MATCH LINE
FOR CONTINUATION REFER TO DRAWING REFERENCE NO. 178901/B/SIR/00-10034

FAT TONG O

N

PROPOSED FRESH WATER MAIN

178901/B/SIR/00/10038

814 600 N

814 400 N

814 200 N

814 000 N

846 400 E

846 600 E

846 800 E

847 000 E

TKO/FB-DH02
TKO/FB-DH01
TKO/FB-DH03
TKO/FB-DH05
TKO/FB-DH04
TKO/FB-DH07
TKO/FB-DH06
TKO/NT-TP01
TKO/NT-TP02
TKO/NT-DH03
TKO/NT-DH01
TKO/NT-TP06
TKO/NT-TP03
TKO/NT-DH02
TKO/NT-TP07
TKO/NT-TP04
TKO/NT-TP05
TKO/SZ-DH03
TKO/SZ-DH02
TKO/SZ-DH05
TKO/SZ-DH01
TKO/SZ-DH04

178901/B/SIR/00/10039

178901/B/SIR/00/10039

178901/B/SIR/00/10039

178901/B/SIR/00/10038

PROPOSED SITE FOR DESALINATION PLANT

NATURAL TERRAIN STUDY AREA

SEPARATION ZONE – NO WORKS BY OTHERS EXCEPT MTRCL'S CONTRACTORS

KWUN TSAI

GS7

CLEAR WATER BAY COUNTRY PARK GN2220/10

MATCH LINE
FOR CONTINUATION REFER TO DRAWING REFERENCE NO. 178901/B/SIR/00-10036

0 10 20 30 40 50 m
1 : 1 500 SCALE BAR

KEY PLAN
SCALE 1 : 40 000

10020 10021 10022 10023 10024 10025 10026 10027 10028 10029 10030 10031 10032 10033 10034 10035 10036 10037

MAP NOS. 12SW11D, 12SW12C, 12SW16B & 12SW17A

LEGEND:

- EXISTING DRILLHOLE
- SITE SPECIFIC DRILLHOLE
- SITE SPECIFIC DRILLHOLE (IN PROGRESS)
- PROPOSED TRIAL PIT (IN PROGRESS)
- SECTION A–A

GI STATION	EASTING	NORTHING
TKO/SZ-DH01	846548.53	814126.32
TKO/SZ-DH02	846597.48	814164.13
TKO/SZ-DH03	846668.22	814198.72
TKO/SZ-DH04	846562.83	814048.84
TKO/SZ-DH05	846689.54	814155.99
TKO/FB-DH01	846362.04	814513.80
TKO/FB-DH02	846581.83	814575.61
TKO/FB-DH03	846471.51	814476.53
TKO/FB-DH04	846429.78	814377.90
TKO/FB-DH05	846577.62	814482.20
TKO/FB-DH06	846435.34	814252.83
TKO/FB-DH07	846609.49	814308.92
TKO/NT-DH01	846742.78	814485.34
TKO/NT-DH02	846754.22	814360.66
TKO/NT-DH03	846608.74	814471.87
TKO/NT-TP01	846664.17	814531.98
TKO/NT-TP02	846619.46	814498.51
TKO/NT-TP03	846705.51	814398.69
TKO/NT-TP04	846660.07	814297.46
TKO/NT-TP05	846684.45	814243.52
TKO/NT-TP06	846647.07	814429.67
TKO/NT-TP07	846731.08	814311.71
TKO/FB-DH02	846581.49	814575.74
TKO/FB-DH05	846591.71	814438.44
TKO/FB-DH07	846614.36	814305.95

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked
Initial	YLC	CKH	SZ	WLS
Date	07/14	07/14	07/14	07/14

Approved

Agreement No.
CE 21/2012 (WS)

Contract Title
DESALINATION PLANT AT TSEUNG KWAN O – FEASIBILITY STUDY

Drawing Title
SITE SPECIFIC GROUND INVESTIGATION LAYOUT PLAN (SHEET 1)

(SHEET 17 OF 17)

Drawing No.
178901/B/SIR/00-10036

Revision
–

Scale
A1 1 : 1500
A3 1 : 3000

水務署
Water Supplies Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

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MAP NOS. 12SW17A, 12SW17B, 12SW17C, 12SW16B & 12SW16D

LEDENG:

- SOUNDING DATA IN METRES BELOW HKPD
- SOUNDING DATA IN METRES ABOVE HKPD
- CONTOUR AT 1 METRE INTERVAL
- SURVEY BOUNDARY
- SITE SPECIFIC DRILLHOLE D1
- SITE SPECIFIC VIBROCORE SD1
- SITE SPECIFIC GRAB SAMPLE GS1
- SITE SPECIFIC DRILLHOLE D5 (SECOND BATCH)
- SITE SPECIFIC VIBROCORE SD5 (SECOND BATCH)
- SITE SPECIFIC GRAB SAMPLE GS5 (SECOND BATCH)
- PROPOSED GEOPHYSICAL SURVEY EXTENT

GI STATION	EASTING	NORTHING
D1	846766.33	814045.60
D2	847010.00	814140.00
D3	846743.00	813870.00
D4	846720.00	813721.00
D5	846752.00	813583.00
SD1	846766.50	814046.70
SD2	847007.00	814139.00
SD3	846735.40	813871.70
SD4	846722.00	813722.00
SD5	846753.00	813582.00
GS1	846970.00	814150.00
GS2	846950.00	814090.00
GS3	846720.00	813800.00
GS4	846680.00	813730.00
GS5	846718.10	813713.30
GS6	846742.20	813615.10
GS7	846969.30	814125.10

Revision	Date	Description			Initial
	Designed	Checked	Drawn	Checked
Initial	YLC	CKH	SZ	WLS
Date	07/14	07/14	07/14	07/14

Approved

Agreement No.
CE 21/2012 (WS)

Contract Title
DESALINATION PLANT AT TSEUNG KWAN O – FEASIBILITY STUDY

Drawing Title
SITE SPECIFIC GROUND INVESTIGATION LAYOUT PLAN (SHEET 2)

Drawing No.
178901/B/SIR/00-10037

Revision
–

Scale
A1 1 : 1500
A3 1 : 3000

水務署 Water Supplies Department

BLACK & VEATCH HONG KONG LIMITED
博威工程顧問有限公司

0 10 20 30 40 50 m
1 : 1 500 SCALE BAR

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DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH01
	SHEET 1 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	DATE : 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
01/03/2014	SW								A INSPECTION PIT 0.50					Brown (7.5YR 5/4), dappled greyish brown, silty fine to coarse SAND with some angular to subangular fine to coarse gravel of moderately decomposed and slightly decomposed rock fragments. (FILL)
01/03/2014									B 1.00					
									C 1.20	+25.30	1.20			
03/03/2014		Dry at 08:00	0	80					T6-131 1.80					Grey (N 5), dappled light brown and greyish brown, angular to subangular COBBLE sized concrete, moderately decomposed and slightly decomposed Granite with some silty sandy angular to subangular fine to coarse gravel of moderately decomposed and slightly decomposed rock fragments, occasional wood pieces and steel bars dia. 15mm. (FILL)
			0	90					T6-131 2.80					From 2.45m to 2.65m : Grey, angular BOULDER sized concrete.
03/03/2014		0.50m at 18:00												
04/03/2014		Dry at 08:00	0	92					T6-131 3.50					From 3.15m to 3.48m : Dark grey, angular BOULDER sized slightly decomposed Tuff.
			0	85					T6-131 4.70					
	SW 4.70													
	PW		0	72					T6-131 5.30	+21.20	5.30			
04/03/2014		0.70m at 18:00												
05/03/2014		Dry at 08:00	0	54					T2101 6.50					Grey (N 5), dappled light brown and greyish brown, angular COBBLE sized slightly decomposed Granite and concrete with some sandy angular to subangular fine to coarse gravel of moderately decomposed and slightly decomposed rock fragments and steel bars dia. 15mm. (FILL)
			0	67					T2101 7.20					
			0	53					T2101 8.10					
			0	36					T2101 9.20					
			0	41					T2101					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	26/03/2014
CHECKED	Y. M. Leung
DATE	27/03/2014

REMARKS
1. An inspection pit was excavated to 1.20m.
2. A constant head permeability test was carried out from 69.00m to 70.50m.
3. A water sample was taken at 45.00m.
4. A piezometer was installed at 35.00m.
5. Piezometer buckets were installed in piezometer from 20.50m to 25.50m depth at 0.50m intervals.

DRILLHOLE RECORD

VIBRO

	CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH01
		SHEET 2 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	DATE : 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	PW	1.30m at 18:00	0	41					T2 10.30	+16.50	10.00			See sheet 1 of 10
05/03/2014														
06/03/2014		8.20m at 08:00												
11			0	53					T2 11.40					
12			0	76					T2 12.50	+14.00	12.50			From 11.58m to 11.78m : Light brown, angular BOULDER sized moderately decomposed Tuff.
06/03/2014		2.10m at 18:00												
07/03/2014		10.50m at 08:00												
13			0	0					1 13.50 13.60	+12.90	13.60			Brown (7.5YR 5/4), slightly silty fine to coarse SAND with some angular to subangular fine to coarse gravel of moderately decomposed rock fragments and occasional angular cobble sized concrete. (FILL)
14			0	72					T2 14.20					Grey (N 5), dappled light grey and dark grey, locally greyish brown, angular to subangular COBBLE sized slightly decomposed Granite, concrete and wood pieces with some sandy angular to subangular fine to coarse gravel of moderately to slightly decomposed rock fragments. (FILL)
			0	0					2 14.90 15.00					
15	PW 15.00 HW													
			0	53					T2 16.20					
16														
			0	60					T2 17.50					
17														
			0	53					T2 18.50	+8.00	18.50			
18														
			0	0					3 19.20 19.30	+7.20	19.30			Light brown (7.5YR 6/4), dappled greyish brown, silty fine to coarse SAND with some angular to subangular fine to coarse gravel of moderately decomposed rock fragments and occasional angular cobble sized concrete. (FILL)
19														
			0	72					T2					Grey (N 5), dappled dark grey and greyish brown, angular to subangular COBBLE sized moderately to slightly decomposed Granite and Tuff with some sandy angular to subangular fine to coarse gravel of moderately to slightly
20														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	26/03/2014
CHECKED	Y. M. Leung
DATE	27/03/2014

REMARKS

DRILLHOLE RECORD

VIBRO

HOLE NO. TKO/FB-DH01

CONTRACT NO. : GE/2013/21

SHEET 3 **OF** 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	**DATE :** 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW									+6.50	20.00			decomposed rock fragments and occasional plastic fragments. (FILL)
07/03/2014		2.80m at 18:00	0	72					T2 IOI 20.50					From 20.30m to 20.50m : Grey, angular BOULDER sized slightly decomposed Granite.
08/03/2014		18.50m at 08:00												
21			0	58					T2 IOI 21.30					
			0	52					T2 IOI					
22									22.30					From 22.06m to 22.30m : Grey, angular BOULDER sized slightly decomposed Granite.
23			0	62					T2 IOI 23.50					
24			0	60					T2 IOI 24.30					
			0	60					T2 IOI					
25 08/03/2014		2.20m at 18:00							25.00					From 24.78m to 25.00m : Grey, angular BOULDER sized slightly decomposed Granite.
10/03/2014		24.10m at 08:00												
26			0	51					T2 IOI					
									26.40	+0.10	26.40			From 26.15m to 26.40m : Grey, angular BOULDER sized concrete.
			0	0					27.20					Dark grey (N 3), dappled greyish brown and grey, sandy angular to subangular fine to coarse GRAVEL of moderately decomposed and slightly decomposed rock fragments with some angular cobble sized moderately decomposed Granite. (FILL)
27									4 27.30	-0.80	27.30			
			0	59					T2 IOI					Grey (N 5), dappled dark grey and light grey, angular COBBLE sized slightly decomposed Granite and Tuff with some angular to subangular fine to coarse gravel of moderately decomposed and slightly decomposed rock fragments and steel bars dia. 20mm. (FILL)
28									28.50					From 28.18m to 28.50m : Grey, angular BOULDER sized concrete.
29			0	0										
									5 29.50 29.60					
			0	37					T2 IOI					
30														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 26/03/2014

CHECKED Y. M. Leung

DATE 27/03/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH01
	SHEET 4 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	DATE : 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW									-3.50	30.00			
			0	37					T2 IOI					See sheet 3 of 10
										30.50	-4.00	30.50		
31			0	0										Greyish brown (2.5Y 5/2), slightly sandy angular to subangular fine to coarse GRAVEL of moderately decomposed and slightly decomposed rock fragments, occasional angular cobble sized slightly decomposed Granite and wood pieces. (FILL)
									6	31.40 31.50	-5.00	31.50		
32			0	51					T2 IOI					Grey (N 5), dappled dark grey, angular COBBLE sized slightly decomposed Tuff and concrete. (FILL)
10/03/2014		10.50m at 18:00								32.90	-6.40	32.90		From 32.66m to 32.90m : Dark grey, angular BOULDER sized slightly decomposed Tuff.
33 11/03/2014		23.80m at 08:00	0	0										Grey (N 5), dappled dark grey, angular medium to coarse GRAVEL of moderately decomposed and slightly decomposed rock fragments with occasional subangular cobble sized moderately decomposed Granite, wood pieces and refuse. (FILL)
34									7	33.90 34.00				
			0	0										
35									8	34.90 35.00	-8.50	35.00		
			0	46					T2 IOI					Grey (N 5), dappled greyish brown and light grey, subangular COBBLE sized concrete, moderately decomposed and slightly decomposed Granite with some angular to subangular fine to coarse gravel of moderately decomposed and slightly decomposed rock fragments. (FILL)
36										36.00				
			0	0										
37 11/03/2014		6.70m at 18:00							9	36.90 37.00				
12/03/2014		24.50m at 08:00	0	31					T2 IOI					
38														
12/03/2014		9.10m at 18:00								38.30	-11.80	38.30		
13/03/2014		23.90m at 08:00	0	0										Light brown (7.5YR 6/4), spotted light grey, fine to coarse SAND with some angular to subangular fine gravel of highly decomposed rock fragments and shell fragments. (FILL)
39									10	39.30 39.40				
			0	0										
40														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	26/03/2014
CHECKED	Y. M. Leung
DATE	27/03/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH01
	SHEET 5 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	**DATE :** 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW									-13.50	40.00			See sheet 4 of 10
			0						11 40.40 40.50	-14.00	40.50			
		1.50m at 18:00						3,3, 3,4,3,5 N=15	12 40.60 13 40.90 40.95					Firm, dark grey (N 3), slightly sandy SILT / CLAY with occasional shell fragments. (FILL)
41 13/03/2014 14/03/2014		24.80m at 08:00								-14.90	41.40			
				89				60 blows	14 41.40 15 41.85 41.90					Greyish brown (2.5Y 5/2), dappled dark grey, slightly silty fine to coarse SAND with some angular to subangular fine gravel of highly decomposed rock fragments. (FILL)
42										-16.00	42.50			
								5,6, 4,3,3,4 N=14	16 42.60 17 42.90 42.95					Firm, dark grey (N 3), dappled greyish brown, slightly sandy SILT / CLAY with occasional subangular to subrounded fine to medium gravel of moderately decomposed rock fragments and shell fragments. (FILL)
43										-16.90	43.40			
				89				32 blows	18 43.40 19 43.85 43.90					Firm, dark grey (N 3), spotted light grey, silty CLAY with occasional shell fragments. (MARINE DEPOSIT)
44														
								4,4, 5,3,4,6 N=18	20 44.60 21 44.90 44.95 96					
45														
			50	95					22 45.40 23 46.40 46.50					
46								3,4, 4,6,4,5 N=19	24 46.60 25 46.90 46.95					
47														
			50	95					26 47.40 27 48.40 48.50					
48														
								3,3, 4,3,4,6 N=17	28 48.60 29 48.90 48.95					
49														
			50	95					30 49.40					
50														

● Disturbed sample
▥ Piston sample
▨ Split spoon sample
▨ U76 undisturbed sample
■ U100 undisturbed sample
▨ Mazier sample
▯ SPT liner sample
▲ Water sample
En Environmental Sample

↓ Standard penetration test
V In-situ vane shear test
Permeability test
Pressuremeter test
Packer Test
Acoustic or optical televiewer survey
Piezometer tip
Standpipe
Groundwater Sampling Well
Vibrating wire piezometer
Impression packer test

LOGGED	T. C. Yip
DATE	26/03/2014
CHECKED	Y. M. Leung
DATE	27/03/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH01
	SHEET 6 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	**DATE :** 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		50							-23.50	50.00			See sheet 5 of 10
51								3,3, 5,6,7,6 N=24	31 50.40 50.50 32 50.60 33 50.90 50.95					
									34 51.40	-24.90	51.40			Firm to stiff, grey (N 5), dappled light grey, silty CLAY. (ALLUVIUM)
52			50	95										
								3,4, 5,6,7,5 N=23	35 52.40 52.50 36 52.60 37 52.90 52.95					
53		1.70m at 18:00												
14/03/2014										-26.90	53.40			
15/03/2014		0.50m at 08:00							38 53.40					Firm, grey (N 5), locally dappled light grey, silty CLAY. (ALLUVIUM)
54			70	95										
								2,2, 3,4,6,5 N=18	39 54.40 54.50 40 54.60 41 54.90 54.95					
55														
									42 55.40					
56			70	95										
								3,2, 4,3,5,5 N=17	43 56.40 56.50 44 56.60 45 56.90 56.95					
57														
									46 57.40					
58			70	95										
								3,3, 3,4,6,5 N=18	47 58.40 58.50 48 58.60 49 58.90 58.95					
59														
									50 59.40					
60			70	95										

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	26/03/2014
CHECKED	Y. M. Leung
DATE	27/03/2014

REMARKS

DRILLHOLE RECORD

VIBRO

HOLE NO. TKO/FB-DH01

CONTRACT NO. : GE/2013/21

SHEET 7 **OF** 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	**DATE :** 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		70							-33.50	60.00			See sheet 6 of 10
61								3,2, 3,4,5,7 N=19	51 60.40 60.50 52 60.60 53 60.90 60.95					
62			70	95					54 61.40					
63								3,4, 5,4,7,7 N=23	55 62.40 62.50 56 62.60 57 62.90 62.95	-36.90	63.40			Light grey (N 6), silty fine SAND. (ALLUVIUM)
64		0.70m at 18:00	70	95					58 63.40					
	15/03/2014								59 64.40 64.50	-38.00	64.50			
65	17/03/2014	1.30m at 08:00						3,4, 6,5,6,7 N=24	60 64.60 61 64.90 64.95	-38.80	65.30			Firm, light grey (N 6), clayey SILT. (ALLUVIUM)
66			70	100					65.30 T2 I O I 65.77					Dark grey (N 3), subangular BOULDER sized slightly decomposed Tuff up to 350mm with some subangular to subrounded cobble sized moderately decomposed and slightly decomposed Tuff and occasional silty clay. (ALLUVIUM)
			70	57					T2 I O I 66.52					
67			70	84					T2 I O I 67.30	-40.80	67.30			
			70	100					62 67.80					Firm to stiff, light grey (N 6), slightly sandy clayey SILT with occasional subangular fine gravel of highly decomposed rock fragments. (ALLUVIUM)
68			70	78					63 67.90 T2 I O I 68.50	-41.40	67.90			Dark grey (N 3), angular to subangular BOULDER sized slightly decomposed Tuff up to 280mm with some angular to subangular cobble sized moderately decomposed and slightly decomposed Tuff. (ALLUVIUM)
									64	-42.00	68.50		V	Extremely weak, light brown, completely decomposed fine ash crystal TUFF. (SILT with occasional angular to subangular fine gravel)
69			70	50										
		0.50m at 18:00						1.07 x 10^{-6} m/sec	65 69.50 69.60 66					
	17/03/2014													
	18/03/2014	1.10m at 08:00												
70			70											

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 26/03/2014

CHECKED Y. M. Leung

DATE 27/03/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH01
	SHEET 8 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	**DATE :** 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW									-43.50	70.00		V	See sheet 7 of 10
		1.10m at 18:00	70	95					67 70.60–70.70	-44.20	70.70			
18/03/2014														
19/03/2014		23.18m at 08:00						3,15, 4,6,6,8 N=24	68 70.80				V	Extremely weak, brown, completely decomposed fine ash crystal TUFF. (Sandy SILT with occasional angular to subangular fine gravel)
71		1.80m at 18:00							69 71.10–71.15					
19/03/2014										-45.10	71.60			
20/03/2014		9.50m at 08:00												
										71.60			V	Extremely weak to very weak, brown, dappled dark brown, completely decomposed fine ash crystal TUFF. (Slightly silty fine to coarse SAND with some angular fine to coarse gravel and occasional angular cobbles)
72			60	0										
								46 bls	70 72.60–72.70					
73				0					71 73.15–73.20					
										-47.30	73.80			
74								2,2, 3,4,3,3 N=13	72 73.90				V	Extremely weak, brown, completely decomposed fine ash crystal TUFF. (Silty fine to coarse SAND with occasional angular fine gravel)
		1.30m at 18:00							73 74.20–74.25					
20/03/2014										-48.20	74.70			
21/03/2014		19.80m at 08:00							74 74.70				V	Extremely weak, light brown, dappled brown, completely decomposed fine ash crystal TUFF. (Slightly sandy SILT with occasional angular to subangular fine gravel)
75			60	95					75 75.70–75.80					
76								4,5, 5,6,10,13 N=34	76 75.90					
									77 76.20–76.25					
									78 76.70					
77			60	95										
									79 77.70–77.80					
78								4,6, 5,6,10,12 N=33	80 77.90					
									81 78.20–78.25					
									82 78.70					
79			60	95										
									83 79.70–79.80	-53.30	79.80			
80									84 79.90				V	Extremely weak, brown, completely decomposed fine ash

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
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- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	26/03/2014
CHECKED	Y. M. Leung
DATE	27/03/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH01
	SHEET 9 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	DATE : 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
21/03/2014 22/03/2014	HW	2.10m at ~~18:00~~ 21.00m at 08:00						4,4, 6,7,9,13 N=35	85 80.20 80.25	-53.50	80.00		V	crystal TUFF. (Silty fine to coarse SAND with occasional angular fine gravel)
									86 80.70	-54.20	80.70		V	Extremely weak to very weak, brown, dappled dark brown, spotted light grey, completely decomposed fine ash crystal TUFF. (Slightly silty fine to coarse SAND with some angular fine to coarse gravel)
81			70	95										
									87 81.70 81.80					
82								9,15, 20,30,50/50mm (100/200mm)	88 89 82.10 82.15					
									90 82.70					
83			70	95										
									91 83.70 83.80					
84								10,18, 25,33,42/40mm (100/190mm)	92 93 84.09 84.14					
									94 84.70	-58.20	84.70		V	Extremely weak to very weak, brown, dappled dark brown, completely decomposed fine ash crystal TUFF. (Fine to coarse SAND with much angular fine to medium gravel)
85			70	95										
22/03/2014	HW 85.55	1.58m at 18:00							95 85.45 85.55	-59.05	85.55			
24/03/2014		20.30m at 08:00	70	100	43	17	16.7		T2 I O I				III	Moderately strong, greyish brown, dappled light brown, moderately decomposed fine ash crystal TUFF. Joints are very closely to closely spaced, rough planar and rough stepped, extremely narrow, iron and manganese stained, dipping 10° to 20°, 40° to 50°, 50° to 60° and occasional 60° to 70°.
86							>20		86.15					
							15.6			-59.97	86.47			
			70	100	70	54	6.3		T2 I O I				II	Strong to very strong, dark grey, spotted light grey, slightly decomposed fine ash crystal TUFF. Joints are medium to widely spaced, locally closely spaced, rough planar, tight to extremely narrow, clean, occasional iron stained and calcite coated, dipping 10° to 20°, 40° to 50° and 50° to 60°. From 87.10m to 87.65m : Subvertical joint. From 87.65m to 88.16m : With closely spaced microfractures, dipping subvertically. From 88.16m to 88.40m : Subvertical joint.
87							12.0		87.35					
			70	100	93	84	6.5		T2 I O I					
88							3.2		88.81					
89			70	100	100	100	0.8		T2 I O I					
90														

