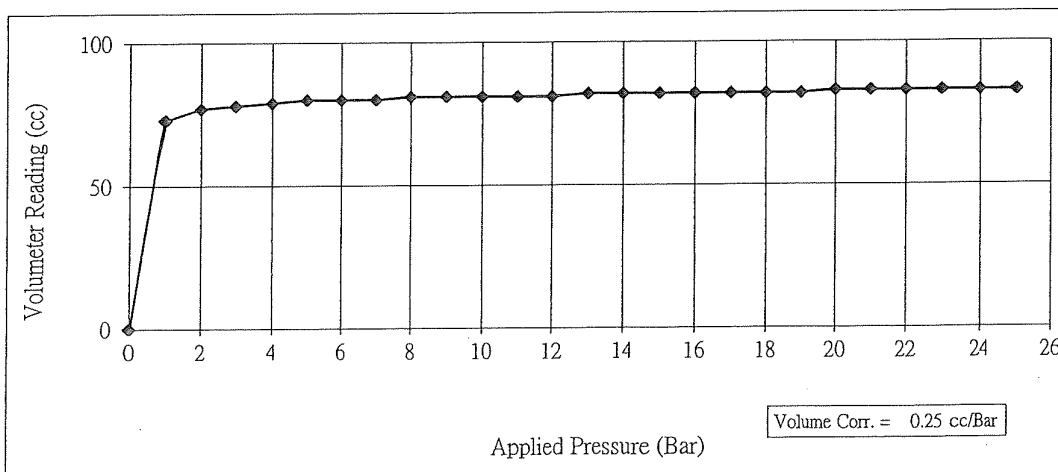
Ept. No : INS/4 INS/4.7 INS/4.12 INS/4.1 INS/4.2 INS/4.3

Manufacturer : Apageo Segelm S.A. Apageo Segelm S.A. Apageo Segelm S.A. Blondelle S.A. Blondelle S.A. Blondelle S.A.

Date of Calibration : 20-Dec-23

Calibration Procedure : The pressuremeter probe was pressurised in small increments and allowed to inflate under atmospheric conditions. Volume change was recorded against pressure. The pressure correction at a certain volume change represents the interior of probe.

Applied Pressure (Bar)	0.0	1.0	2.0	3.0	4.0	5.0	6.0
Volumeter Reading after 1-min holding (cc)	0	73	77	78	79	80	80
Applied Pressure (Bar)	7.0	8.0	9.0	10.0	11.0	12.0	13.0
Volumeter Reading after 1-min holding (cc)	80	81	81	81	81	81	82
Applied Pressure (Bar)	14.0	15.0	16.0	17.0	18.0	19.0	20.0
Volumeter Reading after 1-min holding (cc)	82	82	82	82	82	82	83
Applied Pressure (Bar)	21.0	22.0	23.0	24.0	25.0		
Volumeter Reading after 1-min holding (cc)	83	83	83	83	83		



Calibrated By : NG Yat Hong

Certified By : WONG Chun Hing

Date : 20-Dec-23

Date : 20-Dec-23



Appendix B: Location Plan

Not provided by customer



FT Laboratories Ltd
科達測檢試驗所有限公司



Reference No.: (A13E1702)

Job No.: (51566080)

Pressuremeter Test at

Contract No. : GE/2022/08 Ground Investigation - New Territories East

Contract No. : GE/2022/08

Borehole No.: BH15

Test Zone : 9.50m-10.50m



FT Laboratories Ltd.
科達測檢試驗所有限公司

PART I

HOKLAS Test Report



PRESSUREMETER TEST REPORT

Test Reference No.	: 51566080 - A13E1702
Laboratory	: FT Laboratories Ltd.
Address	: Lot No. DD77 Section 1552 S.Ass 1RP, Ng Chow South Road, Ping Che, Fanling, N.T.
Telephone	: (852) 2758 4861
Facsimile	: (852) 2758 8962
Client	: Driltech Ground Engineering Ltd.
Address	: Blocks A & B, 8/F., Hong Kong Spinners Industrial Building Phase 6, 481-483 Castle Peak Road, Kowloon, Hong Kong
Contract No	: GE/2022/08
Project Title	: Contract No. : GE/2022/08 Ground Investigation - New Territories East
Test Method	: ASTM D 4719-00 Standard Test Method for Prebored Pressuremeter Testing in Soils.
Date of order received	: 13-Jan-24
Date of test conducted	: 13-Jan-24
Location of Test	: Lung Kwu Tan
Test Results	: The test results are detailed in the subsequent page(s) (The values given in this Test Report only relate to the unit-under-test and the values measured at the time of the test.)

Test performed and Reported by

KWONG Chun Leung

Report Certified by

☐ HO Tak Cho, Eric (Technical Manager)

☒ WONG Chun Hing (Asst. Operation Manager)

(HOKLAS Approved Signatory)

Date :

17/1/2024

Notes:

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FT Laboratories Ltd

Pressuremeter Test

Project : Contract No. : GE/2022/08 Ground Investigation - New Territories East
Site Location : Lung Kwu Tan
Client : Driltech Ground Engineering Ltd.
Contractor : N/A
Sub-Contractor : N/A
Test Date : 13-Jan-24
Weather : Fine
Operator : KWONG Chun Leung

* Drillhole information

Hole No. : BH15
Test Depth below ground level : 9.50m-10.50m
Drilling tool diameter : 63mm
Drilling tool : Drilling Rig
Drilling Fluid : Water
Soil Description : N/A
GWL Measured Below Ground Level : N/A m

Pressuremeter Setting

Gauge no. : FT/INS/4.1
FT/INS/4.2
FT/INS/4.3
Probe no. : FT/INS/4.7
Probe Diameter : 58mm
Probe Calibration Date : 20-Dec-23
Gauge height : 1 m AGL
Pocket length : 1000mm
Type of protective sheath : Rubber
Type of inner membrane : Rubber
Initial Volume (Vo) : 520 cm³

Calibration and Correction Factors

Volume Correction : 0.25 cm³/bar
Gauge Correction Factor : 1
Gauge Height : 1 m
GWL Measured Below Ground Level : N/A m
Pressure Difference between Guard cells & Central cells : 0 bar

* Information provided by customer.



FT Laboratories Ltd
SUMMARY OF PRESSUREMETER TEST RESULTS

Project : Contract No. : GE/2022/08 Ground Investigation - New Territories East

Site Location : Lung Kwu Tan

Client : Driltech Ground Engineering Ltd.

Contractor : N/A

Sub-Contractor : N/A

Test Date : 13-Jan-24

Limit Pressure : 0.89 MPa

Drillhole No.	Test Depth (m)	Volume Range,(cm ³) (Initial)		Shear Modulus (MPa)	Pressuremeter Modulus (MPa)
		(V ₀)	(V ₁)		
		19.94	174.00		
		Pressure Range (Bar) (Initial)			
BH15	9.50m-10.50m	(P ₀)	(P ₁)	1.70	4.52
		0.12	4.36		

Remarks : N/A



FT Laboratories Ltd

Project : Contract No. : GE/2022/08 Ground Investigation - New Territories East

Site Location : Lung Kwu Tan

Client : Driltech Ground Engineering Ltd.