- Disturbed sample
- Piston sample
- Split spoon sample
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- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

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REMARKS

DRILLHOLE RECORD

VIBRO

HOLE NO.	TKO/FB-DH01
CONTRACT NO. :	GE/2013/21
SHEET	10 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846362.04 N 814513.80	**DATE :** 03/03/2014 to 25/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.50 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
24/03/2014		3.10m at 18:00	70	100	100	100			T2 1 90.28				II	See sheet 9 of 10
25/03/2014		21.10m at 08:00					0.8							
91			70	100	100	100			T2 1 91.50	-63.50	90.00			
25/03/2014		5.20m at 18:00								-65.00	91.50			End of Investigation Hole at 91.50m.
92														
93														
94														
95														
96														
97														
98														
99														
100														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
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- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
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- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	26/03/2014
CHECKED	Y. M. Leung
DATE	27/03/2014

REMARKS

DRILLHOLE RECORD

HOLE NO. TKO/FB-DH03

CONTRACT NO. : GE/2013/21

SHEET 1 OF 6

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846471.51 N 814476.53	**DATE :** 04/04/2014 to 25/04/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.77 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
04/04/2014	SW								A INSPECTION PIT 0.50 B 1.00 C 1.20	+26.77 +25.57	0.00 1.20			Soft, brown (7.5YR 5/4), sandy clayey SILT with some angular to subangular fine to coarse gravel of moderately decomposed and slightly decomposed rock fragments. (FILL)
			0	75					T6-131 2.40					Grey (N 5), angular COBBLE sized slightly decomposed Granite and concrete with some angular to subangular medium to coarse gravel of moderately decomposed and slightly decomposed rock fragments, occasional brick fragments and pockets of silty fine to coarse sand. (FILL)
			0	54					T6-131 3.50					
04/04/2014		0.90m at 18:00								+23.27	3.50			
07/04/2014		Dry at 08:00	0	70					T6-131 4.30					Grey (N 5), dappled light grey and brown, sandy angular fine to coarse GRAVEL of moderately decomposed and slightly decomposed rock fragments with some angular to subangular cobble sized moderately decomposed Granite and brick, occasional angular boulder sized concrete up to 220mm and wood fragments. (FILL)
			0	56					T6-131 5.00					
			0	91					T6-131 6.10					
		2.10m at 18:00	0	83					T6-131 6.50	+20.67	6.10			Grey (N 5), dappled brown, angular COBBLE sized slightly decomposed Granite and concrete with some angular to subangular medium to coarse gravel of moderately decomposed and slightly decomposed rock fragments, occasional angular boulder sized slightly decomposed Granite up to 550mm, occasional asphalt, plastic and pockets of silty fine to coarse sand. (FILL)
07/04/2014 08/04/2014		Dry at 08:00	0	78					T6-131 7.30					
			0	83					T6-131 8.50					
			0	81					T6-131 9.20					
		3.10m at 18:00												
08/04/2014 09/04/2014		Dry at 08:00	0	68					T6-131 9.85					
			0	65										

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 26/04/2014

CHECKED Y. M. Leung

DATE 28/04/2014

REMARKS
1. An inspection pit was excavated to 1.20m.
2. A water sample was taken at 50.00m.
3. A piezometer was installed at 30.00m.
4. Piezometer buckets were installed in piezometer from 21.00m to 26.00m depth at 0.50m intervals.

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH03
	SHEET 2 OF 6

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM40	E 846471.51 N 814476.53	DATE : 04/04/2014 to 25/04/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 26.77 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	SW									+16.77	10.00			See sheet 1 of 6
			0	65					T6-131 10.60					
11			0	59					T6-131 11.40					
			0	85					T6-131 12.00					
12	SW 12.00 PW													
			0	66					T2101 12.70					
13			0	57					T2101 13.60					
			0	60					T2101 14.40					
14			0	52					T2101 15.30					
15		6.80m at 18:00												
09/04/2014														
10/04/2014		15.10m at 08:00												
			0	61					T2101 16.10					
16			0	80					T2101 16.60					
			0	80					T2101 17.00					
17				89				36 bls	1 17.45	+9.77	17.00			Grey (N 5), spotted brown and dark brown, fine to coarse SAND with some subangular fine to medium gravel of moderately decomposed rock fragments. (FILL)
								2,2, 4,6,12,15 N=37	2 17.50	+9.27	17.50			Dense, dark brown (7.5YR 3/4), clayey / silty fine to coarse SAND with some subangular fine to medium gravel of highly decomposed and moderately decomposed rock fragments. (FILL)
									3 17.60					
18									4 17.90 17.95					
										+7.87	18.90			
19			0	56					T2101 18.90					Grey (N 5), dappled brownish grey, locally dark grey, angular COBBLE sized slightly decomposed Tuff and concrete with some angular to subangular medium to coarse gravel of moderately decomposed and slightly decomposed rock fragments, asphalt fragments and occasional angular boulder sized concrete up to 320mm. (FILL)
20 10/04/2014		7.20m at 18:00							20.00					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	26/04/2014
CHECKED	Y. M. Leung
DATE	28/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH03
	SHEET 3 OF 6

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846471.51 N 814476.53	**DATE :** 04/04/2014 to 25/04/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.77 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
11/04/2014	PW	19.20m at 08:00								+6.77	20.00			See sheet 2 of 6
			50	47					T2 IOI					
21	PW 21.20 HW								21.20					
			50	51					T2 IOI					
22									22.00					
			50	53					T2 IOI					
									22.90					
23			50	55					T2 IOI					
									23.70					
24			50	64					T2 IOI					
									24.50					
			50	64					T2 IOI					
25		6.90m at 18:00							25.20					
11/04/2014 12/04/2014		23.10m at 08:00												
			50	43					T2 IOI					
26									26.25					
			50	50					T2 IOI					
27									27.30					
			50	58					T2 IOI					
28									28.50					
									T2 IOI					
29			50	59						-2.73	29.50			
		7.20m at 18:00												Grey (N 5) and dark brown (7.5YR 3/4), slightly sandy angular to subangular fine to coarse GRAVEL of moderately decomposed and slightly decomposed rock
12/04/2014 14/04/2014		23.40m							29.85					
30			50	76					T2 IOI					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
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- Piezometer tip
- Standpipe
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- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	26/04/2014
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DATE	28/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH03
	SHEET 4 OF 6

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM40	E 846471.51 N 814476.53	DATE : 04/04/2014 to 25/04/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 26.77 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW	at 08:00	50	78					T2 01 30.45	-3.23	30.00			fragments with some angular cobble sized slightly decomposed Granite and asphalt, occasional angular boulder sized slightly decomposed Granite up to 430mm and occasional wood fragments. (FILL)
31			50	60					T2 01 31.30					
32 14/04/2014		6.70m at 18:00	50	63					T2 01 32.05					
15/04/2014		23.30m at 08:00	50	63					T2 01 33.10					
33			50	56					T2 01 34.20					
34			50	50					T2 01 35.30					
35 15/04/2014		10.80m at 18:00												
16/04/2014		23.80m at 08:00	50	75					T2 01 36.10					
36			50	66					T2 01 37.20					
37			50	67					T2 01 38.40	-11.63	38.40			
38			50	80					T2 01 39.15					Grey (N 5), dappled brownish grey, angular COBBLE sized slightly decomposed Tuff and concrete with some angular to subangular fine to coarse gravel of moderately decomposed and slightly decomposed rock fragments, occasional brick and metal fragments. (FILL)
39			50	74					T2 01 39.85					
16/04/2014		6.50m at 18:00												
40 17/04/2014		24.10m	50	75					T2 01					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
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- SPT liner sample
- Water sample
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- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

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DATE	28/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH03
	SHEET 5 OF 6

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846471.51 N 814476.53	**DATE :** 04/04/2014 to 25/04/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.77 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW	at 08:00	50	78					T2 01 40.65	-13.23	40.00			See sheet 4 of 6
41			50	70					T2 01 41.80	-15.03	41.80			
42			50	66					T2 01 42.50					Grey (N 5), dappled brownish grey, slightly sandy angular to subangular fine to coarse GRAVEL of moderately decomposed rock fragments, some angular cobble sized concrete, brick fragments and occasional cloth fragments. (FILL)
43			50	59					T2 01 43.35					
44			50	42					T2 01 44.50					
17/04/2014		5.90m at 18:00								-17.73	44.50			
22/04/2014		24.30m at 08:00		89				61 bls	5					From 44.38m to 44.50m : Very stiff, dark grey (N 3), slightly sandy clayey SILT with some subangular fine to medium gravel and shell fragments.
45								3,4, 6,8,10,14 N=38	6 44.95 45.00 7 45.10 45.40 8 45.45					Very stiff, dark grey (N 3), spotted white, SILT / CLAY with some angular fine to medium gravel and shell fragments. (DISTURBED MARINE DEPOSIT)
22/04/2014		7.20m at 18:00								-18.78	45.55			
23/04/2014		24.10m at 08:00	50	100					T2 01 45.55					Dark grey (N 3), spotted grey, angular BOULDER sized slightly decomposed Tuff up to 390mm with occasional angular cobble sized slightly decomposed Tuff and pockets of silt / clay. (FILL)
46									T2 01 46.30					
47			50	62					T2 01 47.35					
48			50	57					T2 01 48.50					
23/04/2014		6.60m at 18:00								-21.73	48.50			
24/04/2014		24.10m at 08:00					NA			-21.85	48.62	1	V	Moderately strong, dark grey, spotted grey, dappled brown, moderately decomposed coarse ash crystal TUFF. Joints are very closely to closely spaced, rough stepped, narrow, iron stained, dipping 0° to 10°, 30° to 40° and subvertically.
							15.0			-22.05	48.82		III	
49			80	63	24	0	NA		T2 01 49.30	-22.23	49.00	1	V	
							NR			-22.53	49.30			
							15.4						II	From 48.50m to 48.62m : Extremely weak, brown, completely decomposed TUFF. (Slightly sandy silty CLAY with some angular fine to coarse gravel)
		5.80m at 18:00	80	100	86	65	0.5		T2 01 9 50.01					From 48.82m to 49.00m : Extremely weak, brown, completely decomposed TUFF. (Slightly sandy silty CLAY
50 24/04/2014	50.01													

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	26/04/2014
CHECKED	Y. M. Leung
DATE	28/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

HOLE NO. TKO/FB-DH03

CONTRACT NO. : GE/2013/21

SHEET 6 **OF** 6

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM40	E 846471.51 N 814476.53	**DATE :** 04/04/2014 to 25/04/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 26.77 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
25/04/2014		24.20m at 08:00								-23.23	50.00		II	with some angular fine to coarse gravel and occasional angular cobbles) From 49.00m to 49.30m : No recovery, inferred to be completely decomposed TUFF.
			80	100	100	100	0.5		T2 IOI					Strong, dark grey, spotted grey, locally streaked dark brown, slightly decomposed coarse ash crystal TUFF. Joints are medium to widely spaced, locally very closely to closely spaced, rough planar and rough stepped, very narrow to narrow, manganese and occasional iron stained, dipping 0° to 10°, 10° to 20°, 50° to 60° and occasional subvertically. From 49.30m to 49.56m : With very closely to closely spaced joints.
51									51.50					
			80	100	100	100	5.9 1.1		T2 IOI					
52									52.43					From 52.38m to 53.30m : Subvertical joint.
			80	100	91	75			T2 IOI					
53							8.7		53.06					
			80	100	95	60	2.7 9.1 3.8 12.5		T2 IOI					
54									54.54	-27.77	54.54			End of Investigation Hole at 54.54m.
25/04/2014		6.30m at 18:00												
55														
56														
57														
58														
59														
60														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 26/04/2014

CHECKED Y. M. Leung

DATE 28/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

HOLE NO. TKO/FB-DH04

CONTRACT NO. : GE/2013/21

SHEET 1 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	**DATE :** 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
03/03/2014	SW									+28.45	0.00			
									A INSPECTION PIT 0.50					Brown (7.5YR 5/4), silty fine to coarse SAND with some angular to subangular fine to coarse gravel of highly decomposed and moderately decomposed rock fragments and occasional tile fragments. (FILL)
1	SW 1.00								B 1.00	+27.45	1.00			
	HW		0	75					T2 1.60					Light grey (N 6), dappled greyish brown, angular to subangular COBBLE sized slightly decomposed Granite and concrete with some angular medium to coarse gravel of slightly decomposed rock fragments. (FILL)
			0	90					T2 2.15					
2			0	63					T2 2.80					
			0	80					T2 3.30					
3		Dry at 18:00												
03/03/2014														
04/03/2014		Dry at 08:00	0	86					T2 3.80					
			0	60					T2 4.30					
4			0	100					T2 4.50	+23.95	4.50			
			0	0					1 5.20					Dark brown (7.5YR 3/4), fine to coarse SAND with much angular to subangular fine gravel of slightly decomposed fragments and occasional angular cobble sized wood piece. (FILL)
5									5.30	+23.15	5.30			
			0	80					T2 5.80					Dark grey (N 3), dappled greyish brown and light brown, angular COBBLE sized concrete and slightly decomposed Granite and Tuff with occasional angular medium to coarse gravel of slightly decomposed rock fragments. (FILL)
			0	84					T2 6.33					
6			0	67					T2 7.00					
			0	58					T2 7.52					
7			0	84					T2 8.21					
		Dry at 18:00												
8	04/03/2014													
	05/03/2014	Dry at 08:00	0	75					T2 8.61					
			0	70					T2 9.21					
9			0	80					T2 9.71					
			0	80					T2					
10														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 02/04/2014

CHECKED Y. M. Leung

DATE 03/04/2014

REMARKS
1. An inspection pit was excavated to 1.00m.
2. A constant head permeability test was carried out from 63.00m to 64.50m.
3. A water sample was taken at 57.00m.
4. A piezometer was installed at 35.00m.
5. Piezometer buckets were installed in piezometer from 22.00m to 27.00m depth at 0.50m intervals.

DRILLHOLE RECORD

VIBRO

HOLE NO. TKO/FB-DH04

CONTRACT NO. : GE/2013/21

SHEET 2 **OF** 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	**DATE :** 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		0	80					T2 10.31	+18.45	10.00			See sheet 1 of 10
			0	80					T2 10.81					
11			0	90					T2 11.31					
			0	75					T2 11.91					
12			0	68					T2 12.50	+15.95	12.50			
05/03/2014		Dry at 18:00												
06/03/2014		Dry at 08:00	0	0					13.10					Dark grey (N 3), dappled light brown, angular to subangular medium to coarse GRAVEL of concrete and moderately decomposed rock fragments with occasional subangular cobble sized slightly decomposed Tuff. (FILL)
13									2 13.20	+15.25	13.20			
			0	76					T2 13.70					Grey (N 5), dappled light grey and dark grey, angular to subangular COBBLE sized concrete, slightly decomposed Granite and Tuff with some subangular medium to coarse gravel of moderately decomposed and slightly decomposed rock fragments and occasional brick fragments. (FILL)
14			0	64					T2 14.20					
			0	0										
15									3 15.05 15.15					
			0	69					T2 15.70					
16		Dry at 18:00	0	73					T2 16.25					
06/03/2014														
07/03/2014		Dry at 08:00	0	75					T2 16.85					
17			0	74					T2 17.31	+11.14	17.31			
			0	76					T2 18.20					Grey (N 5), dappled dark grey and reddish brown, slightly sandy angular to subangular fine to coarse GRAVEL of concrete, moderately decomposed and slightly decomposed rock fragments with occasional angular cobble sized slightly decomposed Tuff, concrete and asphalt fragments. (FILL)
18			0	80					T2 18.70					
			0	48					T2 19.50					
19			0	90					T2 20.00					
20														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 02/04/2014

CHECKED Y. M. Leung

DATE 03/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH04
	SHEET 3 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	DATE : 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW									+8.45	20.00			
														See sheet 2 of 10
		Dry at 18:00 07/03/2014	0	68					T2 20.35	+8.10	20.35			
		Dry at 08:00 08/03/2014	0	70					T2 20.50					Grey (N 5), dappled light grey and dark grey, angular to subangular COBBLE sized concrete and slightly decomposed Granite and Tuff with some angular to subangular medium to coarse gravel of concrete, moderately decomposed and slightly decomposed rock fragments. (FILL)
21									T2 21.00					
		Dry at 18:00 08/03/2014	0	60					T2 21.50					
		Dry at 08:00 10/03/2014	0	88					T2					
22									22.15					
			0	80					T2 22.70					
23			0	75					T2 23.10					
			0	58					T2 23.70					
										+4.75	23.70			
24			0	0					4 24.35 24.45					Grey (N 5), dappled light grey, slightly sandy angular to subangular medium to coarse GRAVEL of concrete, moderately decomposed and slightly decomposed rock fragments with occasional angular cobble sized slightly decomposed Tuff and brick fragments. (FILL)
			0	78					T2					
										+3.60	24.85			
25			0	76					25.00 T2 25.70					Grey (N 5), dappled dark grey and greyish brown, angular to subangular COBBLE sized concrete and slightly decomposed Granite and Tuff with occasional angular to subangular medium to coarse gravel of moderately decomposed and slightly decomposed rock fragments, occasional wood pieces and metal fragments. (FILL)
26			0	70					T2 26.30					
			0	60					T2 26.80					
27			0	0					5 27.60 27.70					From 26.80m to 27.60m : Dark brown, angular COBBLE sized wood piece.
28		2.10m at 18:00 10/03/2014	0	63					T2 28.50					
		24.10m at 08:00 11/03/2014	0	0					6 29.40 29.50					From 28.50m to 29.50m : Grey, dappled light brown, angular to subangular medium to coarse GRAVEL of slightly decomposed rock fragments.
29														
			0	78					T2					
30														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	02/04/2014
CHECKED	Y. M. Leung
DATE	03/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH04
	SHEET 4 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	DATE : 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		0	78					T2 30.27	-1.55	30.00			See sheet 3 of 10
			0	69					T2 31.00					
31 11/03/2014		1.67m at 18:00												
13/03/2014		24.31m at 08:00	0	60					T2 31.50					
13/03/2014		1.84m at												
14/03/2014		18:00												
32		24.21m at 08:00	0	60					T2 32.20					
			0	68					T2 32.60					
			0	75					T2 33.00					
33			0	65					T2 33.55	-5.10	33.55			
			0	60					T2 34.20					Grey (N 5), dappled dark grey and greyish brown, angular to subangular medium to coarse GRAVEL of concrete, brick and moderately decomposed and slightly decomposed rock fragments with some angular to subangular cobble sized concrete and moderately decomposed and slightly decomposed Tuff. (FILL)
34			0	60					T2 34.85					
14/03/2014		1.75m at 18:00												
15/03/2014		24.30m at 08:00	0	60					T2 35.35					
35			0	60					T2 35.95					
36			0	60					T2 36.50					
			0	60					T2 37.00					
37			0	60					T2 37.65					
			0	60					T2 38.20					
38			0	60					T2 38.82	-10.25	38.70			
15/03/2014		1.90m at 18:00												
17/03/2014		24.36m at 08:00	0	90					T2 39.20					Grey (N 5), dappled greyish brown and light brown, angular to subangular COBBLE sized concrete and slightly decomposed Granite and Tuff with some angular to subangular medium to coarse gravel of moderately decomposed and slightly decomposed rock fragments, concrete and occasional metal fragments. (FILL)
39			0	75					T2 40.00					
40														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	02/04/2014
CHECKED	Y. M. Leung
DATE	03/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH04
	SHEET 5 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	DATE : 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		0	81					T2 40.53	-11.55	40.00			See sheet 4 of 10
41		1.70m at 18:00	0	80					T2 41.20					
17/03/2014														
18/03/2014		24.27m at 08:00	0	78					T2 41.65	-13.20	41.65			
		1.80m at 18:00	0	70					T2 42.15					Grey (N 5), dappled dark grey and greyish brown, angular to subangular medium to coarse GRAVEL of concrete, moderately decomposed and slightly decomposed rock fragments with some angular to subangular cobble sized concrete and slightly decomposed Granite and Tuff, occasional plastic and metal fragments. (FILL)
42														
18/03/2014														
19/03/2014		23.50m at 08:00	0	75					T2 42.70					
			0	70					T2 43.15					
43			0	70					T2 43.62					
			0	70					T2 44.17					
44			0	80					T2 44.77					
		1.65m at 18:00												
19/03/2014														
20/03/2014		24.40m at 08:00	0	75					T2 45.42					
45			0	65					T2 45.94					
			0	65					T2 46.50					
46			0	80					T2 47.10					
			0	81					T2 47.72					
		1.52m at 18:00												
20/03/2014														
22/03/2014		24.71m at 08:00	0	75					T2 48.30					
47			0	80					T2 48.85					
			0	83					T2 49.45					
48			0	80					T2					
49														
50														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	02/04/2014
CHECKED	Y. M. Leung
DATE	03/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH04
	SHEET 6 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	DATE : 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW								50.05	-21.55	50.00			See sheet 5 of 10
			0	70					T2 1 01 50.60					
51			0	83					T2 1 01 51.20					
		1.85m at 18:00	0	80					T2 1 01 51.60					
22/03/2014														
24/03/2014		25.51m at 08:00												
52			0	80					T2 1 01 52.25					
			0	85					T2 1 01 52.90					
53			0	80					T2 1 01 53.50					
			0	73					T2 1 01 54.05					
54			0	95					T2 1 01	-25.95	54.40			Grey (N 5), dappled greyish brown, angular to subangular COBBLE sized concrete and slightly decomposed Granite and Tuff with some angular to subangular medium to coarse gravel of slightly decomposed rock fragments, occasional plastic and metal fragments. (FILL)
			0	78					54.70 T2 1 01 55.25					
55			0	56					T2 1 01 56.00	-27.55	56.00			
			0	0					64 57.00					Firm, grey (N 5), silty CLAY. (ALLUVIUM)
56									7 57.10					
				96				15 bls	8 57.55					
57									9 57.60					
								2,1, 2,3,2,3 N=10	10 58.20					
58									11 58.50 58.55					
									12 59.10					
59			50	100										
60														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	02/04/2014
CHECKED	Y. M. Leung
DATE	03/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH04
	SHEET 7 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	DATE : 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW									-31.55	60.00			See sheet 6 of 10 From 60.10m to 60.20m : With occasional organic matters.
24/03/2014		1.62m at 18:00						2,1, 2,3,3,3 N=11	13 60.10 60.20 14 60.30 15 60.60 60.65	-32.40	60.85			
61 25/03/2014		25.30m at 08:00	0	95					60.85 T2101					Dark grey (N 3), dappled light brown, subangular to subrounded COBBLE sized slightly decomposed Tuff with some sandy silty subangular medium to coarse gravel of moderately decomposed rock fragments. (ALLUVIUM)
									61.50	-33.05	61.50			
62			0	95					16				V	Extremely weak, light brown, completely decomposed fine ash crystal TUFF. (Sandy SILT with some angular to subangular fine gravel)
									62.50 17 62.60	-34.15	62.60			
63								6,9, 11,29,60/70mm (100/220mm)	18 62.62 19 62.92 62.97				V	Extremely weak, light brown, dappled greyish brown, completely decomposed fine ash crystal TUFF. (Slightly sandy SILT with occasional angular fine gravel)
								2.83 x 10^{-6} m/sec		-35.05	63.50			
64			0	95					20 63.50				V	Extremely weak, light brown, dappled brown, completely decomposed fine ash crystal TUFF. (Sandy SILT with some angular to subangular fine gravel)
									64.50 21 64.60 22 64.61					
65 25/03/2014 26/03/2014		1.67m at 18:00 25.47m at 08:00						6,10, 10,28,62/60mm (100/210mm)	23 64.91 64.96					
										-37.05	65.50			
66			0	95					24 65.50				V	Extremely weak, brown, dappled light brown, completely decomposed fine ash crystal TUFF. (Silty fine to coarse SAND with some angular fine gravel)
									66.50 25 66.60 26					
67								7,12, 35,65/65mm (100/140mm)	27 66.84 66.89					
									28 67.50					
68			0	95					68.50 29 68.60 30					
								8,17, 36,41,23/20mm (100/170mm)	31 68.87 68.92					
69														
									32 69.50					
70			0											

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	02/04/2014
CHECKED	Y. M. Leung
DATE	03/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

HOLE NO. TKO/FB-DH04

CONTRACT NO. : GE/2013/21

SHEET 8 **OF** 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	**DATE :** 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		0	95						-41.55	70.00		V	See sheet 7 of 10
								10,27, 44,56/25mm (100/100mm)	33 70.50 34 70.60 35 70.80 70.85	-42.15	70.60		V	Extremely weak, light brown, dappled brown, locally streaked dark grey, completely decomposed fine ash crystal TUFF. (Sandy SILT with some angular to subangular fine gravel)
71														
72			0	95					36 71.50					
		1.84m at 18:00							37 72.50 72.60					
26/03/2014 27/03/2014		24.17m at 08:00						13,24, 46,54/15mm (100/90mm)	38 39 72.79 72.84					
73														
									40 73.50					
74			0	95										
									41 74.50 74.60					
								14,29, 71,29/15mm (100/90mm)	42 74.84					
75										-47.05	75.50			
									43 75.50				V	Extremely weak, brown, spotted light grey, dappled light brown, completely decomposed coarse ash crystal TUFF. (Sandy SILT with some angular fine gravel)
76			0	95										
									44 76.50 76.60					
								50/45mm, 70,30/10mm (100/85mm)	45 76.73					
77														
									46 77.50					
78			0	95										
									47 78.50 78.60	-50.15	78.60			
								27,23/25mm, 70,30/25mm (100/100mm)	48 49 78.75 78.80				V	Extremely weak to very weak, light brown, dappled brown and greyish brown, completely decomposed coarse ash crystal TUFF. (Silty fine to coarse SAND with some angular to subangular fine gravel)
79														
									50 79.50					
80			0											

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 02/04/2014

CHECKED Y. M. Leung

DATE 03/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH04
	SHEET 9 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	DATE : 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		0	95						-51.55	80.00		V	See sheet 8 of 10
81								50/25mm, 100/45mm (100/45mm)	51 80.50 52 80.60 80.67					
82		1.74m at 18:00	0	95					53 81.50					
		27/03/2014							54 82.50 82.60					
		28/03/2014 24.51m at 08:00						50/35mm, 100/65mm (100/65mm)	55 82.70					
83									56 83.50					
84			0	95										
									57 84.50 84.60					
								50/70mm, 100/70mm (100/70mm)	58 84.74					
85									59 85.50					
86			0	95										
									60 86.50 86.60					
								50/45mm, 100/65mm (100/65mm)	61 86.71					
87														
									62 87.50	-59.05	87.50		IV	Weak to moderately weak, brown, dappled light brown and dark brown, highly decomposed coarse ash crystal TUFF with closely spaced, iron and manganese stained relict joints, dipping 0° to 10° and 30° to 40°. (Angular COBBLES with some sandy angular fine to coarse gravel)
88			0	100										
	HW 88.50								63 88.40 88.50					
		1.65m at 18:00	0	96	0	0	NA		T2	-60.25	88.70		III	Moderately strong, brown, dappled light brown and dark brown, spotted light grey, moderately decomposed coarse ash crystal TUFF. Joints are very closely spaced, locally extremely closely spaced, rough planar and rough stepped, extremely narrow, iron and manganese stained, dipping 30° to 40°, 40° to 50°, 50° to 60° and occasional 60° to 70°.
89	28/03/2014 29/03/2014	24.27m at 08:00					NI		89.00					
			70	100	6	0	>20		T2	-61.25	89.70			
									89.84				II	Strong, locally moderately strong, dark grey, spotted light
90			70	100	69	64	16.7		T2					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	02/04/2014
CHECKED	Y. M. Leung
DATE	03/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

HOLE NO. TKO/FB-DH04

CONTRACT NO. : GE/2013/21

SHEET 10 **OF** 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846429.78 N 814377.90	**DATE :** 03/03/2014 to 31/03/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 28.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
										-61.55	90.00			
			70	100	69	64	6.5						II	grey, locally dappled light brown and brown, slightly decomposed fine ash crystal TUFF. Joints are closely spaced, locally very closely and medium spaced, rough planar and rough stepped, extremely narrow to very narrow, iron and locally manganese stained, silt coated, dipping 0° to 10°, 40° to 50°, 50° to 60° and occasional 60° to 70°. From 89.70m to 90.00m : With very closely spaced microfractures, dipping 10° to 20°, 60° to 70° and 70° to 80°. From 90.60m to 91.48m : Subvertical joint.
							>20		T2 IOI					
							4.0		90.68					
91			70	100	66	39	12.5		T2 IOI					
							7.9		91.65					
										-63.41	91.86		III	
92			70	99	52	47	>20		T2 IOI	-63.81	92.26			From 91.86m to 92.26m : Moderately strong, moderately decomposed TUFF.
													II	
									92.61	-64.25	92.70			
										-64.40	92.85		III	From 92.70m to 92.85m : Moderately strong, moderately decomposed TUFF.
93			70	100	94	63	6.9		T2 IOI	-64.70	93.15		II	
		1.84m at 18:00											III	From 93.15m to 93.50m : Moderately strong, moderately decomposed TUFF.
	29/03/2014								93.45	-65.05	93.50			
	31/03/2014	24.00m at 08:00											II	
94			70	100	44	13	15.0		T2 IOI					From 93.83m to 94.57m : Subvertical joint.
							>20		94.47					
		1.71m at 18:00	70	97	67	23	11.9		T2 IOI	-66.45	94.90			From 94.47m to 94.70m : With very closely spaced microfractures, dipping 10° to 20°, 60° to 70° and 70° to 80°. From 94.90m to 95.07m : Moderately strong, moderately decomposed TUFF with closely spaced, kaolin infilled joints up to 1mm thick, dipping 40° to 50°.
95	31/03/2014								95.07	-66.62	95.07		III	End of Investigation Hole at 95.07m.
96														
97														
98														
99														
100														

- Disturbed sample
- Piston sample
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- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 02/04/2014

CHECKED Y. M. Leung

DATE 03/04/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH06
	SHEET 1 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846435.34 N 814252.83	**DATE :** 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
07/04/2014	PW								A 0.50 B 1.00 C 1.50 D 2.00	+35.96	0.00			Greyish brown (2.5Y 5/2), silty fine to coarse SAND with some angular to subangular fine to coarse gravel of moderately decomposed rock fragments. (FILL)
									INSPECTION PIT	+33.96	2.00			
			50	58					T2 1 0 1 2.60					Grey (N 5), dappled greyish brown and light brown, locally dappled dark grey, angular to subangular COBBLE sized slightly decomposed Granite and Tuff, concrete and asphalt with occasional angular medium to coarse gravel of moderately decomposed and slightly decomposed rock fragments. (FILL)
			50	50					T2 1 0 1 3.20					
			50	53					T2 1 0 1 4.00					
		Dry at 18:00	50	50					T2 1 0 1 4.70					
07/04/2014 08/04/2014		Dry at 08:00	50	50					T2 1 0 1 5.50					
			50	63					T2 1 0 1 6.10					
			50	57					T2 1 0 1 6.80					
			50	67					T2 1 0 1 7.40					
			50	50					T2 1 0 1 8.30					
		8.30m at 18:00	50	67					T2 1 0 1 9.00					From 8.75m to 8.90m : Greyish brown (2.5Y 5/2), dappled brown, silty fine to coarse SAND with some angular to subangular fine gravel of moderately decomposed rock fragments.
08/04/2014 09/04/2014		Dry at 08:00	50	53					T2 1 0 1 9.60					
			50	64					T2 1 0 1					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	12/05/2014
CHECKED	Y. M. Leung
DATE	12/05/2014

REMARKS
1. An inspection pit was excavated to 2.00m.
2. A constant head permeability test was carried out from 72.50m to 74.00m.
3. A water sample was taken at 50.00m.

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH06
	SHEET 2 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM45	E 846435.34 N 814252.83	DATE : 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	PW		50	64					T2 10.30					See sheet 1 of 10 From 10.15m to 10.30m : Greyish brown (2.5Y 5/2), dappled brown, silty fine to coarse SAND with some angular to subangular fine gravel of moderately decomposed rock fragments.
			50	84					T2 10.80					
11			50	60					T2 11.50					
12			50	64					T2 12.20					
		12.00m at 18:00	50	69					T2 12.90					
09/04/2014 13 10/04/2014		Dry at 08:00	50	67					T2 13.50					
14			50	57					T2 14.20					
			50	50					T2 15.00					
15			50	50					T2 15.70					
16			50	57					T2 16.40					
			50	60					T2 17.20					
17			50	50					T2 18.00					
18			50	80					T2 18.60					
			50	57					T2 19.30					
19		17.50m at 18:00												
10/04/2014 11/04/2014		Dry at 08:00	50	60					T2 20.00	+15.96	20.00			
20														

- Disturbed sample
- Piston sample
- Split spoon sample
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- U100 undisturbed sample
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- Water sample
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- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	12/05/2014
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DATE	12/05/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH06
	SHEET 3 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846435.34 N 814252.83	**DATE :** 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	PW		50	50					T2 IOI 20.70	+15.96	20.00			Grey (N 5), dappled greyish brown and brown, slightly sandy angular to subangular fine to coarse GRAVEL of moderately decomposed rock fragments with some angular to subangular cobble sized slightly decomposed Granite and concrete and asphalt fragments. (FILL)
21			50	54					T2 IOI 21.40					
			50	67					T2 IOI 22.00	+14.16	21.80			Grey (N 5), dappled greyish brown and dark grey, angular to subangular COBBLE sized slightly decomposed Granite and concrete with some angular fine to coarse gravel of moderately decomposed and slightly decomposed rock fragments and occasional asphalt fragments. (FILL)
22			50	54					T2 IOI 22.70					
23			50	54					T2 IOI 23.40					
			50	57					T2 IOI 24.10					
24			50	50					T2 IOI 24.80					
		10.00m at 18:00												
	11/04/2014 12/04/2014	Dry at 08:00	50	50					T2 IOI 25.50					
25			50	57					T2 IOI 26.20					
26			50	50					T2 IOI 26.90					
			50	58					T2 IOI 27.50					
27			50	57					T2 IOI 28.20					
			50	63					T2 IOI 28.80					
28			50	57					T2 IOI 29.50					
		25.00m at 18:00												
29	12/04/2014 14/04/2014	Dry at 08:00	50	63					T2 IOI					
30														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	12/05/2014
CHECKED	Y. M. Leung
DATE	12/05/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH06
	SHEET 4 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846435.34 N 814252.83	**DATE :** 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	PW								T2 1 30.10	+5.96	30.00			See sheet 3 of 10
	PW 30.54 HW	28.00m at 18:00	50	57					T2 1					
14/04/2014									30.80					
15/04/2014		Dry at 08:00	50	57					T2 1					
31									31.50					
		29.20m at 18:00	50	54					T2 1					
32 15/04/2014									32.20					
16/04/2014		29.15m at 08:00	50	57					T2 1					
33			50	67					32.90					
									T2 1					
			50	76					33.50					
34									T2 1					
			50	67					34.00					
									T2 1	+1.51	34.45			
			50	67					34.60					Grey (N 5), dappled greyish brown. brown and dark grey, slightly sandy angular to subangular fine to coarse GRAVEL of moderately decomposed and slightly decomposed rock fragments and concrete fragments with some angular cobble sized concrete and slightly decomposed Granite and Tuff, occasional wood pieces, brick and plastic fragments. (FILL)
35									T2 1					
			50	61					35.20					
									T2 1					
			50	53					35.90					
36									T2 1					
			50	71					36.60					From 36.40m to 36.60m : Angular boulder sized slightly decomposed Tuff.
37		26.50m at 18:00							T2 1					
16/04/2014									37.30					
17/04/2014		29.20m at 08:00	50	60					T2 1					
38									37.90					
			50	88					T2 1					From 38.03m to 38.30m : Angular boulder sized slightly decomposed Tuff.
									38.30					
		26.00m at 18:00	50	63					T2 1					
39 17/04/2014									39.00	-3.04	39.00			From 38.80m to 39.00m : Angular boulder sized slightly decomposed Tuff.
23/04/2014		29.25m at 08:00	50	61					T2 1					Greyish brown (2.5Y 5/2), dappled brown, grey and light brown, angular to subangular COBBLE sized concrete and slightly decomposed Granite and Tuff with some angular to subangular fine to coarse gravel of moderately decomposed and slightly decomposed rock fragments, occasional brick, tile, wood pieces and metal gragments.
									39.70					
40			50	57					T2 1					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
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LOGGED	T. C. Yip
DATE	12/05/2014
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REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH06
	SHEET 5 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846435.34 N 814252.83	**DATE :** 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		50	57					T2 01 40.40	-4.04	40.00			(FILL) See sheet 4 of 10 From 40.15m to 40.40m : Angular boulder sized slightly decomposed Granite.
41			50	60					T2 01 41.10					
		27.00m at 18:00	50	57					T2 01 41.80					
23/04/2014														
24/04/2014		29.75m at 08:00												
42			50	54					T2 01 42.50					
			50	51					T2 01 43.20					
43			50	54					T2 01 43.90					
			50	60					T2 01 44.60					
44			50	57					T2 01 45.30					
45			50	54					T2 01 46.00					
		28.00m at 18:00												
46 24/04/2014														
25/04/2014		29.20m at 08:00												
			50	54					T2 01 46.80					
47			50	53					T2 01 47.50					
			50	57					T2 01 48.20					
48			50	53					T2 01 49.00					
49			50	54					T2 01 49.70					
			50	57					47 T2 01					
50														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	12/05/2014
CHECKED	Y. M. Leung
DATE	12/05/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH06
	SHEET 6 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846435.34 N 814252.83	**DATE :** 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		50	57					T2 IOI 50.40	-14.04	50.00			See sheet 5 of 10
			50	63					T2 IOI 51.00					
51 25/04/2014		27.00m at 18:00												
26/04/2014		29.15m at 08:00	50	67					T2 IOI 51.60					
52			50	60					T2 IOI 52.30					
			50	60					T2 IOI 53.00					
53			50	62					T2 IOI 53.65					
54			50	62					T2 IOI 54.30	-18.34	54.30			
26/04/2014		27.00m at 18:00												
28/04/2014		29.15m at 08:00	50	54					T2 IOI 55.00					Grey (N 5), dappled greyish brown and light brown, slightly sandy angular to subangular fine to coarse GRAVEL of highly decomposed and slightly decomposed rock fragments with some angular to subangular cobble sized slightly decomposed Granite and concrete, occssional brick, wood pieces and metal fragments. (FILL)
55			50	69					T2 IOI 55.65					
56			50	73					T2 IOI 56.20					
			50	69					T2 IOI 56.75					
57			50	65					T2 IOI 57.40					
		25.50m at 18:00	50	75					T2 IOI 58.00					
58 28/04/2014														
29/04/2014		29.15m at 08:00	50	70					T2 IOI 58.60					
59			50	67					T2 IOI 59.20					
			50	67					T2 IOI 59.80					
60			50	86					T2 IOI					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	12/05/2014
CHECKED	Y. M. Leung
DATE	12/05/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH06
	SHEET 7 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM45	E 846435.34 N 814252.83	DATE : 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW									-24.04	60.00			See sheet 6 of 10
29/04/2014		26.50m at 18:00	50	56					T2 1 60.60					
30/04/2014		29.50m at 08:00								-24.89	60.85			
61			50	83					T2 1 61.50					Grey (N 5), spotted and mottled light grey, angular BOULDER sized slightly decomposed Granite up to 600mm. (FILL)
			50	82					T2 1 62.00					
62									1	-26.04	62.00			Firm to stiff, grey (N 5), dappled light grey, silty CLAY. (ALLUVIUM)
			50	95					2 63.00 63.10					
63								3,4, 6,5,7,10 N=28	3 63.20					
									4 63.50 63.55					
64			50	95					5 64.00					
									6 65.00 65.10					
65								4,3, 4,6,7,12 N=29	7 65.20					
									8 65.50 65.55					
66			50	95					9 66.00					
									10 67.00 67.10					
67								2,3, 5,7,7,8 N=27	11 67.20					
									12 67.50 67.55					
68										-32.04	68.00			
			50	95					13 68.00					Firm to stiff, grey (N 5), silty CLAY with occasional organic matters. (ALLUVIUM)
69									14 69.00 69.10					
								3,4, 6,6,8,11 N=31	15 69.20					
									16 69.50 69.55	-33.64	69.60			
		25.00m at	50	92					T2 1 69.60					Dark grey (N 3), spotted light grey, dappled light brown, subangular COBBLE sized slightly decomposed Tuff.
70										-34.04	70.00			

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	12/05/2014
CHECKED	Y. M. Leung
DATE	12/05/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH06
	SHEET 8 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45
MACHINE & NO.	VBM45	E 846435.34 N 814252.83	DATE : 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
30/04/2014	HW	18:00								-34.04	70.00			(ALLUVIUM)
02/05/2014		29.50m at 08:00	50	0					T2 70.10					Firm, light grey (N 6), dappled light brown, slightly clayey sandy SILT. (ALLUVIUM)
									17 70.50 70.60	-34.64	70.60			
			50	68					T2					Dark grey (N 3), dappled light brown, spotted light grey, subangular to subrounded COBBLE sized slightly decomposed Tuff with occasional angular to subangular medium to coarse gravel of moderately decomposed rock fragments. (ALLUVIUM)
71									71.00	-35.04	71.00			
			50	95					18				V	Extremely weak, brown, dappled light brown, locally spotted light grey, completely decomposed fine ash crystal TUFF. (Sandy SILT with occasional angular to subangular fine gravel)
72									19 72.00 72.10					
								5,6, 13,25,62/70mm (100/220mm)	20 72.12					
									21 72.42 72.47					
73								2.22×10^{-6} m/sec	22 73.00					
			50	95										
74									23 74.00 74.10					
		23.50m at 18:00						7,8, 14,30,56/60mm (100/210mm)	24 74.11					
02/05/2014									25 74.41 74.46					
03/05/2014		29.10m at 08:00												
75										-39.04	75.00			
			50	95					26 75.00				V	Extremely weak, light brown, dappled light grey, completely decomposed fine ash crystal TUFF with occasional iron and manganese stained relict joints, dipping 10° to 20° and 70° to 80°. (Slightly sandy SILT)
76									27 76.00 76.10					
								10,22, 48,52/65mm (100/140mm)	28 76.34					
									29 76.39					
77									30 77.00					
			50	95										
78									31 78.00 78.10					
								25,25/45mm, 100/70mm (100/70mm)	32 78.29					
79														
			50	95					33 79.00					
80		29.00m at							80.00					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	12/05/2014
CHECKED	Y. M. Leung
DATE	12/05/2014

REMARKS

DRILLHOLE RECORD

HOLE NO. TKO/FB-DH06

CONTRACT NO. : GE/2013/21

SHEET 9 **OF** 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	**E** 846435.34 **N** 814252.83	**DATE :** 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
03/05/2014	HW	18:00								-44.04	80.00		V	See sheet 8 of 10
05/05/2014		29.15m at 08:00						22,28/65mm, 100/70mm (100/70mm)	34 80.10 35 80.31					
81			50	95					36 81.00	-45.04	81.00		V	Extremely weak, brown, dappled dark brown, completely decomposed fine ash crystal TUFF. (Slightly sandy SILT with occasional angular fine gravel)
82								18,32/45mm, 100/70mm (100/70mm)	37 82.00 82.10 38 82.29					
83			50	95					39 83.00					
84		26.50m at 18:00							40 84.00 84.10	-48.14	84.10			
05/05/2014														
07/05/2014		29.20m at 08:00						27,23/35mm, 100/60mm (100/60mm)	41 84.27				V	Extremely weak to very weak, brown, dappled light brown and dark grey, completely decomposed fine ash crystal TUFF. with occasional iron and manganese stained relict joints, dipping 60° to 70° and 70° to 80°. (Sandy SILT with occasional angular fine gravel)
85			50	95					42 85.00					
86								50/70mm, 100/40mm (100/40mm)	43 86.00 86.10 44 86.21					
87			50	83					45 87.00					
	HW 87.70								46 87.60 87.70	-51.74	87.70		III	Moderately strong, locally moderately weak, light brown, dappled grey and brown, moderately decomposed fine ash crystal TUFF.
88			50	92	0	0	NI		T2 I O I	-52.14	88.10		V	Joints are extremely closely to very closely spaced, locally closely spaced, rough planar and rough stepped, extremely narrow to very narrow, iron and manganese stained, dipping 40° to 50°, 50° to 60° and 60° to 70°.
		23.00m at 18:00					NA			-52.44	88.40		III	From 88.10m to 88.40m : Extremely weak to very weak, light brown, dappled greyish brown, completely decomposed fine ash crystal TUFF. (Sandy SILT with some angular fine to medium gravel)
07/05/2014							NI		88.70					
08/05/2014		29.25m at 08:00	50	94	0	0			T2 I O I 89.03					
89							>20			-53.34	89.30			From 89.30m to 89.40m : Very weak to weak, light brown, highly decomposed fine ash crystal TUFF. (Sandy angular fine to coarse GRAVEL)
							NA			-53.44	89.40		IV	
			50	97	13	0	12.5		T2 I O I				III	
							NI							
90							13.5							