Contractor : N/A

Sub-Contractor : N/A

Test Date : 13-Jan-24

Hole No. : BH15

Test Depth below ground level : 9.50m-10.50m

Field Data Summary

Gauge Pressure	Volume Change cm ³				
KPa($\times 10^2$)	15s	30s	60s	90	120s
0.0	0	0	0	0	0
0.25	11	16	18	19	20
0.50	25	30	33	34	35
1.0	47	50	53	55	57
1.5	65	69	70	72	73
2.0	83	87	90	93	95
2.5	103	104	104	105	106
3.0	119	124	126	127	128
4.0	151	156	163	170	175
5.0	201	215	225	239	259
6.0	290	305	328	349	363
7.0	410	436	460	488	509
8.0	556	589	626	657	689



PART II

This part of report contain opinion of the laboratory
and
is not covered under the HOKLAS accreditation

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FT Laboratories Ltd

Project : Contract No. : GE/2022/08 Ground Investigation - New Territories East

Site Location : Lung Kwu Tan

Client : Driltech Ground Engineering Ltd.

Contractor : N/A

Sub-Contractor : N/A

Test Date : 13-Jan-24

Hole No. : BH15

Test Depth below ground level : 9.50m-10.50m

Gauge Pressure	Time	Meas'd Vol.	Vol. at 120s	Creep Volume	Volume Correction	Corrected Volume	Probe Correction	Corrected Pressure	Corrected Volume Ratio
KPa($\times 10^2$)	(s)	(cm ³)	(cm ³)	(cm ³)	(cm ³)	(cm ³)	KPa($\times 10^2$)	KPa($\times 10^2$)	
0	0	0	0	0	0	0	0.00	0.00	0.000
0.25	15	11	20	4	0.06	19.94	-0.13	0.12	0.037
	30	16							
	60	18							
	90	19							
	120	20							
0.5	15	25	35	5	0.13	34.88	-0.08	0.42	0.063
	30	30							
	60	33							
	90	34							
	120	35							
1	15	47	57	7	0.25	56.75	-0.01	0.99	0.099
	30	50							
	60	53							
	90	55							
	120	57							
1.5	15	65	73	4	0.38	72.63	0.04	1.54	0.123
	30	69							
	60	70							
	90	72							
	120	73							
2	15	83	95	8	0.50	94.50	0.11	2.11	0.154
	30	87							
	60	90							
	90	93							
	120	95							
2.5	15	103	106	2	0.63	105.38	0.14	2.64	0.169
	30	104							
	60	104							
	90	105							
	120	106							
3	15	119	128	4	0.75	127.25	0.21	3.21	0.198
	30	124							
	60	126							
	90	127							
	120	128							
4	15	151	175	19	1.00	174.00	0.36	4.36	0.252
	30	156							
	60	163							
	90	170							
	120	175							
5	0	201	259	44	1.25	257.75	0.63	5.63	0.332
	30	215							
	60	225							
	90	239							
	120	259							



FT Laboratories Ltd

Project : Contract No. : GE/2022/08 Ground Investigation - New Territories East

Site Location : Lung Kwu Tan

Client : Driltech Ground Engineering Ltd.

Contractor : N/A

Sub-Contractor : N/A

Test Date : 13-Jan-24

Hole No. : BH15

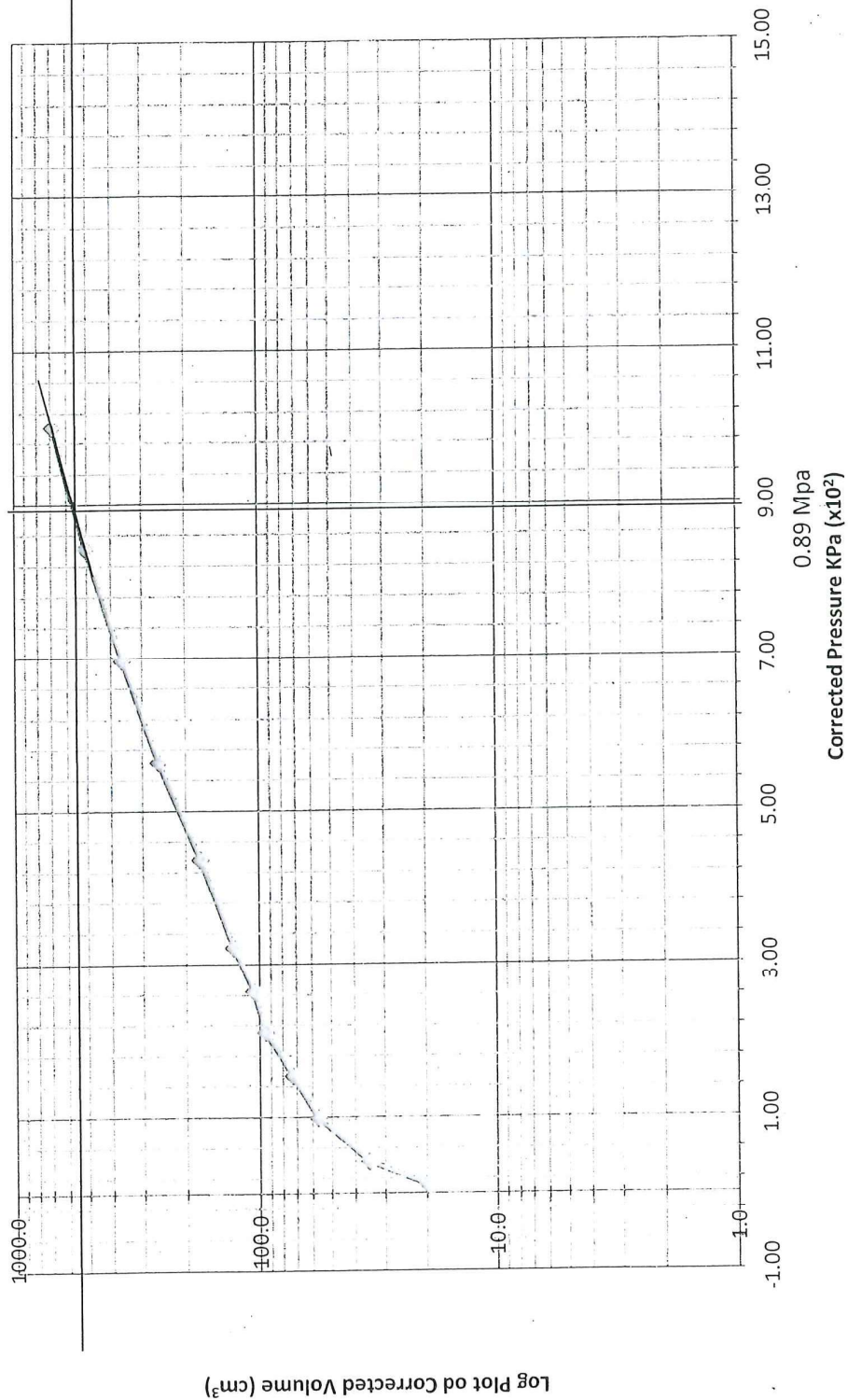
Test Depth below ground level : 9.50m-10.50m