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 12/05/2014

CHECKED Y. M. Leung

DATE 12/05/2014

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH06
	SHEET 10 OF 10

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45
MACHINE & NO.	VBM45	E 846435.34 N 814252.83	**DATE :** 07/04/2014 to 10/05/2014
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 35.96 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
										-54.04	90.00			
									90.03				III	See sheet 9 of 10
							NI							
			50	98	12	0	16.7		T2 IOI	-54.66	90.62		IV	From 90.62m to 90.83m : Weak to moderately weak, grey, dappled dark grey, highly decomposed fine ash crystal TUFF, (Slightly sandy angular fine to coarse GRAVEL with occasional angular cobbles)
							NA			-54.87	90.83			
							10.0			-54.97	90.93		III	From 90.93m to 91.03m : Weak to moderately weak, grey, dappled dark grey, highly decomposed fine ash crystal TUFF, (Slightly sandy angular fine to coarse GRAVEL with occasional angular cobbles)
91							NA			-55.07	91.03		IV	
							>20		91.03				III	
			50	100	69	43	7.4		T2 IOI					locally moderately strong to strong, greyish brown, dappled light brown and grey, moderately decomposed fine ash crystal TUFF.
							>20		91.45	-55.57	91.53			
							13.3			-55.84	91.80		II	From 91.53m to 91.80m : Strong, slightly decomposed TUFF.
							>20						III	
92			50	100	53	20	14.3		T2 IOI					Joints are very closely to closely spaced, rough planar and rough stepped, extremely narrow, iron and manganese stained, dipping 10° to 20°, 40° to 50°, 50° to 60° and occasional 60° to 70°.
							>20							
							13.2			-56.49	92.45		II	
							>20		92.70					Strong, dark grey, locally spotted light grey, dappled greyish brown, slightly decomposed fine ash crystal TUFF.
93			50	97	35	11	13.2		T2 IOI					Joints are closely spaced, locally very closely spaced, occasional medium spaced, rough planar and rough stepped, tight to extremely narrow, clean, locally iron and manganese stained, dipping 10° to 20°, 40° to 50° and 50° to 60°.
		24.50m at 18:00												
	08/05/2014						>20		93.70					
	09/05/2014	29.15m at 08:00												
94			50	100	75	16	13.5		T2 IOI					
							5.0			-58.56	94.52		III	From 94.52m to 95.10m : Moderately strong, moderately decomposed TUFF.
		25.00m at 18:00												
	09/05/2014						>20		94.91					
95	10/05/2014	29.20m at 08:00								-59.14	95.10		II	
							3.8							
			50	100	83	55	15.0		T2 IOI					
96							6.9			-60.20	96.16			
		26.00m at 18:00					>20			-60.30	96.26		III	From 96.16m to 96.26m : Moderately strong, moderately decomposed TUFF.
	10/05/2014						20.0		96.36	-60.40	96.36		II	End of Investigation Hole at 96.36m.
97														
98														
99														
100														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	12/05/2014
CHECKED	Y. M. Leung
DATE	12/05/2014

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH01**

SHEET **1** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846548.53** N **814126.32**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD8**		DATE **26.11.2013** to **05.12.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+16.44** 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
26.11.2013	SW								0.00	+16.44	0.00			Brown (10YR 5/3), clayey silty fine to coarse SAND with some subangular fine to coarse gravel of rock fragments. (FILL)
									1 0.45 INSPECTION PIT					
									2 0.95					
									3 1.45 1.50	+14.94	1.50			
			80	54					T2-120 2.70					Angular to subangular, light grey (10YR 7/2) and brown (10YR 5/3), slightly clayey silty sandy fine to coarse GRAVEL and COBBLE of rock fragments and with some concrete, wood, steel, and brick fragments. (FILL)
			80	45					T2-120 4.00					
			80	35					T2-120 5.30					
26.11.2013		3.50 at 1800												
27.11.2013		Dry at 0800	0	83					T2-120 6.00					
			0	60					T2-120 6.70					
			0	60					T2-120 7.70					
			0	54					T2-120 9.00					
	SW 9.00m													
	PW		0	45					T2-120	+6.44	10.00			

- 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 **L. Zhang**

DATE **12.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

1. An inspection pit was excavated to 1.50m deep by hand tools.
2. Constant head permeability test was carried out at section from 35.50m to 37.00m.
3. Groundwater sample was taken at 45.70m.
4. A piezometer was installed with tip at 40.00m.

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH01**

SHEET **2** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846548.53** N **814126.32**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD8**		DATE **26.11.2013** to **05.12.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+16.44** 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			0	62					10.00 T2-120 11.00					As sheet 1 of 5.
12			0	45					T2-120 12.00					
27.11.2013		5.50 at 1800	0	54					T2-120 12.70					From 12.00m to 12.30m: With a boulder of moderately decomposed tuff fragment.
28.11.2013 13		8.70 at 0800	0	60					T2-120					
14			0	70					14.00 T2-120					From 13.60m to 14.00m: With a boulder of concrete fragment.
15			0	65					15.00 T2-120					
16			0	59					16.20 T2-120					
17			0	63					17.50 T2-120					
18			0	59					18.50 T2-120					
19									19.80					
28.11.2013		5.70 at 1800												
29.11.2013 20		8.70 at								-3.56	20.00			

- 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 **L. Zhang**

DATE **12.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH01**

SHEET **3** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846548.53** N **814126.32**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD8**		DATE **26.11.2013** to **05.12.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+16.44** 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
		0800												As sheet 2 of 5.
			0	75					T2-120					
21									21.00					From 21.10m to 21.30m: With a boulder of concrete fragment.
			0	62					T2-120					
22									22.20					
			0	65					T2-120					
23									23.00					
			0	58					T2-120					
24		5.90 at 1800												
29.11.2013														
30.11.2013		12.70 at 0800												
25			0	81					T2-120					
									25.50					
26			0	68					T2-120					
									26.80					
27			0	58					T2-120					
									28.00					
28			0	77					T2-120					
									29.30					
29			0	67					T2-120					
30.11.2013	PW 30.00m	5.70 at 1800								-13.56	30.00			

- 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 **L. Zhang**

DATE **12.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH01**

SHEET **4** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846548.53** N **814126.32**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD8**		DATE **26.11.2013** to **05.12.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+16.44** 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
02.12.2013	HW	15.50 at 0800												As sheet 3 of 5.
31			0	42					T2-101 30.00–31.20					
32			0	52					T2-101 31.20–32.50					
33			0	62					T2-101 32.50–33.80	-17.36	33.80			
34			0	100					5 34.80 6 34.90 7 35.30					Firm, greyish brown (15YR 5/2), clayey sandy SILT. (ALLUVIUM)
35								3,5 5,4,5,6 N=20						
36			0	100					8 35.80 9 36.80 10 36.90 11 37.12	-19.36	35.80			Very stiff, light grey (10YR 7/1) and yellowish brown (10YR 5/6), sandy very clayey SILT. (ALLUVIUM)
37		13.20 at 1800						12,18 50,50/45mm 100blS/120mm						
02.12.2013 05.12.2013		15.50 at 0800												
38			0	100					12 37.80 13 38.15	-21.36	37.80			Very stiff, dark greyish brown (10YR 4/2) and brown (10YR 5/3), sandy very clayey SILT. (ALLUVIUM)
			0	55					38.25 T2-101 38.80	-21.81	38.25			Subangular to subrounded, yellowish brown (10YR 5/8) mottled grey, slightly sandy clayey silty medium to coarse GRAVEL and occasional cobble of rock fragments. (ALLUVIUM)
39			0	60					T2-101 39.30	-22.86	39.30			
			80	0					14 39.90	-23.56	40.00		IV	Weak to moderately weak, yellowish brown (10YR 5/4), highly decomposed fine ash TUFF. (Angular, slightly silty sandy coarse GRAVEL and COBBLE of highly decomposed tuff fragments)
40	HW 40.00m													

- 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 **L. Zhang**

DATE **12.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH01**

SHEET **5** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD **ROTARY**	CO-ORDINATES E **846548.53** N **814126.32**	WORKS ORDER NO. **GE/2011/25.45A**	
MACHINE **SD8**		DATE **26.11.2013** to **05.12.2013**	
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+16.44** 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
													IV	As sheet 4 of 5.
			80	94	23	0	NI		T2-101 40.00–40.48	-23.84	40.28		III	Moderately strong, grey mottled brown, moderately decomposed fine ash TUFF. Joints are extremely closely to very closely spaced, occasionally closely and medium spaced, rough planar and rough undulating, iron and manganese oxide stained, dipping at 5 ° to 15°, 35° to 45°, 65° to 75° and subvertically from 40.28m to 40.69m, 41.10m to 41.31m, 41.80m to 42.05m, 42.22m to 42.36m, 42.68m to 42.80m, 43.07m to 43.56m, 43.59m to 43.68m, 43.77m to 44.36m, 44.90m to 45.07m and 45.52m to 45.70m.
41			80	100	52	0			T2-101 40.48–41.45					
42			80	100	63	0	>20		T2-101 41.45–42.37					
43			80	100	68	31			T2-101 42.37–43.77		43.07			
							7.0				43.50			
							18.5				43.77			
44			80	100	63	9	>20		T2-101 43.77–45.17					From 43.95m to 44.05m: Moderately weak and moderately strong.
45														
05.12.2013		14.70 at 1300	80	100	58	0		▲	T2-101 45.17–	-29.26	45.70			
46														End of hole at 45.70 m.
47														
48														
49														
50														

- 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 **L. Zhang**

DATE **12.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH02**

SHEET **1** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD **ROTARY**	CO-ORDINATES E **846597.48** N **814164.13**	WORKS ORDER NO. **GE/2011/25.45A**	
MACHINE **SD38**		DATE **04.12.2014** to **11.12.2013**	
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+13.82** 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
04.12.2013	SW								0.00	+13.82	0.00			Very pale brown (10YR 7/3), slightly sandy SILT with much angular to subangular fine to coarse gravel of rock fragments and with some concrete fragments. (FILL)
									1 INSPECTION PIT 0.45					
1									2 0.95	+12.82	1.00			Reddish yellow (5YR 6/6), slightly clayey silty fine to coarse SAND with much angular to subangular fine to coarse gravel of rock fragments and with some concrete fragments. (FILL)
									3 1.45 1.50	+12.32	1.50			
			0	93					T6-146 2.22	+11.60	2.22			Angular to subangular, grey (5YR 7/2) mottled brown, slightly sandy clayey silty fine to coarse GRAVEL and COBBLE of rock fragments and with some concrete fragments. (FILL)
2			0	79					T6-146 2.98					Angular to subangular, grey (2.5Y 6/1) mottled brown, medium to coarse GRAVEL and COBBLE of rock fragments and with some concrete fragments. (FILL)
			0	47					T6-146 4.05	+9.77	4.05			
3			0	70					T6-146 5.10					Angular to subangular, yellowish brown (10YR 5/8) mottled grey, slightly clayey silty sandy fine to coarse GRAVEL and COBBLE of rock fragments and with some concrete fragments. (FILL)
			0	70					T6-146 6.20	+7.62	6.20			
4			0	56					5 7.00 7.10	+6.72	7.10			Reddish yellow (7.5YR 6/6), clayey silty fine to coarse SAND with much angular to subangular fine to coarse gravel of rock fragments and with some concrete fragments. (FILL)
			0	52					T6-146 7.76					Angular to subangular, grey (10YR 6/1) mottled brown, slightly silty sandy fine to coarse GRAVEL and COBBLE of rock fragments and with some concrete, asphalt and refuse fragments. (FILL)
5			0	79					T6-146 8.90					
			0	65					T6-146 9.36	+4.46	9.36			
6			0	78					T6-146					Angular to subangular, reddish yellow (7.5YR 7/8), clayey silty sandy fine to coarse GRAVEL and COBBLE of rock fragments and with some refuse
7														
8														
9														
10														

- 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 **L. Zhang**

DATE **16.12.2001**

CHECKED **R. Chu**

DATE **02.01.2014**

REMARKS

1. An inspection pit was excavated to 1.50m deep by hand tools.
2. Constant head permeability test was carried out at section from 27.80m to 29.30m.
3. Groundwater sample was taken at 45.20m.
4. A piezometer was installed with tip at 35.00m.

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH02**

SHEET **2** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846597.48** N **814164.13**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD38**		DATE **04.12.2014** to **11.12.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+13.82** 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
									T6-146 10.23	+3.59	10.23			fragments. (FILL)
11		4.70 at 1800	0	89					T6-146 11.30					Angular to subangular, grey (10YR 6/1) mottled brown, slightly silty sandy fine to coarse GRAVEL and COBBLE of rock fragments and with some concrete, brick and refuse fragments. (FILL)
04.12.2013														
05.12.2013		9.50 at 0800	0	94					T6-146 11.66					
12			0	100					T6-146 12.60					
13			0	85					T6-146 13.78					
14	SW 13.78m PW		0	90					T6-146 14.50					
			0	69					T2-120 15.04					
15			0	42					T2-120 16.12					
16			0	47					T2-120 17.26					
17			0	80					T2-120 18.22					
18			0	85					T2-120 19.18					
19			0	100					T2-120 19.65					
20									T2-120	-6.18	20.00			

- 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
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- PRESSUREMETER TEST
- BOREHOLE TELEVIEWER
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED	**L. Zhang**
DATE	**16.12.2001**
CHECKED	**R. Chu**
DATE	**02.01.2014**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH02**

SHEET **3** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846597.48** N **814164.13**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD38**		DATE **04.12.2014** to **11.12.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+13.82** 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
05.12.2013		5.80 at 1800	0	75					T2-120 20.36					As sheet 2 of 5.
06.12.2013		12.10 at 0800	0	66					T2-120 21.00					
21			0	0					6 21.20 21.30					
			0	61					T2-120 21.96					
22			0	56					T2-120 22.78					
23			0	71					T2-120 23.48					
			0	63					T2-120 24.20	-10.38	24.20			
24			0	24					7 25.10 25.20	-11.38	25.20			Firm, greyish brown (2.5Y 5/2), clayey sandy SILT with some angular to subangular fine to medium gravel of rock fragments. (FILL)
25			0	54					T2-120 26.60	-12.78	26.60			Angular to subangular, grey (10YR 5/1) mottled yellowish brown, fine to coarse GRAVEL and COBBLE of rock fragments. (FILL)
06.12.2013		5.60 at 1800												
07.12.2013		14.20 at 0800	0	100					8 26.60 9 27.60 10 27.70 11 28.10	-14.78	28.60		V	Extremely weak, pale olive (5Y 6/4) spotted light grey and yellow, completely decomposed fine ash TUFF. (Very stiff, slightly sandy SILT)
27														
28								1,2 2,4,6,7 N=19						
			0	100					12 28.60 13 29.20 29.30	-15.48	29.30		IV	Weak to moderately weak, olive grey (5Y 5/2), highly decomposed fine ash TUFF. (Angular, slightly silty sandy fine to coarse GRAVEL of highly decomposed tuff fragments)
29	PW	11.50 at 1300												
07.12.2013	29.30m								T2-101 29.45	-15.63	29.45		III	
09.12.2013	HW	11.90 at 0800	0	100	53	0	20.0		14				V	Moderately strong, light grey spotted yellow, moderately decomposed fine ash TUFF. (CORESTONE)
30			0	100						-16.18	30.00			

- 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 **L. Zhang**

DATE **16.12.2001**

CHECKED **R. Chu**

DATE **02.01.2014**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH02**

SHEET **4** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD **ROTARY**	CO-ORDINATES E **846597.48** N **814164.13**	WORKS ORDER NO. **GE/2011/25.45A**	
MACHINE **SD38**		DATE **04.12.2014** to **11.12.2013**	
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+13.82** 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
									15 30.15–30.25	-16.43	30.25		V	Extremely weak, light olive grey (5Y 6/2) mottled yellow, completely decomposed fine ash TUFF. (Very stiff, slightly clayey sandy SILT)
							NI			-16.53	30.35		III–II	
31			0	95	83	72	2.7		T2-101					Strong, dark grey, slightly decomposed fine ash vitric TUFF. (CORESTONE) From 30.25m to 30.35m: Moderately weak to moderately strong and moderately decomposed.
							15.2			-17.65	31.47		III	From 31.47m to 31.80m: Moderately strong and moderately decomposed.
									16 31.80	-17.98	31.80		V	
32			0	100										Extremely weak, light yellowish brown (10YR 6/4) spotted white, completely decomposed fine ash TUFF. (Very stiff, clayey sandy SILT)
33								3,5 7,10,20,44 N=81	17 32.80 18 32.90 19 33.30					
									33.62	-19.80	33.62		IV	
			0	73	0	0	NI		T2-101	-20.15	33.97		V	Moderately weak to moderately strong, greyish brown (10YR 5/2), highly decomposed fine ash TUFF. (Angular, medium to coarse GRAVEL and COBBLE of highly decomposed tuff fragments)
34							NR		20 34.10	-20.28	34.10			
			0	96					21 34.60		34.70		IV	From 33.97m to 34.10m: No recovery, assumed to be completely decomposed TUFF.
09.12.2013		10.50 at 1800							34.70	-21.10	34.92			
10.12.2013		14.35 at 0800					NI						III	Moderately strong, grey spotted white, moderately decomposed fine ash TUFF. (CORESTONE)
35			0	72	48	25	15.6		T2-101	-21.74	35.56		V	From 35.56m to 35.90m, 36.75m to 36.88m and 37.62m to 37.83m: No recovery, assumed to be completely decomposed TUFF.
							NR			-22.08	35.90		III	
36							0.6		35.90					From 36.28m to 36.75m and 36.88m to 37.44m: Strong and slightly decomposed.
			0	87	80	61	2.1		T2-101	-22.46	36.28		II	
							NR			-22.93	36.75			From 37.44m to 37.62m: Moderately weak to moderately strong.
37									36.88	-23.06	36.88		V	
							7.1						II	
			0	78	59	53			T2-101	-23.62	37.44			
							>20			-23.80	37.62		III	
							NR		37.83	-24.01	37.83		V	
38							8.3						II	Strong, dark grey spotted white, slightly decomposed fine ash TUFF. Joints are very closely to closely spaced, occasionally medium spaced, rough planar and rough undulating, iron and manganese oxide stained, dipping at 0° to 10°, 15° to 25°, 45° to 55°, 60° to 70° and subvertically from 38.06m to 38.26m, 38.18m to 38.45m and 39.45m to 39.67m. From 38.10m to 38.90m and 40.32m to 40.45m: Moderately weak to moderately strong.
			0	100	53	28			T2-101	-24.28	38.10 38.19		III	
	HW 38.66m						>20		38.66	-25.08	38.90		II	
39			0	100	58	19			T2-101					
											39.45			
							13.8				39.74			
10.12.2013		10.40 at 1800							39.74					
11.12.2013		14.40 at							T2-101	-26.18	40.00			
40														

- 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 **L. Zhang**

DATE **16.12.2001**

CHECKED **R. Chu**

DATE **02.01.2014**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH02**

SHEET **5** of **5**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846597.48** N **814164.13**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD38**		DATE **04.12.2014** to **11.12.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+13.82** 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
		0800					3.4						II	From 40.45m to 40.77m: Moderately strong and moderately decomposed.
			0	96	62	56	>20		T2-101	-26.50	40.32		III	
									40.77	-26.95	40.77		II	From 43.25m to 43.36m: No recovery, assumed to be completely decomposed TUFF.
41							5.8							
			0	100	100	92			T2-101		41.63			
							12.5				41.87			
42									42.26					
							2.8							
43			0	93	93	93			T2-101		42.95			
							6.7			-29.43	43.25			
							NR			-29.54	43.36		V	
							4.4						II	
									43.81		43.81			
44							8.9							
			0	100	100	71			T2-101		44.26			
							3.6				44.54			
							10.7				44.82			
45		12.00 at 1800					2.6			-31.38	45.20			
11.12.2013														End of hole at 45.20 m.
46														
47														
48														
49														
50														

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- U76 SAMPLE
- PISTON SAMPLE (76mm)
- MAZIER SAMPLE
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- STANDARD PENETRATION TEST
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- PACKER TEST
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- BOREHOLE TELEVIEWER
- PIEZOMETER TIP
- STANDPIPE TIP

LOGGED **L. Zhang**

DATE **16.12.2001**

CHECKED **R. Chu**

DATE **02.01.2014**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH03**

SHEET **1** of **2**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD **ROTARY**	CO-ORDINATES E **846668.22** N **814198.72**	WORKS ORDER NO. **GE/2011/25.45A**	
MACHINE **SD37**		DATE **26.11.2013** to **28.11.2013**	
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+5.38** 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
26.11.2013	SW								0.00	+5.38	0.00			Yellowish red (5YR 5/6), sandy very clayey SILT with some subangular fine gravel of quartz and rock fragments. (FILL)
									1 0.45	+4.88	0.50			Light yellowish brown (10R 6/4), clayey silty fine to coarse SAND with some subangular fine to coarse gravel of quartz and rock fragments. (FILL)
									2 0.95					
									INSPECTION PIT					
									3 1.45	+3.88	1.50			Angular to subangular, light grey (10YR 7/1) and brownish yellow (10YR 6/6), slightly sandy COBBLE and some fine to coarse gravel of rock fragments and with some concrete fragments. (FILL)
			0	26					T2-120 2.00					
			0	14					T2-120 2.50					
			0	42					T2-120 3.00					
			0	68					T2-120 3.50					
			0	54					T2-120 4.00					
			0	52					T2-120 4.50					
26.11.2013		2.10 at 1800	0	26					T2-120 5.00					
27.11.2013		3.10 at 1200	80	44					T2-120 5.50	-0.12	5.50			
			80	17					T2-120 6.50					Angular to subangular, light brownish grey (10YR 6/2), slightly sandy fine to coarse GRAVEL and COBBLE of rock fragments. (FILL)
	SW 6.50m													
	PW		80	40					T2-120 7.50					
			80	35					T2-120 8.95					
			80	41					T2-120	-4.62	10.00			

- 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 **L. Zhang**

DATE **09.12.2013**

CHECKED **R. Chu**

DATE **16.12.2013**

REMARKS

1. An inspection pit was excavated to 1.50m deep by hand tools.
2. A groundwater sample was taken at 18.15m.
3. A piezometer was installed with tip at 12.00m.