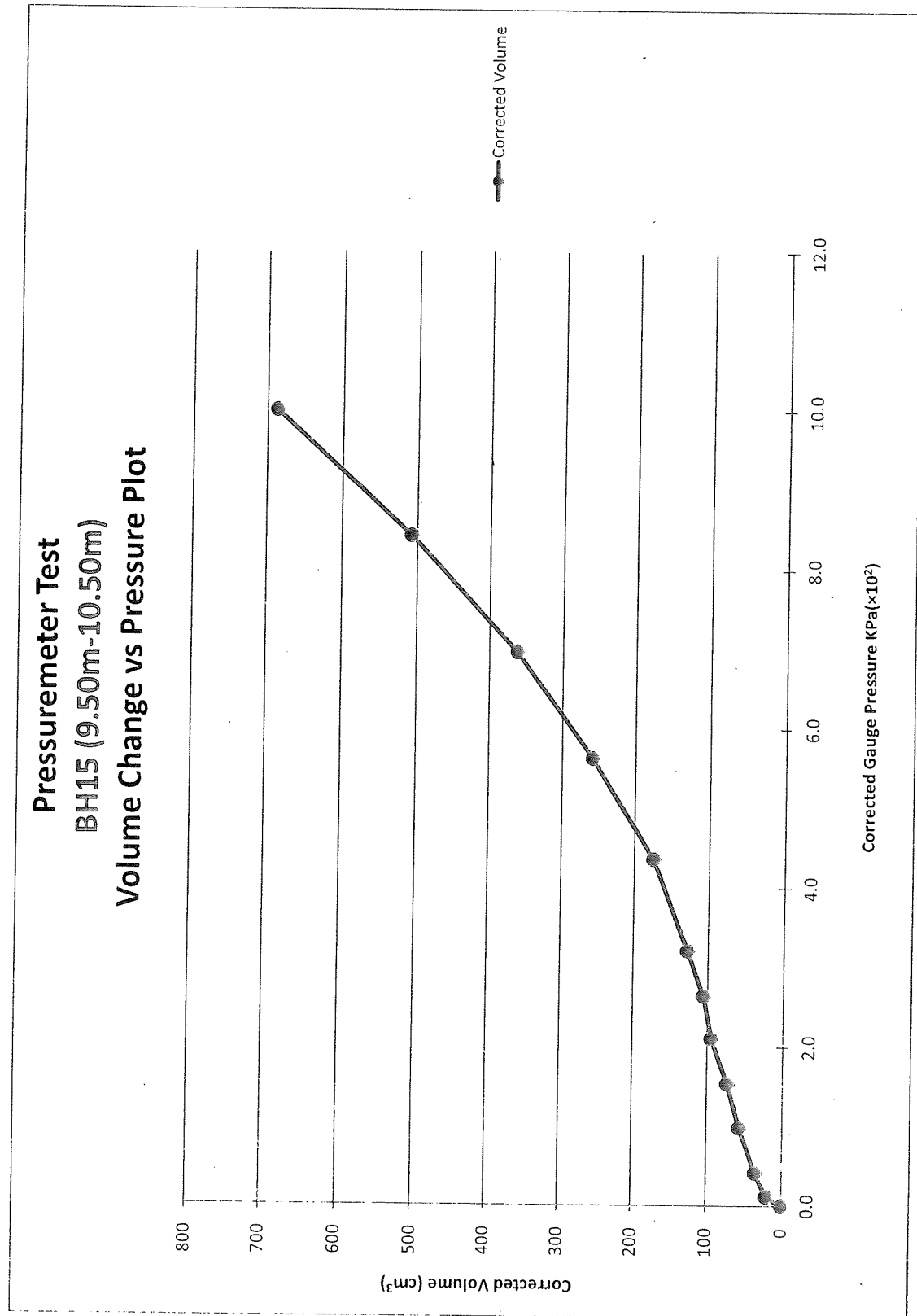
Gauge Pressure	Time	Meas'd Vol.	Vol. at 120s	Creep Volume	Volume Correction	Corrected Volume	Probe Correction	Corrected Pressure	Corrected Volume Ratio
KPa($\times 10^2$)	(s)	(cm ³)	(cm ³)	(cm ³)	(cm ³)	(cm ³)	KPa($\times 10^2$)	KPa($\times 10^2$)	
6	0	290							
	30	305							
	60	328							
	90	349							
	120	363	363	58	1.50	361.50	0.96	6.96	0.411
7	15	410							
	30	436							
	60	460							
	90	488							
	120	509	509	73	1.75	507.25	1.43	8.43	0.495
8	15	556							
	30	589							
	60	626							
	90	657							
	120	689	689	100	2.00	687.00	2.00	10.00	0.570

Comment : N/A



Pressuremeter Test
BH15 (9.50m-10.50m)
Limit Pressure







Appendix A: **Calibration Certificate**



FT Laboratories Ltd

Pressure Losses Calibration Record

Item Calibrated Name / Description : Pressuremeter Control Unit Pressuremeter Test Probe 50m Twin High Pressure Leads Pressure Gauges Pressure Gauges Pressure Gauges

Ept. No : INS/4 INS/4.7 INS/4.12 INS/4.1 INS/4.2 INS/4.3

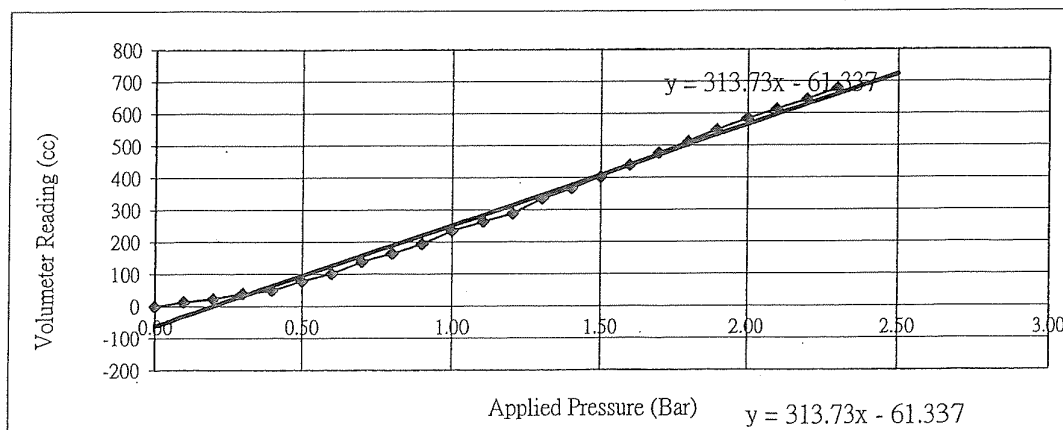
Manufacturer : Apageo Segelm Apageo Segelm Apageo Segelm Blondelle S.A. Blondelle S.A. Blondelle S.A.

Date of Calibration : 20-Dec-23

Calibration Procedure : The pressuremeter probe was pressurised in small increments and allowed to inflate under atmospheric conditions. Volume change was recorded against pressure. The pressure correction at a certain volume change represents the interior of probe.

Applied Pressure (Bar)	0.00	0.10	0.20	0.30	0.40	0.50	0.60
Volumeter Reading after 1-min holding (cc)	0	13	23	39	49	78	102
Applied Pressure (Bar)	0.70	0.80	0.90	1.00	1.10	1.20	1.30
Volumeter Reading after 1-min holding (cc)	138	164	194	235	263	288	335
Applied Pressure (Bar)	1.40	1.50	1.60	1.70	1.80	1.90	2.00
Volumeter Reading after 1-min holding (cc)	367	403	439	477	512	549	584
Applied Pressure (Bar)	2.10	2.20	2.30				
Volumeter Reading after 1-min holding (cc)	613	644	678				

Notes Test should be terminated when Volumeter Reading over 700cc.



Calibrated By : NG Yat Hong

Certified By : WONG Chun Hing

Date : 20-Dec-23

Date : 20-Dec-23



FT Laboratories Ltd

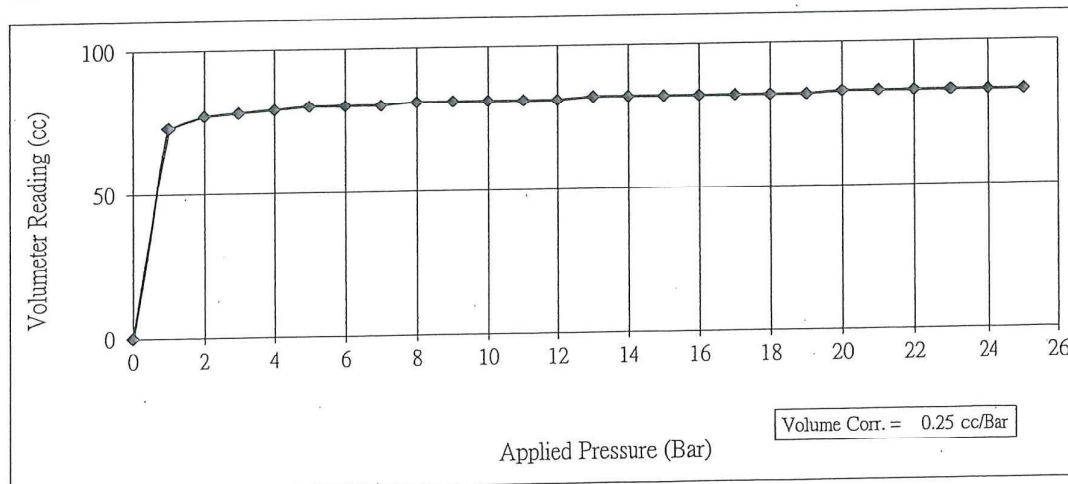
Volume Losses Calibration Record

Item Calibrated	Name / Description :	<u>Pressuremeter</u> <u>Control</u> <u>Unit</u>	<u>Pressuremeter</u> <u>Test Probe</u>	<u>50m Twin</u> <u>High</u> <u>Pressure</u> <u>Leads</u>	<u>Pressure</u> <u>Gauges</u>	<u>Pressure</u> <u>Gauges</u>	<u>Pressure</u> <u>Gauges</u>
Ept. No :	INS/4	INS/4.7	INS/4.12	INS/4.1	INS/4.2	INS/4.3	
Manufacturer :	Apageo Segelm S.A.	Apageo Segelm S.A.	Apageo Segelm S.A.	Blondelle S.A.	Blondelle S.A.	Blondelle S.A.	

Date of Calibration : 20-Dec-23

Calibration Procedure : The pressuremeter probe was pressurised in small increments and allowed to inflate under atmospheric conditions. Volume change was recorded against pressure. The pressure correction at a certain volume change represents the inertia of probe.

Applied Pressure (Bar)	0.0	1.0	2.0	3.0	4.0	5.0	6.0
Volumeter Reading after 1-min holding (cc)	0	73	77	78	79	80	80
Applied Pressure (Bar)	7.0	8.0	9.0	10.0	11.0	12.0	13.0
Volumeter Reading after 1-min holding (cc)	80	81	81	81	81	81	82
Applied Pressure (Bar)	14.0	15.0	16.0	17.0	18.0	19.0	20.0
Volumeter Reading after 1-min holding (cc)	82	82	82	82	82	82	83
Applied Pressure (Bar)	21.0	22.0	23.0	24.0	25.0		
Volumeter Reading after 1-min holding (cc)	83	83	83	83	83		



Calibrated By : NG Yat Hong

Certified By : WONG Chun Hing

Date :

20-Dec-23

Date :

20-Dec-23



Appendix B: Location Plan

Not provided by customer



Appendix F

Digital Acoustic Borehole Televviewer Survey Records (Travel Time and Amplitude, Joints Interpretation and Stereographic Plots Records)



Task Order No. GE/2022/08.35A

Borehole: BH15

Test Date: 16 Jan 2024

top of borehole.....

East: 809755.85

North: 831416.81

Elev: +8.91mPD

North ref. is magnetic

Depth units are metres

Vertical scale: 1/10

Horiz scale = vert scale

Zone from 27.770 to 23.000m

Format BHTV-NESWN

Borehole diam: 10.100cm

data intervals.....

azimuth: 2.000deg

depth: 0.001m

TRAVEL TIME (0.1 μ sec)

AMPLITUDE

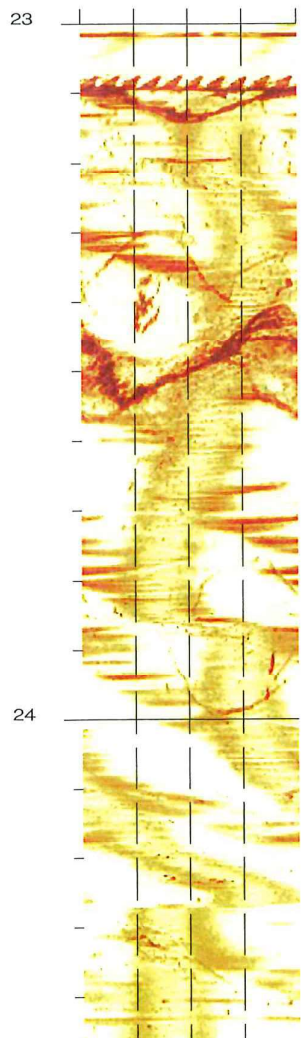
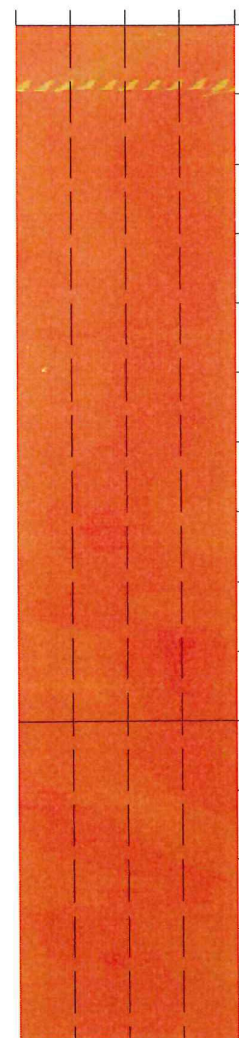
1490 2056