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH03**

SHEET **2** of **2**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD **ROTARY**	CO-ORDINATES E **846668.22** N **814198.72**	WORKS ORDER NO. **GE/2011/25.45A**	
MACHINE **SD37**		DATE **26.11.2013** to **28.11.2013**	
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+5.38** 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
														As sheet 1 of 2.
	PW 10.60m		80	78					T2-120 10.00 – 10.60	-5.22	10.60		III	Moderately strong, yellowish brown, moderately decomposed fine ash TUFF. (CORESTONE)
11	HW		80	85	0	0			T2-120 11.00					
			80	92	0	0	>20		T2-120	-6.27	11.65			From 11.65m to 12.11m: Weak to moderately weak and highly decomposed. (Angular, coarse GRAVEL and COBBLE of highly decomposed tuff fragments)
12							NI		12.00	-6.73	12.11		IV	
			80	92	61	0	>20		T2-120 12.49		12.49		III	Strong, grey, slightly decomposed fine ash TUFF. Joints are very closely to closely spaced, occasionally medium spaced, rough planar and rough undulating, iron and manganese oxide stained, calcite coated, dipping at 5° to 15°, 45° to 55° 65° to 75° and subvertically from 12.11m to 12.35m, 12.49m to 12.89m, 13.10m to 13.56m, 13.56m to 13.79m, 14.91m to 15.06m, 15.17m to 15.43m, 15.56m to 15.68m, 15.80m to 15.98m, 15.98m to 16.11m, 16.50m to 16.77m and 17.69m to 17.88m.
			80	100	21	21	10.0		T2-120		12.69			
13	HW 13.10m								13.10					
			80	100	24	0	>20		T2-101					
27.11.2013		2.78 at 1800							13.68	-8.30	13.68			
28.11.2013		3.25 at 0800											II	
14			80	100	86	57	8.2		T2-101					From 12.11m to 13.68m and 14.53m to 15.40m: Moderately strong and moderately decomposed.
							>20			-9.15	14.53			
									14.77		14.65		III	
15			80	100	74	60	9.7		T2-101	-10.02	15.40			
											15.78		II	
			80	100	60	16	>20		15.78					
16							12.7		T2-101		16.18			
									16.65					
			80	100	91	77	3.8		T2-101		16.81			
17											17.61			
							13.8				17.92			
18		3.10 at 1300					0.0			-12.77	18.15			
28.11.2013														End of hole at 18.15 m.
19														
20														

- 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 **L. Zhang**

DATE **09.12.2013**

CHECKED **R. Chu**

DATE **16.12.2013**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH04**

SHEET 1 of 4

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846562.83** N **814048.84**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD38**		DATE **26.11.2013** to **30.11.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+15.28** 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
26.11.2013	SW								1 0.00 – 0.45 INSPECTION PIT; 2 0.45 – 0.95 INSPECTION PIT; 3 0.95 – 1.45 INSPECTION PIT	+15.28	0.00			Angular to subangular, greyish brown (10YR 5/2) mottled reddish yellow, slightly clayey silty sandy fine to coarse GRAVEL of rock fragments and with some brick and refuse fragments. (FILL)
										+13.78	1.50			
			0	91					1.50 T6-146 2.20					Angular to subangular, light grey (10YR 6/1) mottled brown, slightly silty sandy fine to coarse GRAVEL and COBBLE of rock fragments and with some concrete and refuse fragments. (FILL)
			0	0					4 3.20 – 5 3.30					
			0	33					6 4.20 – 4.30 T6-146					
			0	73					7 5.15					
			0	45					8 5.70 – 5.80 T6-146					
26.11.2013		2.70 at 1800												
27.11.2013		4.55 at 0800	0	68					6.36 T6-146	+8.92	6.36			
			0	71					7.20 T6-146					Angular to subangular, light grey (10YR 6/1) mottled brown, clayey silty sandy fine to coarse GRAVEL and COBBLE of rock fragments. (FILL)
			0	73						+7.52	7.76			
			0	92					9 8.00 – 10 8.50 – 8.60 T6-146					Stiff, light grey (2.5Y 7/1) mottled very pale brown, silty sandy CLAY. (FILL)
			0	75					9.00 T6-146	+6.68	8.60			Angular to subangular, light grey (10YR 7/1) mottled brown, slightly clayey silty sandy gravelly COBBLE and BOULDER of rock fragments and with some concrete, mortar and refuse fragments. (FILL)
			0	91						+5.28	10.00			

- 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 **L. Zhang**

DATE **09.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

1. An inspection pit was excavated to 1.50m deep by hand tools.
2. A groundwater sample was taken at 34.11m.
3. A piezometer was installed with tip at 25.70m.

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH04**

SHEET **2** of **4**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD **ROTARY**	CO-ORDINATES E **846562.83** N **814048.84**	WORKS ORDER NO. **GE/2011/25.45A**	
MACHINE **SD38**		DATE **26.11.2013** to **30.11.2013**	
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+15.28** 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
			0	0					10.10	+5.18	10.10			As sheet 1 of 4.
									11 10.20	+4.98	10.30			Stiff, greenish grey (5G 5/1) mottled red, slightly sandy silty CLAY. (FILL)
			0	90					T6-146 10.60					Angular to subangular, light grey (10YR 7/1) mottled brown, slightly clayey silty sandy gravelly COBBLE and BOULDER of rock fragments and with some concrete, mortar and refuse fragments. (FILL)
11			0	88					T6-146 11.28					
			0	83					T6-146 12.16					
12			0	62					T6-146 12.66					
			0	94					T6-146 13.72					
13														
			0	87					T6-146 14.62					
14														
			0	85					T6-146 15.50					
15		4.00 at 1800												
27.11.2013		5.65 at 0800												
28.11.2013			0	70					T6-146 16.06					
16			0	88					T6-146 16.90	-1.62	16.90			
	SW 16.90m								12 17.10					Angular to subangular, light grey (10YR 7/1) mottled red and brown, slightly clayey silty sandy fine to coarse GRAVEL and COBBLE rock fragments and with some concrete, brick and steel fragments. (FILL)
17	PW		0	0					17.20					
			0	80					T2-120 17.84					
18			0	94					T2-120 18.48					
			0	81					T2-120					
19									13 19.60	-4.32	19.60			
20										-4.72	20.00			Medium dense, light yellowish brown (2.5Y 6/3), clayey silty fine to coarse SAND. (FILL)

- 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 **L. Zhang**

DATE **09.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH04**

SHEET **3** of **4**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD38**	E **846562.83** N **814048.84**	DATE **26.11.2013** to **30.11.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+15.28** 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
28.11.2013		5.30 at 1800	0	90					14 20.30–20.40	-5.12	20.40			As sheet 2 of 4.
29.11.2013		6.70 at 0800							T2-120					Angular to subangular, light grey (10YR 7/1) mottled red and brown, slightly clayey silty sandy fine to coarse GRAVEL and COBBLE rock fragments and with some concrete, brick and steel fragments. (FILL)
21			0	74					21.55					
22			0	80					T2-120					
									15 22.80	-7.52	22.80			Angular to subangular, greenish grey (10G 6/1) mottled white, clayey silty sandy fine to coarse GRAVEL and COBBLE of rock fragments and with some coral fragments. (FILL)
23			0	54										
									16 23.80					
24			0	92					17 23.90					
									18 24.40	-9.22	24.50			
			0	100					24.50 T2-120					Angular to subangular, light grey (10YR 7/1) and yellowish brown (10YR 5/6), slightly clayey silty sandy fine to coarse GRAVEL and COBBLE rock fragments. (FILL)
25									25.20					
										-10.17	25.45			
			0	100	24	0	>20		T2-120	-10.34	25.62		III	Dense, light olive brown (2.5Y 5/3), clayey silty fine to coarse SAND with some angular fine to coarse gravel and occasional cobble of rock fragments. (FILL)
26							NI			-10.60	25.88		IV	
	PW 26.52m		0	100	90	90			26.22 T2-120	-11.00	26.28		II	Weak to moderately weak, light grey (2.5Y 7/1), highly decomposed fine ash TUFF. (Angular, slightly clayey silty sandy fine to coarse GRAVEL and some cobble of highly decomposed tuff fragments)
	HW								26.52 T2-120					From 25.62m to 25.88m: Moderately strong to strong and moderately decomposed. (CORESTONE)
27		8.00 at 1800	0	100	100	100	1.2							
29.11.2013 30.11.2013		14.50 at 0800							27.14 T2-120					
			0	100	100	100								Very strong, grey spotted white, slightly decomposed fine ash TUFF. Joints are medium to widely spaced, occasionally closely spaced, rough planar and rough undulating, iron and manganese oxide stained, calcite and chlorite coated, dipping at 5° to 15°, 25° to 35°, 65° to 75° and subvertically from 29.04m to 29.13m, 29.70m to 29.82m and 31.53m to 32.07m.
28									28.12 T2-120		27.91			
	HW 28.71m		0	100	100	100			28.71					
29									T2-101					
			0	100	100	94	3.0			-14.72	30.00			
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 **L. Zhang**

DATE **09.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH04**

SHEET **4** of **4**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD **ROTARY**	CO-ORDINATES E **846562.83** N **814048.84**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE **SD38**		DATE **26.11.2013** to **30.11.2013**
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+15.28** 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
31			0	100	99	88	8.8		29.97 T2-101 31.46		30.61 30.95		II	As sheet 3 of 4.
							6.5							
32			0	100	73	73	14.3		T2-101		31.72 32.07			
							7.2		32.89					
33			0	100	98	68			T2-101		33.46			
34		10.60 at 1800					2.0				33.97			
30.11.2013							0.0	▲		-18.83	34.11			End of hole at 34.11 m.
35														
36														
37														
38														
39														
40														

- 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 **L. Zhang**

DATE **09.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH05**

SHEET **1** of **3**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846689.54** N **814155.99**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD37**		DATE **03.12.2013** to **05.12.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+5.27** 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
03.12.2013	SW								0.00	+5.27	0.00			Angular to subangular, light grey (10YR 7/1), slightly clayey silty sandy fine to coarse GRAVEL and occasional cobble of rock fragments. (FILL)
									1 0.45	+4.77	0.50			Subangular, greyish brown (10YR 5/2), clayey silty sandy fine to coarse GRAVEL of rock fragments and with occasional refuse fragments. (FILL)
									2 INSPECTION PIT 0.95					
									3 1.45 1.50	+3.77	1.50			Angular to subangular, light grey (10YR 7/1) mottled brown, slightly clayey silty sandy fine to coarse GRAVEL and COBBLE of rock fragments and with some concrete and brick fragments. (FILL)
			0	79					T6-146 3.00					
			0	100					T6-146 4.00					
			0	66					T6-146 5.00					
			0	55					T6-146 6.00					
			0	50					T6-146 7.00	-0.93	6.20			Angular to subangular, light grey (10YR 7/1) mottled brown, slightly sandy fine to coarse GRAVEL and COBBLE of rock fragments. (FILL)
03.12.2013	SW 7.00m	4.50 at 1800												
04.12.2013	PW	4.10 at 0800												
			0	40					T6-146 8.20					
			0	63					T2-120 9.00					
			0	60					T2-120	-4.73	10.00			

- 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 **L. Zhang**

DATE **09.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

1. An inspection pit was excavated to 1.50m deep by hand tools.
2. A groundwater sample was taken at 21.57m.
3. A piezometer was installed with tip at 14.80m.

DRILTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH05**

SHEET **2** of **3**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD	**ROTARY**	CO-ORDINATES E **846689.54** N **814155.99**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE	**SD37**		DATE **03.12.2013** to **05.12.2013**
FLUSHING MEDIUM	**WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+5.27** 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
									10.10					As sheet 1 of 3.
11			0	59					T2-120					
									11.40					
12			0	64					T2-120					
									12.40					
13			0	54					T2-120					
									13.35					
14			0	40					T2-120					
04.12.2013		3.50 at 1800							14.50	-9.23	14.50		V	Extremely weak to very weak, light yellowish brown (10YR 5/6) mottled grey, completely decomposed fine ash TUFF. (Clayey silty fine to coarse SAND with some angular fine gravel of tuff fragments)
05.12.2013		4.20 at 0800							5					
15	PW 15.30m		70	93					15.20	-10.03	15.30			
	HW								15.30				II	Strong to very strong, grey spotted white, slightly decomposed fine ash TUFF. Joints are closely to medium spaced, occasionally very closely and widely spaced, rough planar and rough undulating, iron and manganese oxide stained, dipping at 5° to 15°, 45° to 55°, 65° to 75° and subvertically from 15.35m to 16.23m, 17.57m to 17.80m, 17.89m to 18.21m and 19.08m to 19.31m.
16	HW 16.17m		70	95	18	14	>20		T2-120					
									16.17		16.17			
17			70	100	100	96			T2-101					
							5.8		17.57					
18			70	100	97	84			T2-101					
											18.76			
19							5.5		19.11					
											19.31			
									T2-101					
20			70	100	100	100	4.9			-14.73	20.00			

- 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 **L. Zhang**

DATE **09.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

DRiLTECH

DRILLHOLE RECORD

CONTRACT NO. **GE/2011/25**

HOLE NO. **TKO/SZ-DH05**

SHEET **3** of **3**

PROJECT **Ground Investigation - New Territories East (Term Contract), Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study**

METHOD **ROTARY**	CO-ORDINATES E **846689.54** N **814155.99**	WORKS ORDER NO. **GE/2011/25.45A**
MACHINE **SD37**		DATE **03.12.2013** to **05.12.2013**
FLUSHING MEDIUM **WATER**	ORIENTATION **VERTICAL**	GROUND LEVEL **+5.27** 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		5.10 at 1800	70	100	100	100	1.4	▲	T2-101 20.59 T2-101	-16.30	20.12 21.57		II	As sheet 2 of 3.
05.12.2013														
22														End of hole at 21.57 m.
23														
24														
25														
26														
27														
28														
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 **L. Zhang**

DATE **09.12.2013**

CHECKED **R. Chu**

DATE **17.12.2013**

REMARKS

DRILLHOLE RECORD

VIBRO

	CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH02
		SHEET 1 OF 2

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	VBM53	E 846581.83 N 814575.61	DATE : 02/03/2015 to 07/03/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 5.40 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/03/2015	PW								INSPECTION PIT A 0.50 B 0.65	+5.40	0.00			Brown (7.5YR 5/4), silty fine to coarse SAND with some angular to subangular fine gravel of highly decomposed and moderately decomposed rock fragments and occasional brick fragments. (FILL)
										+4.75	0.65			
1			0	55					T2 1.30					Grey (N 5), dappled light grey, angular COBBLE sized slightly decomposed Tuff with occasional angular to subangular fine to coarse gravel of moderately decomposed rock fragments. (FILL)
	PW 1.30													
	HW		0	62					T2 1.80					
2			0	64					T2 2.30	+3.10	2.30			
		1.24m at 18:00	0	0					2.50					
02/03/2015									1 2.60	+2.80	2.60			Grey (N 5), dappled light brown, angular COBBLE sized slightly decomposed Tuff with some silty / clayey fine to coarse sand. (FILL)
03/03/2015		2.07m at 08:00	50	95					T2 3.00					Grey (N 5), dappled light grey and dark grey, angular to subangular COBBLE sized slightly decomposed Granite and Tuff with occasional angular to subangular medium to coarse gravel of moderately decomposed and slightly decomposed rock fragments. (FILL)
3			50	76					T2 3.46					
			50	100					T2 3.65					
			50	100					T2 4.01					
4	HW 4.22		50	100					T2	+1.22	4.18			
					73	73			4.33				II	Strong, grey, dappled dark grey, spotted light grey, slightly decomposed fine ash vitric TUFF. Joints are closely to medium spaced, locally very closely spaced, rough planar and rough stepped, extremely narrow to very narrow, iron and manganese stained, occasional clean, dipping 0° to 10°, 10° to 20°, 50° to 60° and 60° to 70°.
			50	100	100	91			T2 4.68					
		1.50m at 18:00	50	88	88	88			T2 5.00					
5 03/03/2015							5.2							
04/03/2015		3.20m at 08:00	50	100	92	83			T2 5.82					
6			50	95	28	0	16.0		T2	-0.82	6.22		III	From 6.22m to 6.65m : Moderately strong, moderately decomposed TUFF.
							19.0		6.46	-1.25	6.65		II	
		2.30m at 18:00	50	100	70	33			T2					
7 04/03/2015									7.06					
05/03/2015		3.21m at 08:00	30	100	88	77	8.0		T2					
							5.4		7.83					From 7.80m to 8.08m : Subvertical joint.
8			30	100	100	76	20.0		T2 8.21					
			30	100	100	78	5.7		T2 8.53					
			30	100	100	100			T2 8.94					
9		2.43m at 18:00	30	100	72	33	13.0		T2					
05/03/2015									9.33					
06/03/2015		3.22m at 08:00	30	100	89	66	9.1		T2	-4.30	9.70		III	From 9.70m to 9.85m : Moderately strong, moderately decomposed TUFF.
							>20		9.77	-4.45	9.85		II	Strong to very strong, grey, dappled dark grey, spotted light
10									T2					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	11/03/2015
CHECKED	Y. M. Leung
DATE	12/03/2015

REMARKS
1. An inspection pit was excavated to 0.65m.
2. An acoustic televiewer survey was carried out from 4.22m to 14.28m.
3. A piezometer was installed at 3.80m.
4. Piezometer buckets were installed in piezometer from 0.50m to 3.50m depth at 0.50m intervals.

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH02
	SHEET 2 OF 2

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	VBM53	E 846581.83 N 814575.61	DATE : 02/03/2015 to 07/03/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 5.40 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
			30	100	76	76	5.3		T2 01 10.23				II	grey, slightly decomposed fine ash vitric TUFF. Joints are medium spaced, locally very closely to closely spaced, rough planar and rough stepped, locally smooth planar, extremely narrow, clean, occasional iron and manganese stained and silt coated, dipping 40° to 50°, 50° to 60°, 60° to 70° and occasional 0° to 10°. From 10.23m to 10.65m : Subvertical joint. From 10.56m to 13.77m : Subvertical joint.
			30	100	90	90			T2 01 10.85					
11			30	100	100	83	2.1		T2 01 11.15					
		2.50m at 18:00	30	100	90	75			T2 01 11.82					
06/03/2015														
12 07/03/2015		3.22m at 08:00	30	100	100	93	9.5		T2 01 12.36					
			30	100	29	0	>20		T2 01 12.64					
13			30	100	100	100	1.4		T2 01 13.56					
			30	100	100	100			T2 01 13.93					
14														
		2.51m at 18:00	30	100	95	81	8.9		T2 01 14.51	-9.11	14.51			End of Investigation Hole at 14.51m.
07/03/2015														
15														
16														
17														
18														
19														
20														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	11/03/2015
CHECKED	Y. M. Leung
DATE	12/03/2015

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21		HOLE NO. TKO/FB-DH05
		SHEET 1 OF 3

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	VBM53	E 846577.62 N 814482.20	DATE : 24/01/2015 to 30/01/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 5.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
24/01/2015	SW									+5.45	0.00			
	SW 0.50								A INSPECTION PIT 0.50	+4.95	0.50			Brown (7.5YR 5/4), silty fine to coarse SAND with some angular fine to medium gravel of moderately decomposed rock fragments. (FILL)
	PW		60	66					T2 IOI 1.00					Grey (N 5), dappled greyish brown and brown, angular COBBLE sized concrete and slightly decomposed Granite, with some angular to subangular medium to coarse gravel of moderately decomposed and slightly decomposed rock fragments, occasional metal fragments, wood pieces and refuse. (FILL)
1			60	90					T2 IOI 1.50					
			60	80					T2 IOI 2.00					
2			0	90					T2 IOI 2.50					
			0	86					T2 IOI 3.00					
3	PW 3.00													
	HW		0	90					T2 IOI 3.50					
			0	64					T2 IOI 4.20					
4		0.85m at 18:00												
24/01/2015														From 4.00m to 4.20m : With angular boulder sized concrete up to 200mm.
26/01/2015		2.70m at 08:00	0	63					T2 IOI 5.00					
		0.87m at 18:00												
5 26/01/2015														From 5.00m to 5.25m : With angular boulder sized slightly decomposed Granite up to 250mm.
27/01/2015		2.73m at 08:00	30	80					T2 IOI 5.50					
			30	60					T2 IOI 6.00					
6			30	50					T2 IOI 6.30	-0.85	6.30		V	Extremely weak, brown, dappled greyish brown, spotted light grey, completely decomposed coarse ash crystal TUFF. (Very silty fine to coarse SAND with some angular fine gravel)
			30	93					1 7.30					
7								8,20, 27,20,20,23 N=90	2 7.40					
									3 7.50					
									4 7.80 7.85					
8									5 8.30					
			30	28										
9									6 9.20 9.30	-3.85	9.30		III	Moderately strong, grey, dappled greyish brown, moderately decomposed coarse ash crystal TUFF. Fractured.
			30	80	0	0	NI		T2 IOI 9.80	-4.15	9.60		V	From 9.60m to 9.80m : No recovery, inferred to be completely decomposed TUFF.
							NR		7	-4.35	9.80		V	
10														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	03/02/2015
CHECKED	Y. M. Leung
DATE	04/02/2015

REMARKS
1. An inspection pit was excavated to 0.50m.
2. An acoustic televiewer survey was carried out from 11.40m to 21.40m.
3. Piezometers were installed at 7.00m and 10.50m.
4. Piezometer buckets were installed in piezometers a) from 1.50m to 6.50m and b) from 4.00m to 10.00m depth at 0.50m intervals.

DRILLHOLE RECORD

VIBRO

	CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH05
		SHEET 2 OF 3

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	VBM53	E 846577.62 N 814482.20	DATE : 24/01/2015 to 30/01/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 5.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		30	100					8 10.45 10.55	-4.55	10.00		V	Extremely weak to very weak, brown, dappled greyish brown, completely decomposed coarse ash crystal TUFF. (Slightly silty fine to coarse SAND with some angular fine to medium gravel)
	HW 10.55									-5.10	10.55		III	Moderately strong, locally moderately weak, greyish brown, dappled brown, moderately decomposed coarse ash crystal TUFF. Joints are very closely to closely spaced, rough planar and rough stepped, very narrow, iron and manganese stained, dipping 40° to 50° and 50° to 60°.
11		1.50m at 18:00	20	88	0	0	>20 10.0		T2 I O I 11.15					
27/01/2015							>20							
28/01/2015		2.75m at 08:00	20	100	67	67	15.4		T2 I O I 11.33	-5.88	11.33		II	Strong, dark grey, spotted light grey, slightly decomposed coarse ash crystal TUFF. Joints are closely to medium spaced, locally very closely spaced, rough planar and rough stepped, occasional rough undulating, extremely narrow, clean and locally calcite coated, dipping 10° to 20°, 20° to 30°, 40° to 50°, 50° to 60° and occasional 70° to 80°.
12			20	100	83	76	3.6		T2 I O I 12.50					
13			20	100	100	72	16.0 3.7		T2 I O I 13.42					
14			20	100	82	49	14.0		T2 I O I 14.09					
			20	100	83	72	7.1		T2 I O I 14.55					From 14.45m to 15.60m : Subvertical joint.
15		2.35m at 18:00	20	100	40	27	>20		T2 I O I 15.37					
28/01/2015														
29/01/2015		2.68m at 08:00	20	100	94	94	6.2		T2 I O I 15.88					
16			20	100	97	61			T2 I O I 16.50					
			20	100	83	74	>20 6.3		T2 I O I 17.47					
17		2.36m at 18:00								-12.15	17.60			
29/01/2015														
30/01/2015		2.69m at 08:00	20	100	100	100			T2 I O I 18.23				II	Strong to very strong, dark grey, spotted light grey, slightly decomposed coarse ash crystal TUFF. Joints are widely spaced, rough planar, tight to extremely narrow, clean, dipping 30° to 40° and 40° to 50°.
18			20	100	100	100	1.1		T2 I O I 19.44					
19							12.1							
20														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	03/02/2015
CHECKED	Y. M. Leung
DATE	04/02/2015

REMARKS

DRILLHOLE RECORD

VIBRO

	CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH05
		SHEET 3 OF 3

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	VBM53	E 846577.62 N 814482.20	DATE : 24/01/2015 to 30/01/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 5.45 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
			20	100	82	73	5.4			-14.55	20.00			
										-14.72	20.17		II	See sheet 2 of 3
							13.2		T2IOI 20.60				II	Strong, dark grey, spotted light grey, slightly decomposed coarse ash crystal TUFF. Joints are closely to medium spaced, locally very closely spaced, rough planar, extremely narrow, clean and occasional calcite coated, dipping 10° to 20°, 20° to 30° and 60° to 70°.
21			20	100	77	57	2.9							
30/01/2015		2.53m at 18:00					10.2		T2IOI 21.53	-16.08	21.53			
														End of Investigation Hole at 21.53m.

22 23 24 25 26 27 28 29 30

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	03/02/2015
CHECKED	Y. M. Leung
DATE	04/02/2015

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21		HOLE NO. TKO/FB-DH07
		SHEET 1 OF 3

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	VBM53	E 846609.49 N 814308.92	DATE : 12/01/2015 to 19/01/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 5.91 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
12/01/2015	SW								A INSPECTION PIT 0.50					Brown (7.5YR 5/4), silty fine to coarse SAND with some angular to subangular fine to coarse gravel of moderately decomposed rock fragments and occasional brick fragments. (FILL)
	SW 0.70								B 0.70	+5.21	0.70			
	PW													Brown (7.5YR 5/4), dappled dark grey and grey, angular COBBLE sized slightly decomposed Granite and Tuff with occasional angular to subangular medium to coarse gravel of moderately decomposed rock fragments. (FILL)
1			50	47					T2IOI 1.30					
		0.66m at 18:00	50	50					T2IOI 2.00					
2 12/01/2015														
13/01/2015			50	70					T2IOI 2.50					
	PW 2.50								1	+3.41	2.50			
	HW													Very dense, brown (7.5YR 5/4), dappled light grey, very silty fine to coarse SAND with some angular to subangular fine gravel of moderately decomposed rock fragments. (FILL)
3			50	90										
									2 3.50 3.60					
								2,3, 5,9,17,30 N=61	3 3.70					
4									4 4.00 4.05	+1.81	4.10			
									4.10					Grey (N 5), angular to subangular COBBLE sized concrete, slightly decomposed Granite and Tuff. (FILL)
										+1.31	4.60			
			50	81					T2IOI					CONCRETE.
5									5.36	+0.55	5.36			
			50	0					5 5.70 5.80	+0.11	5.80			Soft to firm, brown (7.5YR 5/4), sandy clayey SILT with some angular to subangular fine gravel of moderately decomposed rock fragments. (FILL)
6			50	73					T2IOI 6.10					Grey (N 5), subangular COBBLE sized moderately decomposed Tuff and concrete with some sandy silt. (FILL)
									6	-0.29	6.20			
			50	95									V	Extremely weak, brown, dappled grey and light brown, completely decomposed coarse ash crystal TUFF. (Silty fine to coarse SAND with some angular fine gravel)
7									7 7.10 7.20					
								4,7, 7,12,20,27 N=66	8 7.30					
		0.75m at 18:00							9 7.60 7.65					
13/01/2015														
14/01/2015		2.89m at 08:00												
8									10 8.10					
			50	85				3.25 x 10^{-6} m/sec						
9									11 9.10 9.20	-3.29	9.20			
									12 9.21				V	Extremely weak, brown, dappled greyish brown, completely decomposed coarse ash crystal TUFF. (Very silty fine to coarse SAND with some angular fine gravel)
								20,30/70mm 26,24,50/65mm (100/215mm)	13 9.51 9.56					
10														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	20/01/2015
CHECKED	Y. M. Leung
DATE	21/01/2015

REMARKS
1. An inspection pit was excavated to 0.70m.
2. A constant head permeability test was carried out from 8.50m to 10.00m.
3. An acoustic televiewer survey was carried out from 18.53m to 28.65m.
4. Piezometers were installed at 5.70m and 12.00m.
5. Piezometer buckets were installed in piezometers a) from 0.50m to 5.00m and b) from 5.00m to 11.50m depth at 0.50m intervals.

DRILLHOLE RECORD

VIBRO

HOLE NO. TKO/FB-DH07

CONTRACT NO. : GE/2013/21

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45B
MACHINE & NO.	VBM53	E 846609.49 N 814308.92	**DATE :** 12/01/2015 to 19/01/2015
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 5.91 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		50	100					14 10.10	-4.09	10.00		V	See sheet 1 of 3
									10.40					
									15 10.50	-4.59	10.50			
			50	40	34	34	10.0			-4.79	10.70		III	Moderately strong to strong, grey, dappled brown and light brown, moderately decomposed coarse ash crystal TUFF.
							NR		T2 I O I				V	Joints are closely spaced, rough planar, very narrow, iron and manganese stained, dipping 0° to 10° and 20° to 30°.
11									11.00	-5.09	11.00			
			50	0									V	From 10.70m to 11.00m : No recovery, inferred to be completely decomposed TUFF.
									16 11.40					
									11.50	-5.59	11.50			
			50	60	0	0	NI			-5.83	11.74		III	Extremely weak, brown, completely decomposed coarse ash crystal TUFF. (Silty fine to coarse SAND with some angular fine gravel)
							NR		T2 I O I				V	
12		2.75m at 18:00	50	0						-5.99	11.90		V	Moderately strong, locally moderately weak, greyish brown, dappled brown, moderately decomposed coarse ash crystal TUFF.
	14/01/2015								11.90					
	15/01/2015	2.96m at 08:00	60	50	13	0	>20		17 12.10					
							NR		12.20	-6.29	12.20			
									T2 I O I	-6.49	12.40		III	Fractured.
													V	From 11.74m to 11.90m : No recovery, inferred to be completely decomposed TUFF.
	HW 12.90		60	0					12.60	-6.69	12.60			
									18 12.80				V	Extremely weak, brown, dappled greyish brown, completely decomposed coarse ash crystal TUFF. (Silty fine to coarse SAND with some angular fine gravel)
13									12.90	-6.99	12.90			
							>20			-7.15	13.06		II	
			60	67	41	41	NR			-7.35	13.26		V	
									T2 I O I				II	Moderately strong, grey, dappled brown, moderately decomposed coarse ash crystal TUFF.
							4.0		13.51					Fractured.
			60	97	64	34	10.3		T2 I O I	-8.04	13.95			From 12.40m to 12.60m : No recovery, inferred to be completely decomposed TUFF.
14		2.76m at 18:00											III	Extremely weak to very weak, greyish brown, dappled brown, completely decomposed coarse ash crystal TUFF. (Silty fine to coarse SAND with some angular fine to medium gravel)
	15/01/2015								14.21	-8.39	14.30			
	16/01/2015	2.98m at 08:00	60	98	41	16	NI			-8.69	14.60		II	Strong, grey, locally dappled light brown and brown, slightly decomposed coarse ash crystal TUFF.
							13.3		T2 I O I	-8.87	14.78		III	Joints are closely to medium spaced, locally very closely spaced, rough planar, locally rough stepped, extremely narrow and locally very narrow, iron and manganese stained, occasional clean, dipping 0° to 10°, 10° to 20°, 50° to 60° and occasional 40° to 50°
							>20		14.82	-9.09	15.00		II	
15										-9.29	15.20		III	From 13.06m to 13.26m : No recovery, inferred to be completely decomposed TUFF.
			60	93	58	33	9.5						II	From 13.95m to 14.30m : Moderately strong, moderately decomposed TUFF.
									T2 I O I					From 14.60m to 14.78m : Moderately strong, moderately decomposed TUFF.
16									16.02					From 15.00m to 15.20m : Moderately strong, moderately decomposed TUFF.
							2.9							
							15.0							From 16.82m to 17.21m : Subvertical joint.
			60	100	84	62	4.0		T2 I O I					
							12.5							
17									17.21					
							4.5							
			60	70	61	45	13.5			-11.87	17.78		III	From 17.78m to 18.13m : Moderately strong, moderately decomposed TUFF.
18									T2 I O I	-12.22	18.13		V	From 18.13m to 18.53m : No recovery, inferred to be completely decomposed TUFF.
							NR							
									18.53	-12.62	18.53		II	Strong, dark grey, locally dappled grey and brown, slightly decomposed coarse ash crystal TUFF.
			60	100	85	64	10.3		T2 I O I					Joints are closely to medium spaced, locally very closely spaced, rough planar and rough stepped, extremely narrow and locally very narrow, iron and manganese stained, occasional clean, dipping 0° to 10°, 10° to 20°, 40° to 50°, 50° to 60°, occasional 60° to 70° and 70° to 80°.
19									19.05					
		2.78m at 18:00	60	100	62	52			T2 I O I					
	16/01/2015								19.74					
	17/01/2015	2.98m at							T2 I O I					
20														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 20/01/2015

CHECKED Y. M. Leung

DATE 21/01/2015

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/FB-DH07
	SHEET 3 OF 3

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	VBM53	E 846609.49 N 814308.92	DATE : 12/01/2015 to 19/01/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 5.91 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
		08:00								-14.09	20.00		II	See sheet 2 of 3
			60	100	96	84	3.8		T2 01					
									20.82					
21			60	100	85	0	19.2		T2 01					
									21.08					
			60	100	94	86	8.7		T2 01					
22														
		2.85m at 18:00												
	17/01/2015													
	19/01/2015	3.19m at 08:00	60	100	100	100			T2 01					
									22.27					
									22.79					
23			60	100	100	100	3.1		T2 01					
									23.76					
24														
			60	100	74	69			T2 01	-18.35	24.26		III	
							>20			-18.54	24.45		II	From 24.26m to 24.45m : Moderately strong, moderately decomposed TUFF.
							9.4							
									24.77					
25			60	100	100	84	3.6		T2 01					
									25.32					
			60	100	100	83	10.7		T2 01	-19.59	25.50		III	From 25.50m to 26.00m : Moderately strong, moderately decomposed TUFF.
26														
									26.07	-20.09	26.00			
										-20.16	26.07		II	
										-20.26	26.17		III	From 26.07m to 26.17m : Moderately strong, moderately decomposed TUFF.
			60	96	65	65	4.8		T2 01				II	
							>20		26.61	-20.74	26.65		III	From 26.50m to 26.65m : With some gravelly sandy silt infilled joints up to 15mm thick, dipping 50° to 60°.
										-20.94	26.85		II	From 26.65m to 26.85m : Moderately strong, moderately decomposed TUFF.
27							6.7							From 26.85m to 27.20m : Subvertical joint.
			60	96	66	53			T2 01					
28							3.1		27.98					
			60	100	100	100			T2 01					
		3.11m at 18:00												
	19/01/2015								28.85	-22.94	28.85			
29														End of Investigation Hole at 28.85m.
30														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	20/01/2015
CHECKED	Y. M. Leung
DATE	21/01/2015

REMARKS

DRILLHOLE RECORD

HOLE NO. TKO/NT-DH01

CONTRACT NO. : GE/2013/21

SHEET 1 OF 2

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	**CO-ORDINATES**	**W. O. NO.** GE/2013/21.45B
MACHINE & NO.	HD24	E 846742.78 N 814485.34	**DATE :** 14/03/2015 to 19/03/2015
FLUSHING MEDIUM	Water	**ORIENTATION** Vertical	**GROUND LEVEL** + 68.65 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
14/03/2015	HW									+68.65	0.00			
									A INSPECTION PIT 0.50					Firm, brown (7.5YR 5/4), slightly sandy clayey SILT with occasional subangular to subrounded fine gravel of highly decomposed rock fragments. (COLLUVIUM)
		0.50m at 18:00							B 0.90	+67.73	0.92			
1 14/03/2015									0.92					
16/03/2015		Dry at 08:00	70	100					T2 1.42					Dark grey (N 3), spotted light grey, subangular BOULDER sized slightly decomposed Tuff up to 570mm. (COLLUVIUM)
			70	100					T2 1.60					
2			70	95					T2					
									1 2.20	+66.45	2.20		VI	Firm, brown, dappled reddish brown, slightly sandy SILT. (RESIDUAL SOIL)
			70	50										
3		2.50m at 18:00							2 3.20					
16/03/2015									3.30	+65.35	3.30			
17/03/2015		Dry at 08:00							3				V	Extremely weak, reddish brown, spotted light grey, completely decomposed fine ash vitric TUFF. (Slightly sandy SILT with occasional angular to subangular fine gravel)
4			70	86					4.30					
									4 4.40					
5			70	95					5					
									5.40					
6			70	95					6 5.50					
									7					
7			70	95					6.50					
									8 6.60					
									9					
8			70	95					7.60					
									10 7.70					
									11					
		7.30m at 18:00							8.70					
17/03/2015									12 8.80					
9 18/03/2015		Dry at 08:00							13					
			70	95					9.80					
									14 9.90	+58.75	9.90			
10									15					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED T. C. Yip

DATE 19/03/2015

CHECKED Y. M. Leung

DATE 20/03/2015

REMARKS
1. An inspection pit was excavated to 0.90m.
2. A constant head permeability test was carried out from 13.50m to 15.00m.
3. Piezometers were installed at 3.00m and 14.50m.
4. Piezometer buckets were installed in piezometers a) from 0.50m to 2.50m and b) from 5.00m to 14.00m depth at 0.50m intervals.

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/NT-DH01
	SHEET 2 OF 2

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	HD24	E 846742.78 N 814485.34	DATE : 14/03/2015 to 19/03/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 68.65 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW		70	95						+58.65	10.00		V	Extremely weak, greyish brown, dappled brown, completely decomposed fine ash vitric TUFF with occasional iron and manganese stained relict joints, dipping 10° to 20° and 20° to 30°. (Slightly sandy SILT with occasional angular to subangular fine gravel)
11			70	95					16 10.90 17 11.00					
12			70	95					18 12.00 19 12.10					
13			70	95				1.50 x 10^{-6} m/sec	20 13.10 21 13.20					
14		13.50m at 18:00							22 14.20 14.30					
18/03/2015														
19/03/2015		Dry at 08:00												
15 19/03/2015	HW 15.00	14.50m at 18:00								+53.65	15.00			End of Investigation Hole at 15.00m.
16														
17														
18														
19														
20														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	19/03/2015
CHECKED	Y. M. Leung
DATE	20/03/2015

REMARKS

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21		HOLE NO. TKO/NT-DH02
		SHEET 1 OF 2

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	HD24	E 846754.22 N 814360.66	DATE : 02/03/2015 to 09/03/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 78.98 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/03/2015	HW	Dry at 18:00 02/03/2015	75	100					A 0.30	+78.98 +78.68	0.00 0.30			Firm to stiff, dark brown (7.5YR 3/4), sandy SILT with some subangular fine to medium gravel of highly decomposed rock fragments. (TOP SOIL / COLLUVIUM)
03/03/2015		Dry at 18:00 03/03/2015	85	100	80	80	6.3		T2 0.50	+78.48	0.50		II	Dark grey (N 3), dappled dark brown, subangular COBBLE sized slightly decomposed Tuff with some silty sandy subangular medium to coarse gravel of moderately decomposed rock fragments and occasional rootlets. (COLLUVIUM)
04/03/2015		Dry at 08:00	85	100	48	48	NA		T2 0.85	+78.00	0.98		V	Strong, locally moderately strong, dark grey, spotted light grey, slightly decomposed fine ash vitric TUFF. Joints are closely to medium spaced, rough planar, very narrow, iron and manganese stained, dipping 50° to 60° and subvertically.
1			80	88					1 1.10					
2		0.75m at 18:00 04/03/2015							2 2.10 2.20	+76.78	2.20			Extremely weak to very weak, light brown, dappled reddish brown, completely decomposed fine ash vitric TUFF. (Slightly sandy SILT with occasional subangular cobbles)
06/03/2015		Dry at 08:00	70	100	79	64	5.7		T2 2.48	+76.43	2.55		II	Strong, dark grey, spotted light grey, slightly decomposed fine ash vitric TUFF. Joints are closely spaced, rough planar, extremely narrow, iron stained, dipping 40° to 50° and 50° to 60°.
3			70	94	7	0	NA		T2 3.20	+75.78	3.20		IV	Very weak to weak, reddish brown, dappled light brown, highly decomposed fine ash vitric TUFF. (Angular to subangular COBBLES with some slightly sandy silty angular fine to coarse gravel)
4			70	94				3.66 x 10^{-6} m/sec	3 4 4.20				V	Extremely weak, light brown, dappled reddish brown, completely decomposed fine ash vitric TUFF. (Slightly sandy SILT with occasional angular fine gravel)
5		3.50m at 18:00 06/03/2015	70	100					5 4.30 6 5.30					
07/03/2015		Dry at 08:00							5.40 7					
6			70	94					8 6.40 6.50	+72.48	6.50			
7			70	95					9 7.50				V	Extremely weak, locally very weak, light brown, dappled pinkish brown, completely decomposed fine ash vitric TUFF. (Slightly sandy SILT with occasional angular fine gravel)
8			70	91					10 7.60 11 8.60					
9		7.30m at 18:00 07/03/2015	70	100					12 8.70 13 9.70					
10		9.60m 09/03/2015							14 9.80 15					

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	11/03/2015
CHECKED	Y. M. Leung
DATE	12/03/2015

REMARKS
1. An inspection pit was excavated to 0.90m.
2. A constant head permeability test was carried out from 4.00m to 5.50m.
3. Piezometers were installed at 2.70m and 14.80m.
4. Piezometer buckets were installed in piezometers a) from 0.50m to 2.50m and b) from 5.00m to 14.00m depth at 0.50m intervals.

DRILLHOLE RECORD

VIBRO

CONTRACT NO. : GE/2013/21	HOLE NO. TKO/NT-DH02
	SHEET 2 OF 2

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	HD24	E 846754.22 N 814360.66	DATE : 02/03/2015 to 09/03/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 78.98 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
	HW	at 08:00	70	95						+68.98	10.00		V	See sheet 1 of 2
11									16 10.80 17 10.90					
			70	46										
12									18 11.90 12.00	+66.98	12.00		V	Extremely weak to very weak, light brown, dappled brown, completely decomposed fine ash vitric TUFF. (Slightly sandy SILT with occasional angular fine to medium gravel)
			70	95					19					
13									20 13.00 13.10 21					
			70	95										
14									22 14.10 14.20					
15 09/03/2015	HW 15.00	8.50m at 18:00								+63.98	15.00			End of Investigation Hole at 15.00m.
16														
17														
18														
19														
20														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
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- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	11/03/2015
CHECKED	Y. M. Leung
DATE	12/03/2015

REMARKS

DRILLHOLE RECORD

VIBRO

	CONTRACT NO. : GE/2013/21	HOLE NO. TKO/NT-DH03
		SHEET 1 OF 2

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	VBM53	E 846608.74 N 814471.87	DATE : 04/02/2015 to 10/02/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 10.53 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
04/02/2015	HW		50	100					T2 0.00	+10.53	0.00			Dark grey (N 3), spotted light grey, subangular BOULDER sized slightly decomposed Tuff up to 900mm. (COLLUVIUM)
									T2 0.90	+9.63	0.90			
1			50	0					1 1.05					Soft to firm, brown (7.5YR 5/4), slightly sandy clayey SILT with occasional subangular fine to medium gravel of moderately decomposed rock fragments. (COLLUVIUM)
									1 1.15	+9.38	1.15			
			50	88					T2 1.47	+8.98	1.55		II	Greyish brown (2.5Y 5/2), dappled brown, subangular to subrounded COBBLE sized moderately decomposed Tuff with occasional silty subangular to subrounded medium to coarse gravel of moderately decomposed rock fragments. (COLLUVIUM)
2			50	100	58	36	2.9		T2	+8.47	2.06		IV	Strong, dark grey, locally dappled light brown, slightly decomposed fine ash vitric TUFF.
							12.5		2.36					Joints are closely to medium spaced, rough planar, very narrow, iron and manganese stained, dipping 20° to 30°.
		1.51m at 18:00	50	100	0	0	NA		T2 2.63	+7.90	2.63			
04/02/2015			50	100	70	70	7.1		T2 2.83	+7.76	2.77		II	
06/02/2015		2.80m at 08:00					NA			+7.66	2.87		IV	Weak to moderately weak, locally moderately strong, greyish brown, dappled light brown and grey, highly decomposed fine ash vitric TUFF. (Subangular COBBLES with some silty subangular medium to coarse gravel)
3							NI						II	
			20	97	57	52	3.1		T2	+7.21	3.32			
							NA		3.45	+7.08	3.45		IV	Strong, dark grey, dappled light brown and brown, slightly decomposed fine ash vitric TUFF.
			20	93	93	93			T2				II	Joints are closely to medium spaced, rough planar and rough stepped, extremely narrow to very narrow, iron and manganese stained, dipping 10° to 20° and 20° to 30°.
4							1.9		3.85					From 2.77m to 2.87m : Weak to moderately weak, highly decomposed TUFF. (Silty sandy angular to subangular fine to coarse GRAVEL with occasional subangular cobbles)
			20	95	87	87			T2					From 3.32m to 3.45m : Weak to moderately weak, highly decomposed TUFF. (Silty sandy angular to subangular fine to coarse GRAVEL with occasional subangular cobbles)
		2.10m at 18:00												
06/02/2015							4.7		4.95					Strong, dark grey, spotted light grey, slightly decomposed fine ash vitric TUFF.
07/02/2015		4.13m at 08:00	20	100	87	58			T2 5.47					Joints are very closely to closely spaced, locally medium spaced, rough planar and rough stepped, extremely narrow to very narrow, occasional rough undulating, iron and manganese stained, occasional silt coated, dipping 10° to 20°, 40° to 50°, 50° to 60° and occasional 60° to 70°.
			20	93	46	15			T2	+4.71	5.82		III	From 5.82m to 6.30m : Moderately strong, moderately decomposed TUFF.
6	HW 6.25						11.4		6.27	+4.23	6.30		II	
			20	91	73	37			T2					
7									7.02					
			20	91	83	83	6.2		T2					
									7.55					
8			20	97	72	45			T2					
							4.0		8.47					
							12.1		T2	+1.73	8.80			
			20	100	68	49			9.00				II	
9														Strong to very strong, dark grey, spotted light grey, slightly decomposed fine ash vitric TUFF.
			20	100	100	100	2.0		T2					Joints are medium to widely spaced, rough planar and rough stepped, extremely narrow, clean, iron and occasional manganese stained, dipping 10° to 20°, 40° to 50° and 50° to 60°.
10														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	13/02/2015
CHECKED	Y. M. Leung
DATE	16/02/2015

REMARKS
1. A piezometer was installed at 3.00m.
2. An acoustic televiewer survey was carried out from 6.25m to 13.60m.
3. Piezometer buckets were installed in piezometer from 0.50m to 2.50m depth at 0.50m intervals.