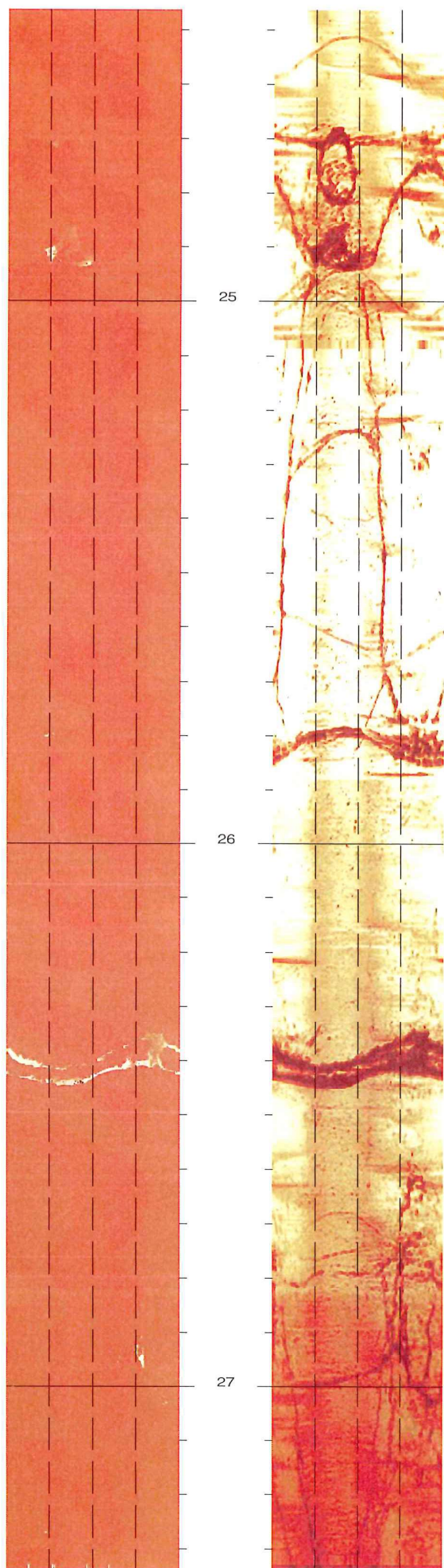
2 256

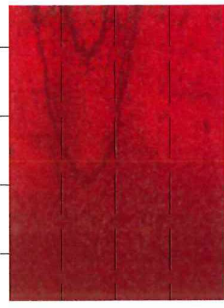
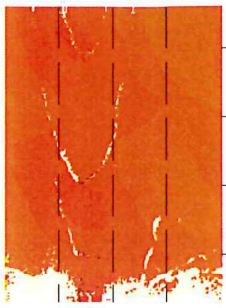


N E S W N

N E S W N







Task Order No. GE/2022/08.35A

Borehole: BH15

Test Date: 16 Jan 2024

top of borehole.....

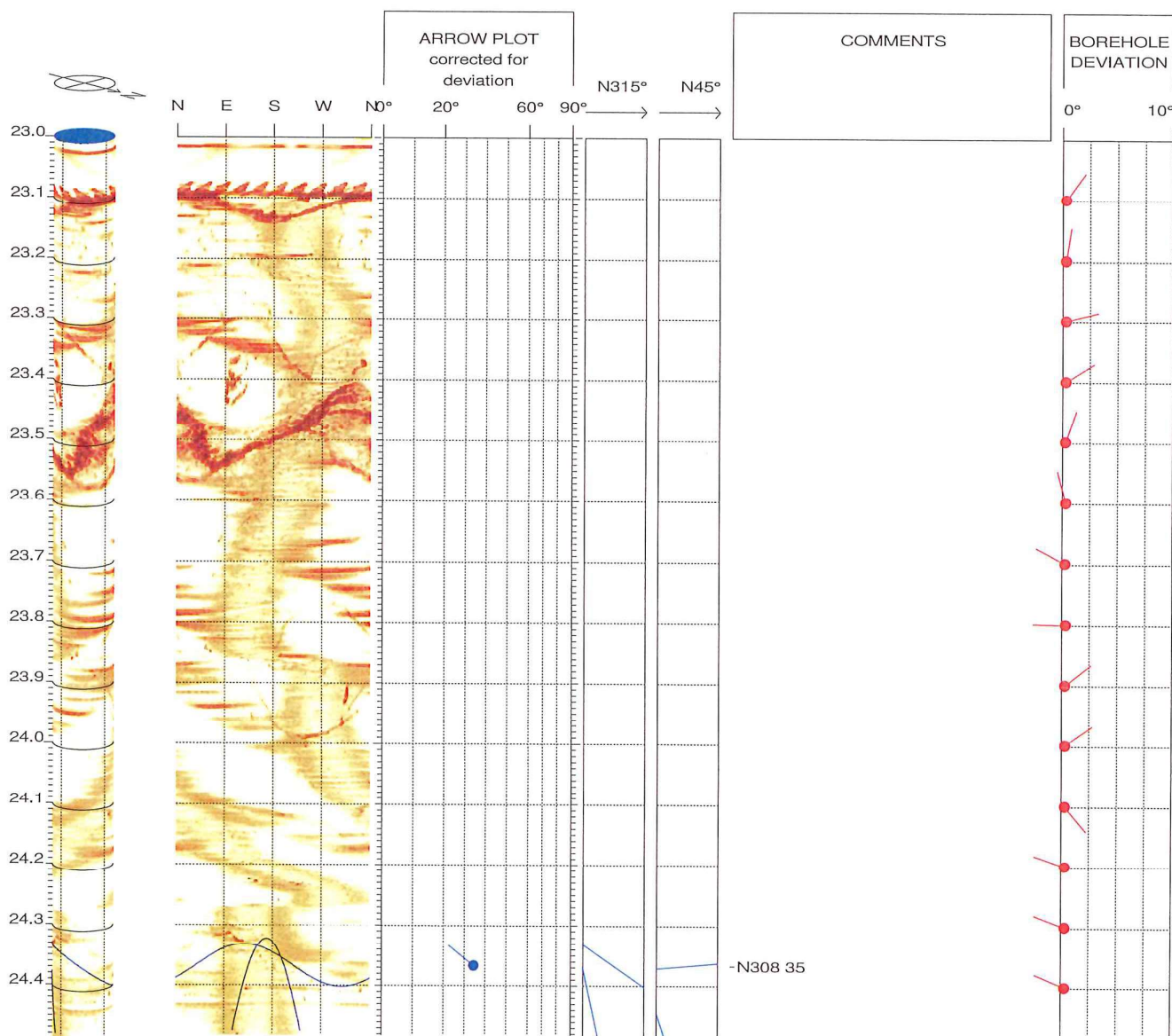
East: 809755.85
 North: 831416.81
 Elev: +8.91mPD