DRILLHOLE RECORD

VIBRO

	CONTRACT NO. : GE/2013/21	HOLE NO. TKO/NT-DH03
		SHEET 2 OF 2

PROJECT Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

METHOD	Rotary	CO-ORDINATES	W. O. NO. GE/2013/21.45B
MACHINE & NO.	VBM53	E 846608.74 N 814471.87	DATE : 04/02/2015 to 10/02/2015
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL + 10.53 mPD

Drilling Progress	Casing Depth/Size	Water Level (m) Shift start / end	Flush Returns %	T C R %	S C R %	R Q D %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
		4.18m at 18:00								+0.53	10.00		II	From 9.95m to 10.25m : With very closely spaced microfractures, dipping 50° to 60°.
07/02/2015									T2 1 10.33					
09/02/2015		5.18m at 08:00					13.6							
11			20	100	97	92			T2 1					
									11.77					
12							1.5							
			20	100	100	100			T2 1					
13		4.25m at 18:00												
09/02/2015									13.18					
10/02/2015		5.16m at 08:00							T2 1					
		4.42m at 18:00	20	100	100	93	5.3		13.77	-3.24	13.77			
14														End of Investigation Hole at 13.77m.
15														
16														
17														
18														
19														
20														

- Disturbed sample
- Piston sample
- Split spoon sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- SPT liner sample
- Water sample
- En Environmental Sample
- Standard penetration test
- V In-situ vane shear test
- Permeability test
- Pressuremeter test
- Packer Test
- Acoustic or optical televiewer survey
- Piezometer tip
- Standpipe
- Groundwater Sampling Well
- Vibrating wire piezometer
- Impression packer test

LOGGED	T. C. Yip
DATE	13/02/2015
CHECKED	Y. M. Leung
DATE	16/02/2015

REMARKS

APPENDIX D

DRILLHOLE COREBOX PHOTOGRAPHS

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

惠保(香港)有限公司
VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH02

Box No.: 1 of 6

Depth : 0.00 m to 4.01 m

Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO 惠保(香港)有限公司
VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21
Ground Investigation - New Territories East (Term Contract)
Works Order No.: GE/2013/21.45B
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH02
Box No.: 2 of 6
Depth : 4.01 m to 6.46 m
Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO 惠保(香港)有限公司
VIBRO (H.K.) LIMITED
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CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH02

Box No.: 3 of 6

Depth : 6.46 m to 8.94 m

Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
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VIBRO 惠保(香港)有限公司
VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21
Ground Investigation - New Territories East (Term Contract)
Works Order No.: GE/2013/21.45B
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH02
Box No.: 4 of 6
Depth : 8.94 m to 11.15 m
Date of Photograph : 20-03-2015

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CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH02

Box No.: 5 of 6

Depth : 11.15 m to 13.56 m

Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO (H.K.) LIMITED
惠保(香港)有限公司
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

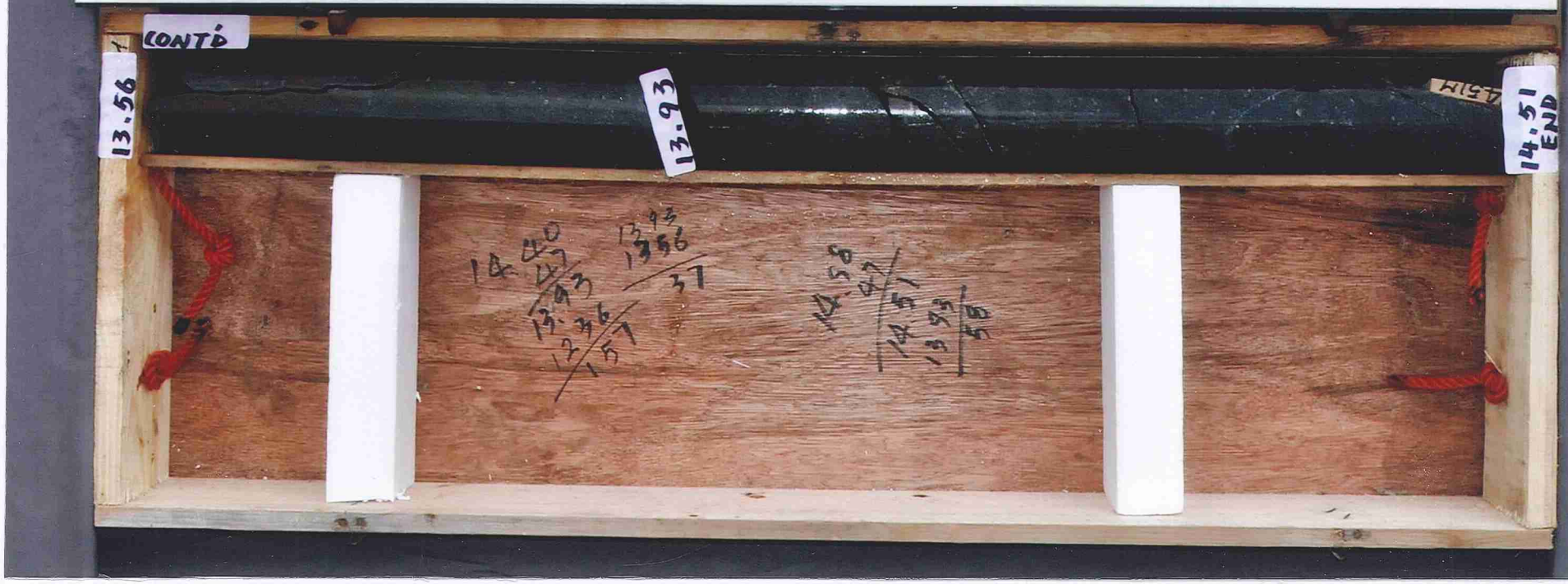
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH02

Box No.: 6 of 6

Depth : 13.56 m to 14.51 m

Date of Photograph : 20-03-2015



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VIBRO (H.K.) LIMITED
惠保(香港)有限公司
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH05

Box No.: 1 of 7

Depth : 0.00 m to 3.50 m

Date of Photograph : 21-03-2015

GEOTECHNICAL ENGINEERING OFFICE
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VIBRO (H.K.) LIMITED
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CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH05

Box No.: 2 of 7

Depth : 3.50 m to 10.55 m

Date of Photograph : 21-03-2015

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CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH05

Box No.: 3 of 7

Depth : 10.55 m to (13.04) m

Date of Photograph : 21-03-2015

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VIBRO 惠保(香港)有限公司
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CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

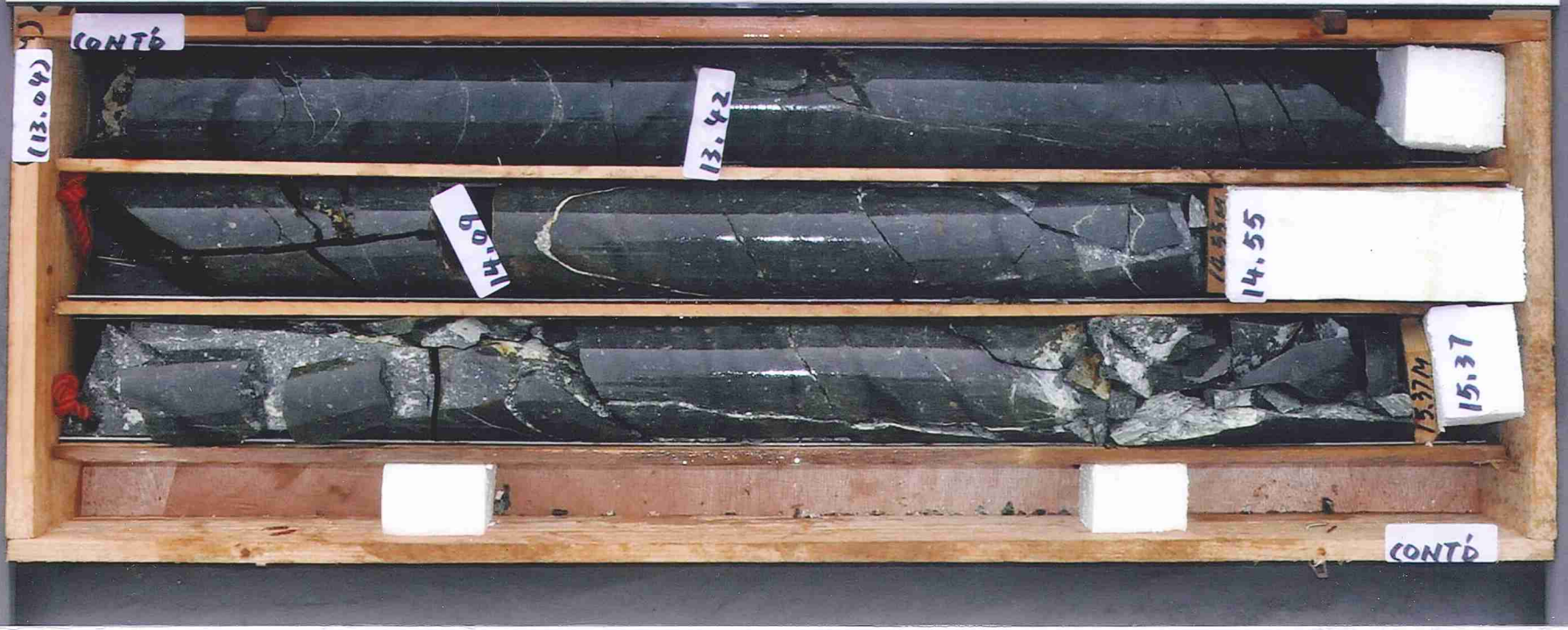
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH05

Box No.: 4 of 7

Depth : (13.04) m to 15.37 m

Date of Photograph : 21-03-2015



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VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH05

Box No.: 5 of 7

Depth : 15.37 m to 17.47 m

Date of Photograph : 21-03-2015

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CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH05

Box No.: 6 of 7

Depth : 17.47 m to (19.99) m

Date of Photograph : 21-03-2015

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VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH05

Box No.: 7 of 7

Depth : (19.99) m to 21.53 m

Date of Photograph : 21-03-2015

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新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21
Ground Investigation - New Territories East (Term Contract)
Works Order No.: GE/2013/21.45B
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH07
Box No.: 1 of 8
Depth : 0.00 m to 5.36 m
Date of Photograph : 21-03-2015

GEOTECHNICAL ENGINEERING OFFICE
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CEDD Contract No. : GE/2013/21
Ground Investigation - New Territories East (Term Contract)
Works Order No.: GE/2013/21.45B
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH07
Box No.: 2 of 8
Depth : 5.36 m to 12.60 m
Date of Photograph : 21-03-2015

GEOTECHNICAL ENGINEERING OFFICE
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VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21
Ground Investigation - New Territories East (Term Contract)
Works Order No.: GE/2013/21.45B
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH07
Box No.: 3 of 8
Depth : 12.60 m to (15.91) m
Date of Photograph : 21-03-2015

GEOTECHNICAL ENGINEERING OFFICE
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CEDD Contract No. : GE/2013/21
Ground Investigation - New Territories East (Term Contract)
Works Order No.: GE/2013/21.45B
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH07
Box No.: 4 of 8
Depth : (15.91) m to 18.53 m
Date of Photograph : 21-03-2015

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新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

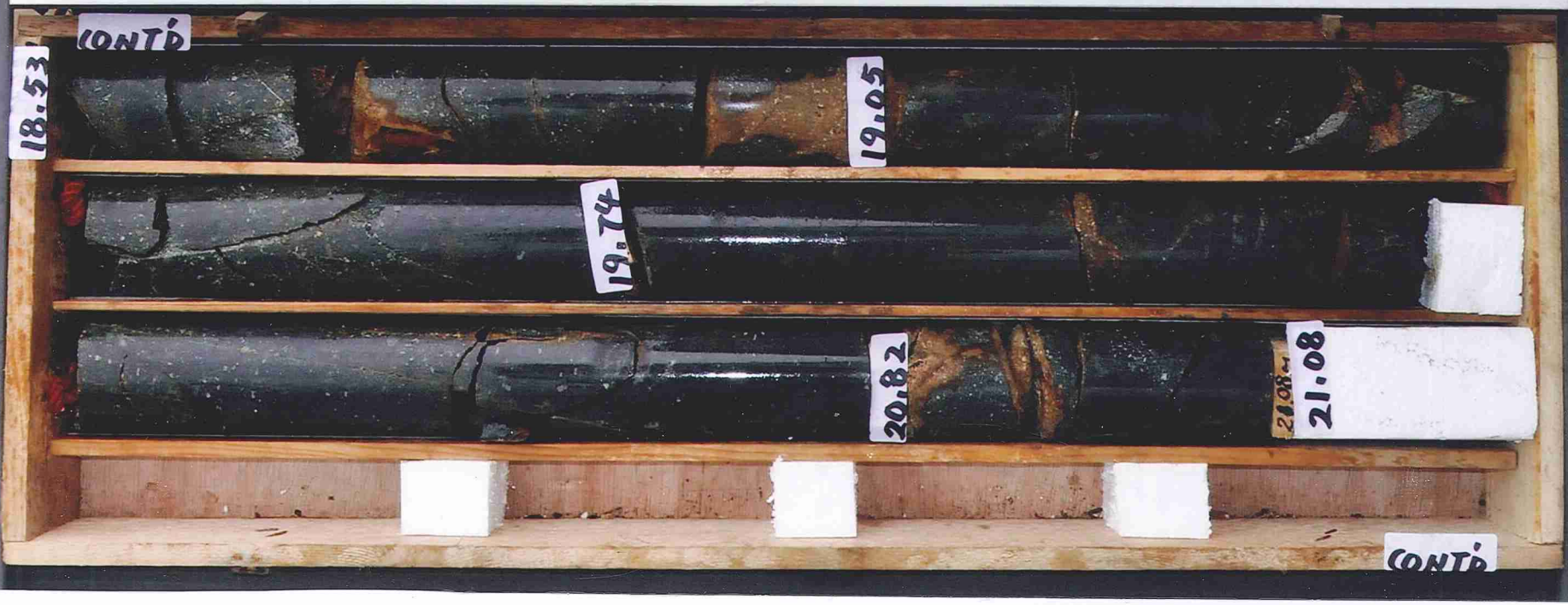
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH07

Box No.: 5 of 8

Depth : 18.53 m to 21.08 m

Date of Photograph : 21-03-2015



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CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH07

Box No.: 6 of 8

Depth : 21.08 m to 23.76 m

Date of Photograph : 21-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO 惠保(香港)有限公司
VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21
Ground Investigation - New Territories East (Term Contract)
Works Order No.: GE/2013/21.45B
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH07
Box No.: 7 of 8
Depth : 23.76 m to 26.07 m
Date of Photograph : 21-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO (H.K.) LIMITED
惠保(香港)有限公司
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/FB-DH07

Box No.: 8 of 8

Depth : 26.07 m to 28.85 m

Date of Photograph : 21-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO 惠保(香港)有限公司
VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/NT-DH01

Box No.: 1 of 1

Depth : 0.00 m to 15.00 m

Date of Photograph : 25/3/2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO 惠保(香港)有限公司
VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/NT-DH02

Box No.: 1 of 2

Depth : 0.00 m to 10.90 m

Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

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VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/NT-DH02

Box No.: 2 of 2

Depth : 10.90 m to 15.00 m

Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO (H.K.) LIMITED
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新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/NT-DH03

Box No.: 1 of 6

Depth : 0.00 m to 2.63 m

Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
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VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/NT-DH03

Box No.: 2 of 6

Depth : 2.63 m to 5.47 m

Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO 惠保(香港)有限公司
VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/NT-DH03

Box No.: 3 of 6

Depth : 5.47 m to (7.97) m

Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO (H.K.) LIMITED
惠保(香港)有限公司
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/NT-DH03

Box No.: 4 of 6

Depth : (7.97) m to 10.33 m

Date of Photograph : 20-03-2015

GEOTECHNICAL ENGINEERING OFFICE
CIVIL ENGINEERING AND DEVELOPMENT DEPARTMENT

VIBRO (H.K.) LIMITED
惠保(香港)有限公司
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21

Ground Investigation - New Territories East (Term Contract)

Works Order No.: GE/2013/21.45B

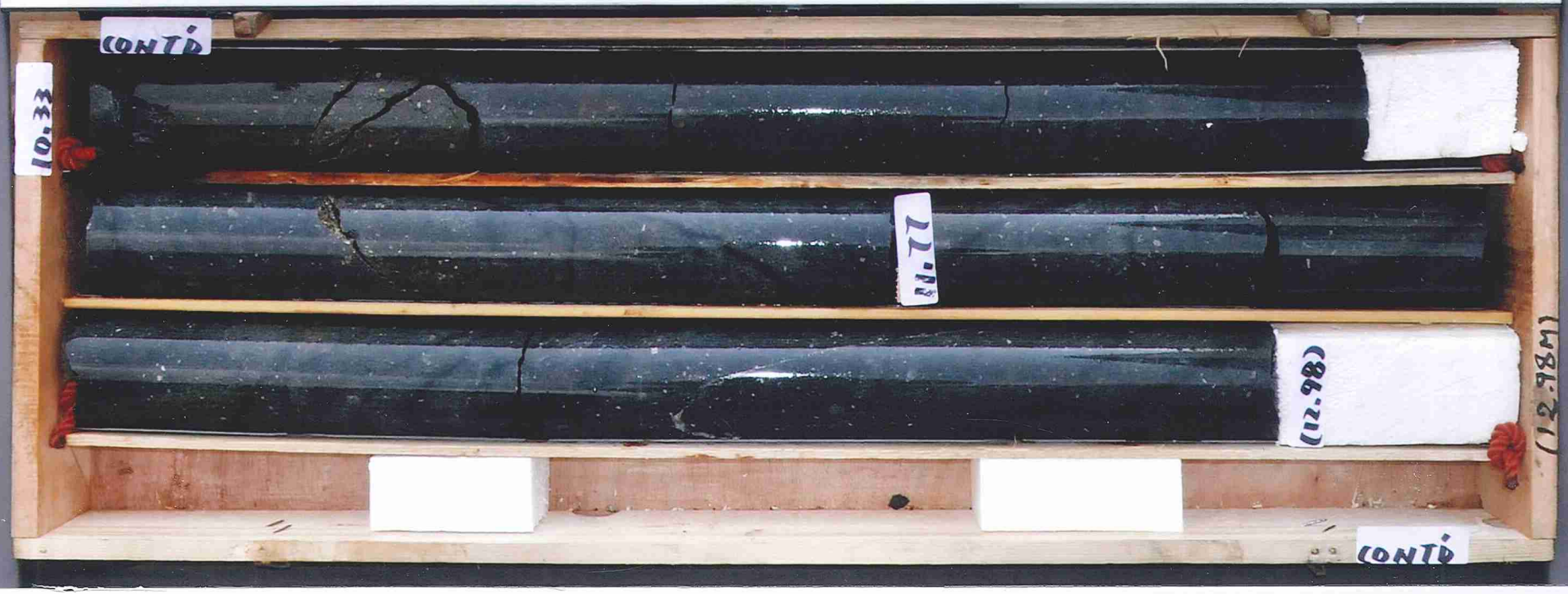
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/NT-DH03

Box No.: 5 of 6

Depth : 10.33 m to (12.98) m

Date of Photograph : 20-03-2015



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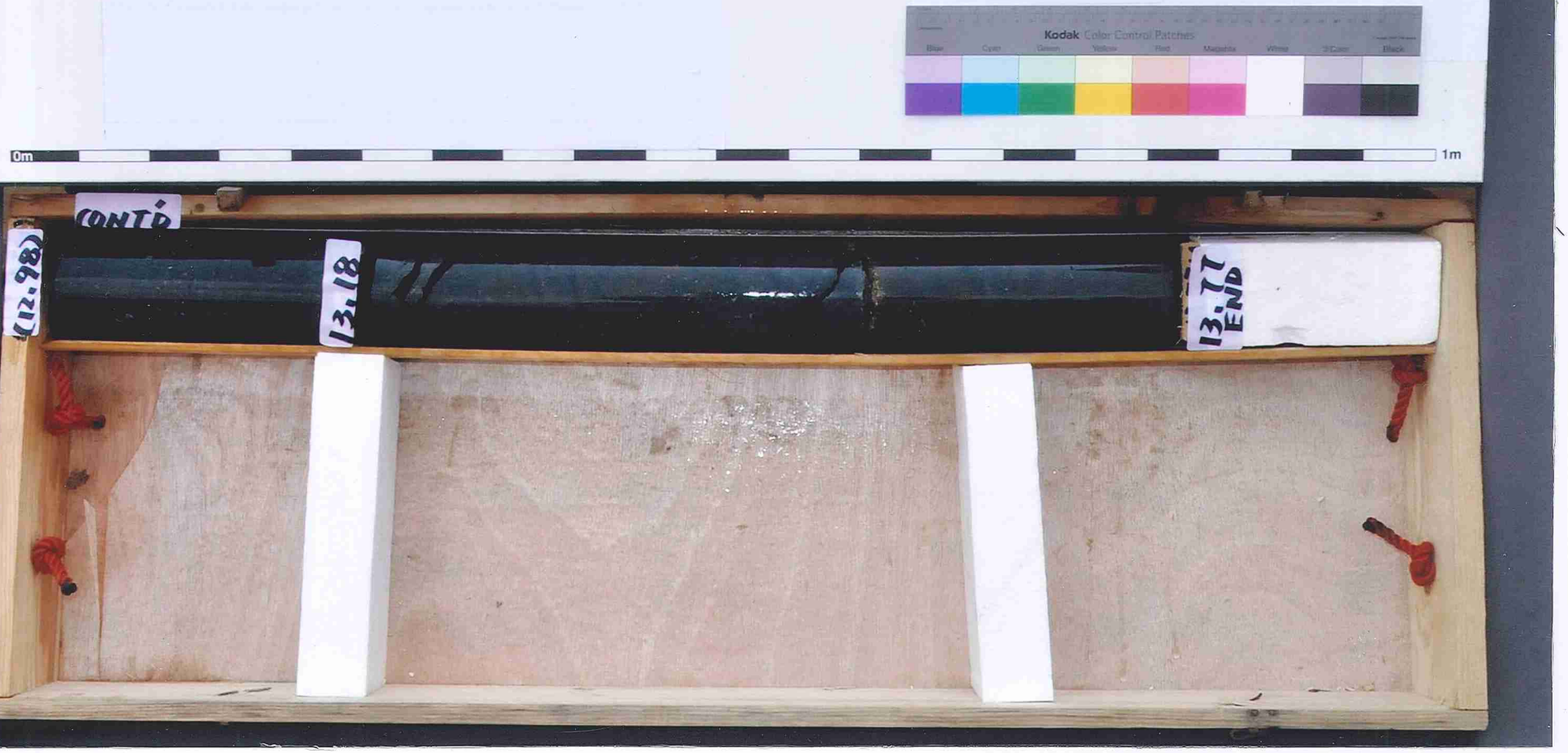
VIBRO 惠保(香港)有限公司
VIBRO (H.K.) LIMITED
新創建集團成員 Member of NWS Holdings