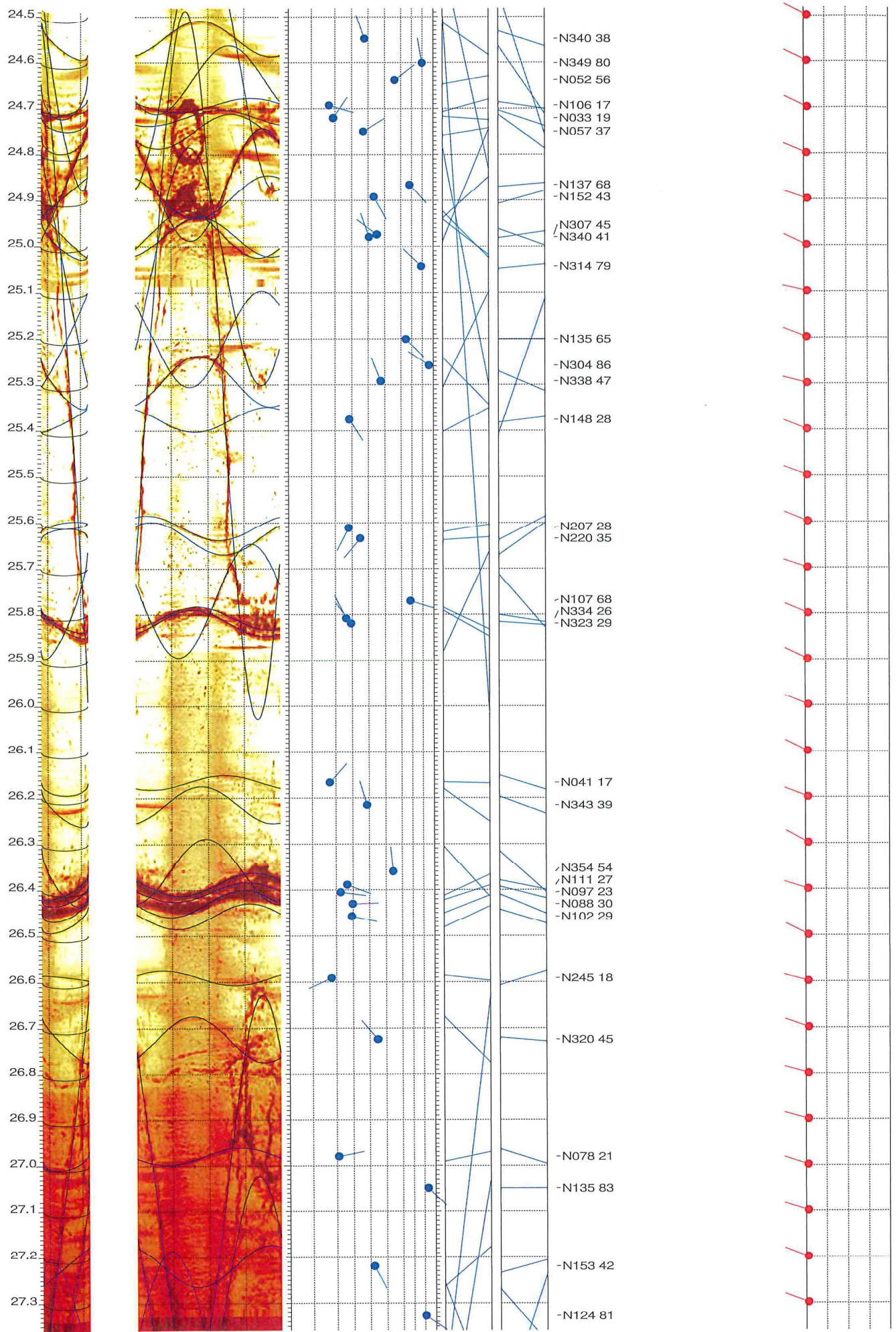
North ref. is magnetic
 Depth units are metres
 Vertical scale: 1/10
 Horiz scale = 1.00x Vert scale

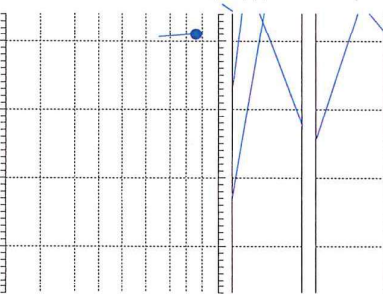
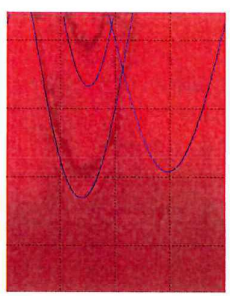
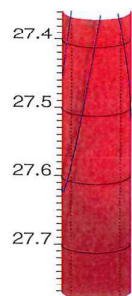
Zone from 27.770 to 23.000m
 Format: BHTV-NESWN

Borehole diam: 10.100cm
 Vertical = borehole-axis
 Image: Amplitude

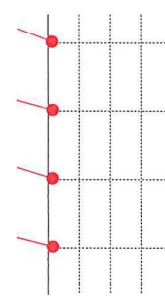
Stratigraphic dips
 Non-stratigraphic dips
 Identified units







-N266 76



RGLDIPv6.2 BHTV results

K = 0: Stratigraphic dips

K = 2: Non-stratigraphic dips

borehole BH15

zone from 27.770 to 23.000 m

North ref is magnetic

Dip format: Dip-azimuth and Dip

17 Jan 2024

	Depth	Azimuth	Dip	1-P0/100	n	Q	K	Upper Depth	Lower Depth	Well Diam	Well deviation Azimuth	Dev	Thickness
1	27.390	N266	75.8	1.000	3	A	2	27.187	27.594	0.101	291.00	0.34	0.0000
2	27.328	N124	80.9	1.000	3	A	2	27.024	27.632	0.101	292.00	0.32	0.0000
3	27.220	N153	42.3	1.000	3	A	2	27.174	27.265	0.101	284.00	0.30	0.0000
4	27.049	N135	83.4	1.000	3	A	2	26.629	27.469	0.101	284.91	0.32	0.0000
5	26.981	N078	21.1	1.000	3	A	2	26.962	27.000	0.101	286.00	0.31	0.0000
6	26.725	N320	44.8	1.000	3	A	2	26.675	26.776	0.101	291.00	0.37	0.0000
7	26.592	N245	18.0	1.000	3	A	2	26.575	26.608	0.101	286.00	0.34	0.0000
8	26.458	N102	29.3	1.000	3	A	2	26.430	26.486	0.101	290.57	0.38	0.0000
9	26.431	N088	29.9	1.000	3	A	2	26.402	26.460	0.101	287.00	0.37	0.0000
10	26.406	N097	22.6	1.000	3	A	2	26.385	26.427	0.101	288.48	0.35	0.0000
11	26.389	N111	26.6	1.000	3	A	2	26.364	26.414	0.101	288.00	0.33	0.0000
12	26.361	N354	54.4	1.000	3	A	2	26.290	26.432	0.101	287.11	0.33	0.0000
13	26.216	N343	38.7	1.000	3	A	2	26.175	26.257	0.101	290.00	0.36	0.0000
14	26.167	N041	17.4	1.000	3	A	2	26.151	26.183	0.101	290.00	0.33	0.0000
15	25.820	N323	29.3	1.000	3	A	2	25.791	25.848	0.101	295.00	0.39	0.0000
16	25.809	N334	26.3	1.000	3	A	2	25.783	25.834	0.101	294.00	0.41	0.0000
17	25.771	N107	68.3	1.000	3	A	2	25.647	25.895	0.101	291.00	0.38	0.0000
18	25.635	N220	34.9	1.000	3	A	2	25.599	25.670	0.101	294.00	0.33	0.0000
19	25.612	N207	28.0	1.000	3	A	2	25.585	25.639	0.101	291.00	0.36	0.0000
20	25.376	N148	28.4	1.000	3	A	2	25.349	25.403	0.101	289.00	0.38	0.0000
21	25.293	N338	47.4	1.000	3	A	2	25.237	25.348	0.101	285.00	0.38	0.0000
22	25.259	N304	85.9	1.000	3	A	2	24.488	26.029	0.101	285.00	0.38	0.0000
23	25.201	N135	64.6	1.000	3	A	2	25.097	25.306	0.101	290.79	0.33	0.0000
24	25.044	N314	78.6	1.000	3	A	2	24.785	25.302	0.101	289.00	0.34	0.0000
25	24.980	N340	40.5	1.000	3	A	2	24.937	25.024	0.101	292.97	0.35	0.0000
26	24.975	N307	45.2	1.000	3	A	2	24.923	25.026	0.101	294.00	0.34	0.0000
27	24.893	N152	43.4	1.000	3	A	2	24.846	24.940	0.101	287.00	0.41	0.0000
28	24.866	N137	67.9	1.000	3	A	2	24.744	24.989	0.101	289.00	0.38	0.0000
29	24.750	N057	36.9	1.000	3	A	2	24.713	24.788	0.101	298.00	0.37	0.0000
30	24.721	N033	19.1	1.000	3	A	2	24.704	24.739	0.101	296.00	0.40	0.0000
31	24.694	N106	17.5	1.000	3	A	2	24.678	24.709	0.101	291.93	0.40	0.0000
32	24.639	N052	56.1	1.000	3	A	2	24.564	24.713	0.101	294.00	0.38	0.0000
33	24.601	N349	79.5	1.000	3	A	2	24.323	24.880	0.101	295.00	0.38	0.0000
34	24.549	N340	37.7	1.000	3	A	2	24.510	24.588	0.101	292.00	0.37	0.0000
35	24.367	N308	34.6	1.000	3	A	2	24.331	24.402	0.101	292.00	0.38	0.0000

Remarks: The Magnetic Declination in 2024 at Lion Rock of Hong Kong is 3°23' west of True North.

Task Order No. GE/2022/08.35A

Borehole: BH15

Test Date: 16 Jan 2024

top of borehole.....

East: 809755.85

North: 831416.81

Elev: +8.91mPD

North ref: magnetic

Depth units are metres

Vertical scale: 1/100

Zone from 27.770 to 23.867m

Mean dip format: dip-azimuth and dip

Frequency histogram parameters:

measurement distance 0.000m

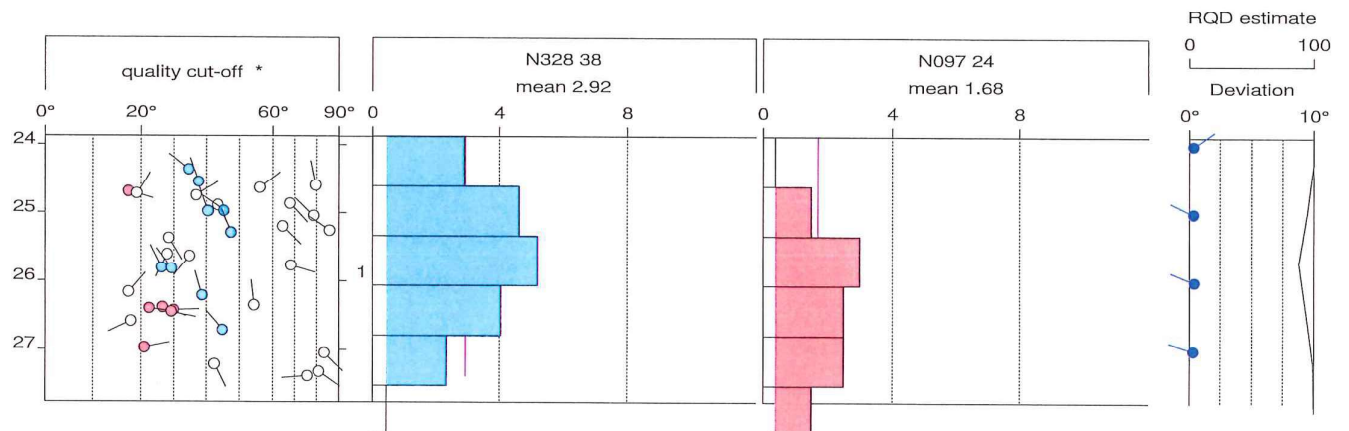
step distance 0.000m

Interpretation 1

Dip data sets

BHTV dips

open symbols not used in mean-dip/zone-axis calculation



Task Order No. GE/2022/08.35A

Borehole: BH15

Test Date: 16 Jan 2024

top of borehole.....

East: 809755.85

North: 831416.81

Elev: +8.91mPD

North ref: magnetic

Depth units are metres

Zone from 27.770 to 23.867m

Mean dip format: dip-azimuth and dip

Interpretation 1

Dip data sets

BHTV dips

BH15

Zone 0. 23.867 - 27.770m

Deviation 0.30 N291.50

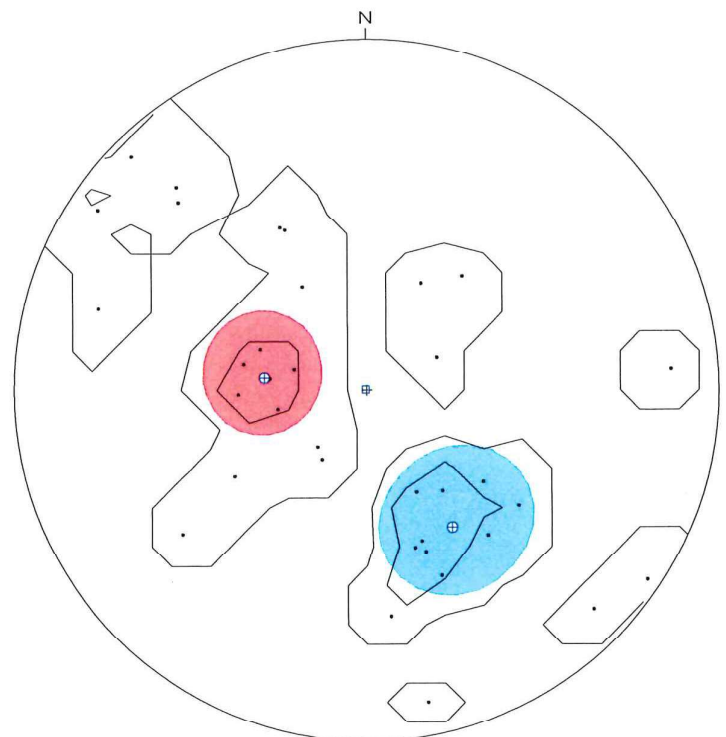
dipdata sets.....

BHTV dips

	mean dip	n	f
N328 38	N328 38	9	2.92
N097 24	N097 24	6	1.68

intersections

	N328 38	N097 24
N328 38		14 N040
N097 24	14 N040	



equal-area lower-hemisphere 0-90
contour-levels 1,3,

⊕ mean dip
□ well axis

RGLDIPv6.2 DIP DATA INTERPRETATION: FRACTURE ANALYSIS

borehole BH15
zone from 23.000 to 27.000 m
North ref is magnetic
17 Jan 2024

Data is classed into 1 types
3 BHTV_dips

Quality cut-off level: *

Mean well deviation: 0.3°deg to N291.5°

2 small-circles defined				MEAN DIP	
SEARCH AREA				pl	cone
azim	pl	cone	azimuth dip	n	f
1 145.4°	52.4°	17.8°	238° 38°	9	2.92
2 279.5°	65.2°	14.2°	7° 24°	6	1.68

Total number of data = 15
Number of data unaccounted for = 20

ZONE		DEVIATION		DEPTHS m		No.		MEAN DIPS and FREQUENCIES													
No.	Dev	Azim	TOP	BASE	DATA	Azi	Dip	n	f	Azi	Dip	n	f	Azi	Dip	n	f	Azi	Dip	n	f
1	0.3	291.5	23.88	27.77	35	238	38	9	2.92	7	24	6	1.68	0	0	0	0.00	0	0	0	0.00



Contract No. GE/2022/08
Ground Investigation - New Territories East

Appendix G

Piezometer Detail and Response Test Record Sheets

<div style="border: 2px solid black; padding: 5px; display: inline-block; font-weight: bold; font-size: 1.2em;">DRiLTECH</div>		DRILLHOLE PIEZOMETER DETAIL AND RESPONSE TEST RECORD SHEET		Drillhole No. : BH15 (Upper)
Contract No. : GE/2022/08		Date of Installation : 16-Jan-24		
Task Order No. : GE/2022/08.35A		Date of Test : 18-Jan-24		
Project : Ground Investigation - New Territories East Agreement No. CE 26/2022 (EP) - Development of Integrated Waste Management Facilities Phase 2 - Investigation, Design and Construction		Ground Level : +8.91 mPD Co-ordinates : <div style="display: flex; justify-content: space-around; margin-top: 10px;"> E 809755.85 N 831416.81 </div>		
Initial Water Level : 6.29 m below G.L.		Piezometer Tip Level : -1.09 mPD		
Tested / Supervised By : M. Hui		Checked By : R. Chu		
Dip meter I.D. : DT-053-006		Checked Date : 18-Jan-24		
Time Elapsed (minutes)	Depth of Water from top of pipe (m)	<div style="display: flex;"> <div style="flex: 1;"> <p>Height above Ground Level</p> <p>0.05 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>Depth below Ground Level</p> <p>8.20 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>9.20 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>10.00 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>10.50 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>11.50 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>12.20 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>13.20 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>14.00 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>14.50 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>15.50 m</p> <hr style="width: 50px; margin: 5px auto;"/> <p>27.88 m</p> </div> <div style="flex: 2;"> <div style="position: absolute; top: 260px; right: 20px; font-size: 0.8em;"> Lockable cover Concrete surface box PVC cap with vent hole Drain pipe Ground Level Cement Bentonite Grout (1 : 3) Pipe dia. : 25mm Bentonite seal Response Zone (Filter Sand) Bentonite seal Cement Bentonite Grout (1 : 3) Bentonite seal Response Zone (Filter Sand) Bentonite seal Cement Bentonite Grout (1 : 3) Base of drillhole </div> </div> </div>		
Filter Material: Sand		<div style="display: flex;"> <div style="flex: 1;"> <p>Material Surrounding Response Zone: From 9.20m to 10.50m: FILL (Slightly sandy clayey SILT)</p> </div> <div style="flex: 1; border-left: 1px solid black; padding-left: 10px;"> <p>Remarks :</p> </div> </div>		
(This row is part of the table structure and contains no specific data for this section)				
(This row is part of the table structure and contains no specific data for this section)				

(N.T.S.)

<div style="border: 2px solid black; padding: 5px; display: inline-block; font-weight: bold; font-size: 1.2em;">DRILTECH</div>		DRILLHOLE PIEZOMETER DETAIL AND RESPONSE TEST RECORD SHEET		Drillhole No. : BH15 (Lower)
Contract No. : GE/2022/08		Date of Installation : 16-Jan-24		
Task Order No. : GE/2022/08.35A		Date of Test : 18-Jan-24		
Project : Ground Investigation - New Territories East Agreement No. CE 26/2022 (EP) - Development of Integrated Waste Management Facilities Phase 2 - Investigation, Design and Construction		Ground Level : +8.91 mPD Co-ordinates : <div style="display: flex; justify-content: space-around; margin-top: 5px;"> E 809755.85 N 831416.81 </div>		
Initial Water Level : 6.32 m below G.L.		Piezometer Tip Level : -5.09 mPD		
Tested / Supervised By : M. Hui		Checked By : R. Chu		
Dip meter I.D. : DT-053-006		Checked Date : 18-Jan-24		

Time Elapsed (minutes)	Depth of Water from top of pipe (m)	Height above Ground Level	
0	0.00	0.05 m	
0.25	0.03		
0.50	0.06		
0.75	0.08		
1.00	0.10		
1.50	0.12	8.20 m	
2.00	0.14		
3.00	0.16		
4.00	0.80	9.20 m	
5.00	0.20		
6.00	0.23		
7.00	0.26		
8.00	0.29	10.00 m	
9.00	0.32	10.50 m	
10.00	0.35		
15.00	0.45	11.50 m	
20.00	0.55		
25.00	0.65		
30.00	0.75		
45.00	0.99		
60.00	1.23	12.20 m	
Filter Material: Sand		13.20 m	Material Surrounding Response Zone: From 13.20m to 14.50m: MARINE DEPOSIT (Silty CLAY)
		14.00 m	Response Zone (Filter Sand)
		14.50 m	
		15.50 m	
		27.88 m	Base of drillhole

Remarks :

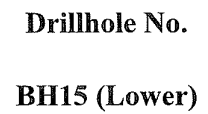
(N.T.S.)



Contract No. GE/2022/08
Ground Investigation - New Territories East

Appendix H

Water Level Monitoring Records



Measured By : **M. Hui**

Remarks :



Contract No. GE/2022/08
Ground Investigation – New Territories East

Appendix I

Digital Data Records (AGS and PDF in CD-ROM)



Media Index Record

Project Identification	D0900
Project Name	Contract No. GE/2022/08 Ground Investigation - New Territories East
Task Order No.	GE/2022/08.35A
Location	Agreement No. CE 26/2022 (EP) - Development of Integrated Waste Management Facilities Phase 2 - Investigation, Design and Construction
Client	Geotechnical Engineering Office, Civil Engineering and Development Department
From	DrilTech Ground Engineering Limited

Issue Sequence Number	Date of Issue	Issued To		General Notes
D0900_GE202208.35A.00	29/Feb/24	Geotechnical Engineering Office, Civil Engineering and Development Department		
File / Folder Name	Creation Date	Creation Time	File Size in Bytes	General Description of Data Transferred
GE202208.35A.ags	29/Feb/24	9:48	30KB	Digital Data in AGS Format for Final Field Work Report
GE202208.35A.pdf	29/Feb/24	10:25	11,842KB	Digital Data in PDF Format for Final Field Work Report
Photographs_202208.35A	29/Feb/24	11:05	15MB	Digital Data in JPG Format for Final Field Work Report
Individual Investigation Stations	29/Feb/24	11:22	2MB	Digital Data in PDF Format for Final Field Work Report



Contract No. GE/2022/08
Ground Investigation - New Territories East

End of Report

Directory of D:\

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Photographs_202208.35A.7z	15528 KB	3/12/2024 02:27:38 PM	r

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Total 0 folder(s); 4 file(s)

Total files size: 29 MB; 29190 KB; 29890766 Bytes

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