CEDD Contract No. : GE/2013/21
Ground Investigation - New Territories East (Term Contract)
Works Order No.: GE/2013/21.45B
Job Title : Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O – Feasibility Study (Natural Terrain)

Hole No.: TKO/NT-DH03
Box No.: 6 of 6
Depth : (12.98) m to 13.77 m
Date of Photograph : 20-03-2015



APPENDIX E

TRIAL PIT RECORDS

VIBRO

Contract No. : GE/2013/21

Project : Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

Works Order No. : GE/2013/21.45B

LOGGED BY : T. C. Yip
DATE : 19/03/2015
CHECKED BY : Y. M. Leung
DATE : 23/03/2015

CO-ORDINATES :
E 846664.17
N 814531.98

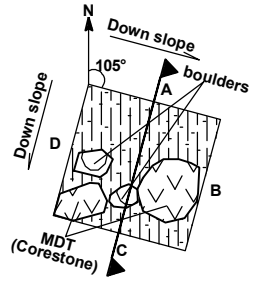
GROUND LEVEL : + 47.04 mPD
EXCAVATION DATES : 18/03/2015 to 19/03/2015
BACKFILL DATES : 28/03/2015

TRIAL PIT NO. TKO/NT-TP01

TRIAL PIT RECORD

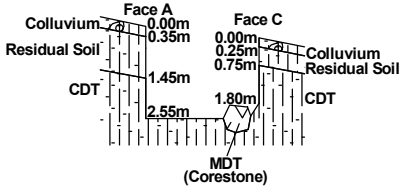
Samples & Tests	Depth (m)	Sketch	Depth (m)	Legend	Weathering Grade	Description
1, 2	0.50	Face A 1.50 m / Face B 1.50 m / Face C 1.50 m / Face D 1.50 m; 11°; boulder	0.40		VI	Firm, moist, dark brown (7.5YR 3/4), sandy SILT with some subangular fine to coarse gravel of highly decomposed and moderately decomposed rock fragments, occasional subangular cobble sized highly decomposed and moderately decomposed Tuff, subangular boulder sized moderately decomposed Tuff up to 220mm and rootlets. (COLLUVIUM)
3, 4	1.00		1.00			Stiff, moist, brown, locally dappled light brown, slightly sandy SILT with occasional pockets of CDT sized up to 200mm. (RESIDUAL SOIL)
5, 6	1.50	boulder; boulder	1.30		V	Extremely weak, reddish brown, dappled light brown and brown, completely decomposed fine ash vitric TUFF. (Slightly sandy SILT with occasional subrounded boulder sized highly decomposed and moderately decomposed Tuff up to 500mm (Corestone))
7, 8	2.00		1.50			
9	2.50	MDT (Corestone); 0.70m; Not excavated; 0.30m	2.50			
			2.60			End of Investigation Hole at 2.60m.
	3.00		3.00			
	3.50		3.50			
	4.00		4.00			
	4.50		4.50			
	5.00		5.00			

PLAN



SECTION

TKO/NT-TP01



SYMBOL

- Small Disturbed Sample
- Large Disturbed Sample
- Undisturbed Sample Hori.
- Undisturbed Sample Vert.
- Block Sample
- En Environmental Sample
- In Situ Density Test
- Water Seepage
- Water Sample
- Standpipe Tip
- N - Schmidt Hammer Test

REMARKS

Shoring : Timber shoring over the full height
Water Seepage : NIL
Stability : Stable
Maximum Depth : 2.60 m
Average Depth : 2.40 m

1. All sample depths are related to highest-point of Face A below ground level.
2. Small disturbed samples were taken from 0.50m to 2.50m at 0.50m intervals.
3. Large disturbed samples were taken at 0.50m and 1.50m.
4. Block samples were taken at 1.00m and 2.00m.
5. The termination of trial pit at 2.60m was due to the obstruction by MDT (Corestone) and boulders.
6. CDT = Completely decomposed TUFF.
7. MDT = Moderately decomposed TUFF.

VIBRO

Contract No. : GE/2013/21

Project : Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

Works Order No. : GE/2013/21.45B

LOGGED BY : T. C. Yip
DATE : 17/03/2015
CHECKED BY : Y. M. Leung
DATE : 18/03/2015

CO-ORDINATES :
E 846619.46
N 814498.51

GROUND LEVEL : + 19.54 mPD
EXCAVATION DATES : 10/03/2015 to 14/03/2015
BACKFILL DATES : 28/03/2015

TRIAL PIT NO. TKO/NT-TP02

TRIAL PIT RECORD

Samples & Tests	Depth (m)	Sketch	Depth (m)	Legend	Weathering Grade	Description
1, 2	0.00 – 0.30		0.00 – 0.30			Firm, moist, dark brown (7.5YR 3/4), sandy SILT with some angular to subangular fine to coarse gravel of highly decomposed and moderately decomposed rock fragments and rootlets. (TOP SOIL / COLLUVIUM)
3, 4	0.30 – 1.00		0.30 – 1.00			Firm to stiff, moist, brown (7.5YR 5/4), dappled grey and light brown, slightly sandy SILT with some subangular to subrounded fine to coarse gravel of highly decomposed and moderately decomposed rock fragments, subangular to subrounded cobble sized highly decomposed and moderately decomposed Tuff and occasional subangular boulder sized moderately decomposed Tuff up to 500mm. (COLLUVIUM 1)
	1.00 – 1.40		1.00 – 1.10			
	1.40 – 1.50		1.10 – 1.40			Stiff, moist, brown (7.5YR 5/4), dappled light grey and reddish brown, subangular to subrounded BOULDER sized moderately decomposed Tuff up to 600mm with gravelly slightly sandy silt and subangular to subrounded cobble sized highly decomposed and moderately decomposed Tuff. (COLLUVIUM 2)
	1.50 – 5.00		1.40 – 5.00			End of Trial Pit at 1.40m.

Face A 1.50 m | Face B 1.50 m | Face C 1.50 m | Face D 1.50 m

22°

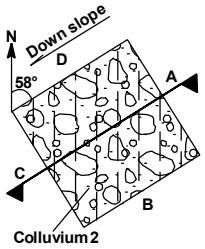
boulder

Colluvium 2

0.30m Not excavated 0.30m

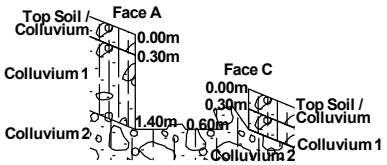
0.50m Not excavated

PLAN



SECTION

TKO/NT-TP02



SYMBOL

- Small Disturbed Sample
- Large Disturbed Sample
- Undisturbed Sample Hori.
- Undisturbed Sample Vert.
- Block Sample
- En Environmental Sample
- In Situ Density Test
- Water Seepage
- Water Sample
- Standpipe Tip
- N - Schmidt Hammer Test

REMARKS

Shoring : Timber shoring over the full height
Water Seepage : NIL
Stability : Stable
Maximum Depth : 1.40 m
Average Depth : 1.10 m

1. All sample depths are related to mid-point of Face A below ground level.
2. Small disturbed samples were taken at 0.50m and 1.00m.
3. A large disturbed sample was taken at 0.50m.
4. A block sample was taken at 1.00m.
5. The termination of trial pit at 1.40m was due to the obstruction by boulders.

VIBRO

Contract No. : GE/2013/21

Project : Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

Works Order No. : GE/2013/21.45B

LOGGED BY : T. C. Yip
DATE : 03/02/2015
CHECKED BY : Y. M. Leung
DATE : 04/02/2015

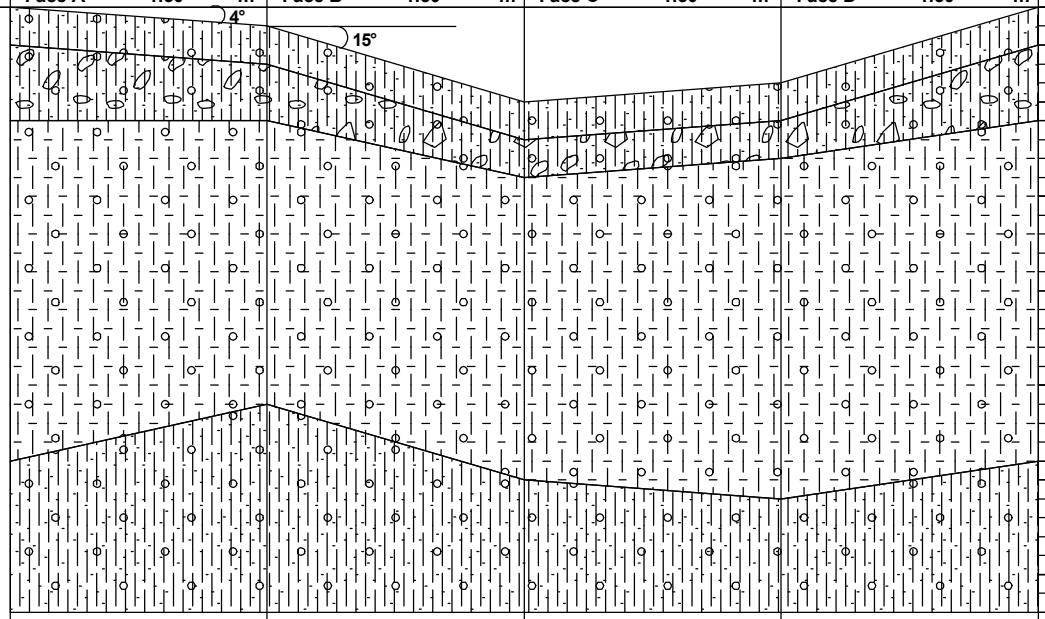
CO-ORDINATES :
E 846705.51
N 814398.69

GROUND LEVEL : + 54.43 mPD
EXCAVATION DATES : 28/01/2015 to 02/02/2015
BACKFILL DATES : 03/03/2015

TRIAL PIT NO. TKO/NT-TP03

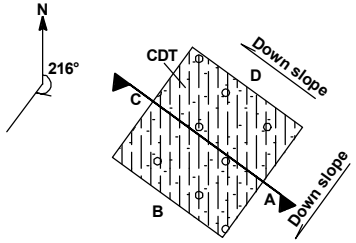
TRIAL PIT RECORD

Sketch



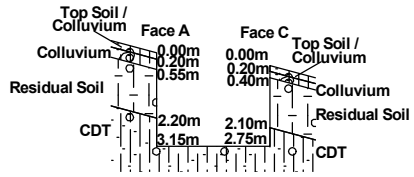
Samples & Tests	Depth (m)	Legend	Weathering Grade	Description
1, 2	0.00 – 0.50			Firm, moist, dark brown (7.5YR 3/4), slightly sandy SILT with some subangular fine to medium gravel of highly decomposed and moderately decomposed rock fragments and rootlets. (TOP SOIL / COLLUVIUM)
3, 4	0.50 – 1.00		VI	Firm, moist, brown (7.5YR 5/4), dappled greyish brown, slightly sandy SILT with occasional subangular fine gravel of highly decomposed rock fragments and subangular to subrounded cobble sized highly decomposed Tuff. (COLLUVIUM)
5, 6, 7, 8	1.00 – 2.00			Stiff, moist, brown, locally dappled reddish brown, slightly clayey SILT with occasional angular to subangular fine gravel of highly decomposed rock fragments. (RESIDUAL SOIL)
9, 10, 11, 12	2.00 – 2.50		V	Extremely weak, brown, dappled light brown and yellowish brown, completely decomposed coarse ash crystal TUFF. (Slightly sandy SILT with occasional angular fine gravel)
	2.50 – 3.00			End of Trial Pit at 3.20m.
	3.00 – 3.20			
	3.20 – 5.00			

PLAN



SECTION

TKO/NT-TP03



SYMBOL

- Small Disturbed Sample
- Large Disturbed Sample
- Undisturbed Sample Hori.
- Undisturbed Sample Vert.
- Block Sample
- En Environmental Sample
- In Situ Density Test
- Water Seepage
- Water Sample
- Standpipe Tip
- N - Schmidt Hammer Test

REMARKS

Shoring : Timber shoring over the full height
Water Seepage : NIL
Stability : Stable
Maximum Depth : 3.20 m
Average Depth : 3.00 m

1. All sample depths are related to highest-point of Face A below ground level.
2. Small disturbed samples were taken from 0.50m to 3.00m at 0.50m intervals.
3. Large disturbed samples were taken at 0.50m, 1.50m and 2.50m.
4. Block samples were taken at 1.00m, 2.00m and 2.70m.
5. Dynamic probe test No. P3 was carried out at the base of trial pit.
6. CDT = Completely decomposed TUFF.

VIBRO

Contract No. : GE/2013/21

Project : Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

Works Order No. : GE/2013/21.45B

LOGGED BY : T. C. Yip
DATE : 11/03/2015
CHECKED BY : Y. M. Leung
DATE : 12/03/2015

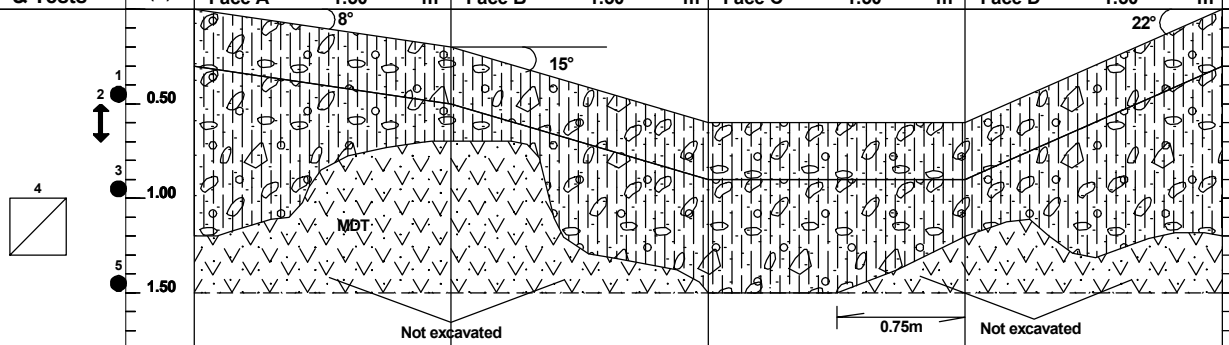
CO-ORDINATES :
E 846660.07
N 814297.46

GROUND LEVEL : + 34.27 mPD
EXCAVATION DATES : 09/03/2015 to 11/03/2015
BACKFILL DATES : 23/03/2015

TRIAL PIT NO. TKO/NT-TP04

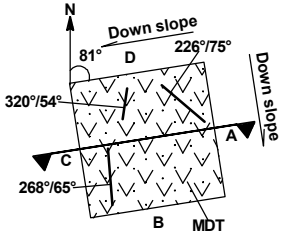
TRIAL PIT RECORD

Sketch



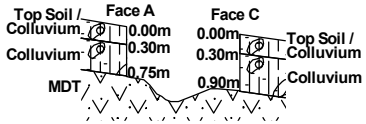
Samples & Tests	Depth (m)	Legend	Weathering Grade	Description
1, 2	0.00 – 0.50			Firm, moist, dark brown (7.5YR 3/4), sandy SILT with some angular to subangular fine to coarse gravel of highly decomposed and moderately decomposed rock fragments, occasional subangular cobble sized moderately decomposed Tuff and rootlets. (TOP SOIL / COLLUVIUM)
3, 4	0.50 – 1.00			Firm to stiff, moist, brown (7.5YR 5/4), dappled light brown, slightly sandy SILT with some subangular to subrounded fine to coarse gravel of highly decomposed rock fragments and occasional subangular cobble sized highly decomposed Tuff. (COLLUVIUM)
5	1.00 – 1.20		III	Moderately strong, locally moderately weak, greyish brown, dappled light brown and brown, moderately decomposed fine ash vitric TUFF.
	1.20 – 1.50			Joints are closely to medium spaced, rough planar, extremely narrow to very narrow, iron and manganese stained, dipping 226°/75°, 268°/65° and 320°/54°.
	1.50			End of Trial Pit at 1.50m.
	2.00			
	2.50			
	3.00			
	3.50			
	4.00			
	4.50			
	5.00			

PLAN



SECTION

TKO/NT-TP04



SYMBOL

- Small Disturbed Sample
- Large Disturbed Sample
- Undisturbed Sample Hori.
- Undisturbed Sample Vert.
- Block Sample
- En Environmental Sample
- In Situ Density Test
- Water Seepage
- Water Sample
- Standpipe Tip
- N - Schmidt Hammer Test

REMARKS

Shoring : Timber shoring over the full height
Water Seepage : NIL
Stability : Stable
Maximum Depth : 1.50 m
Average Depth : 1.30 m

1. All sample depths are related to highest-point of Face A below ground level.
2. Small disturbed samples were taken at 0.50m, 1.00m and 1.50m.
3. A large disturbed sample was taken at 0.50m.
4. A block sample was taken at 1.00m.
5. The termination of trial pit at 1.50m was due to the obstruction by MDT.
6. MDT = Moderately decomposed TUFF.

VIBRO

Contract No. : GE/2013/21

Project : Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

Works Order No. : GE/2013/21.45B

LOGGED BY : T. C. Yip
DATE : 17/03/2015
CHECKED BY : Y. M. Leung
DATE : 18/03/2015

CO-ORDINATES :
E 846684.45
N 814243.52

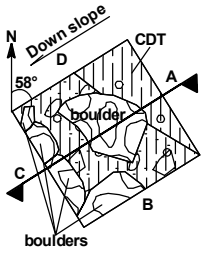
GROUND LEVEL : + 27.37 mPD
EXCAVATION DATES : 09/03/2015 to 11/03/2015
BACKFILL DATES : 23/03/2015

TRIAL PIT NO.
TKO/NT-TP05

TRIAL PIT RECORD

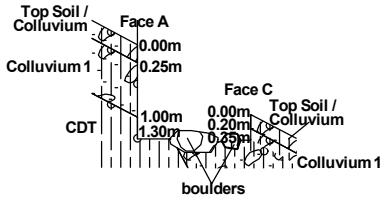
Samples & Tests	Depth (m)	Sketch	Depth (m)	Legend	Weathering Grade	Description
1, 2, 3	0.50	Face A 1.50 m; Face B 1.50 m; Face C 1.50 m; Face D 1.50 m; 28°; CDT; 0.40m; 0.60m; boulders Not excavated	0.20			Firm, moist, dark brown (7.5YR 3/4), sandy SILT with some subangular fine to coarse gravel of highly decomposed and moderately decomposed rock fragments and rootlets. (TOP SOIL / COLLUVIUM)
	1.00		0.50			
	1.50		0.80		V	Firm to stiff, moist, brown (7.5YR 5/4), dappled light grey and reddish brown, slightly sandy SILT with some subangular to subrounded fine to coarse gravel of highly decomposed and moderately decomposed rock fragments, subangular to subrounded cobble sized highly decomposed Tuff and some subangular to subrounded boulder sized moderately decomposed Tuff up to 800mm. (COLLUVIUM 1)
	2.00		1.00			
	2.50		1.30			Extremely weak, reddish brown, streaked light brown, completely decomposed fine ash vitric TUFF. (SILT with occasional angular fine to medium gravel)
	3.00		1.50			End of Trial Pit at 1.30m.
	3.50		2.00			
	4.00		2.50			
	4.50		3.00			
	5.00		3.50			
			4.00			
			4.50			
			5.00			

PLAN



SECTION

TKO/NT-TP05



SYMBOL

- Small Disturbed Sample
- Large Disturbed Sample
- Undisturbed Sample Hori.
- Undisturbed Sample Vert.
- Block Sample
- En Environmental Sample
- In Situ Density Test
- Water Seepage
- Water Sample
- Standpipe Tip
- N - Schmidt Hammer Test

REMARKS

Shoring : Timber shoring over the full height
Water Seepage : NIL
Stability : Stable
Maximum Depth : 1.30 m
Average Depth : 1.00 m

1. All sample depths are related to mid-point of Face A below ground level.
2. Small disturbed samples were taken at 0.50m and 1.00m.
3. A large disturbed sample was taken at 0.50m.
4. The termination of trial pit at 1.30m was due to the obstruction by boulders.
5. CDT = Completely decomposed TUFF.

VIBRO

Contract No. : GE/2013/21

Project : Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

Works Order No. : GE/2013/21.45B

LOGGED BY : T. C. Yip
DATE : 17/03/2015
CHECKED BY : Y. M. Leung
DATE : 18/03/2015

CO-ORDINATES :
E 846647.07
N 814429.67

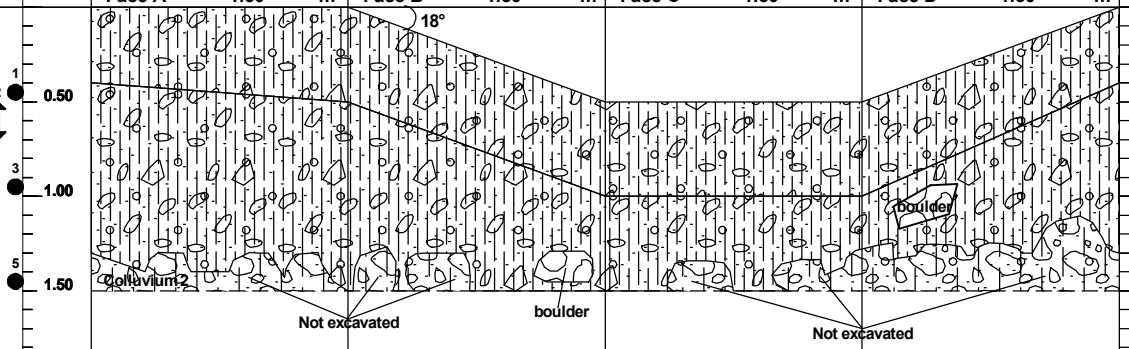
GROUND LEVEL : + 26.07 mPD
EXCAVATION DATES : 11/03/2015 to 14/03/2015
BACKFILL DATES : 28/03/2015

TRIAL PIT NO. TKO/NT-TP06

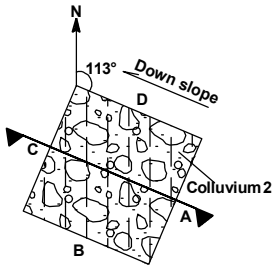
TRIAL PIT RECORD

Samples & Tests	Depth (m)	Sketch	Depth (m)	Legend	Weathering Grade	Description
1 (0.40-0.50)	0.40		0.40			Firm, moist, dark brown (7.5YR 3/4), sandy SILT with some angular to subangular fine to coarse gravel of highly decomposed and moderately decomposed rock fragments, occasional subangular to subrounded cobble sized highly decomposed Tuff and some rootlets. (TOP SOIL / COLLUVIUM)
2 (0.50-1.00)	0.50		0.50			
3 (1.00-1.30)	1.00		1.00			Firm to stiff, moist, brown (7.5YR 5/4), slightly sandy SILT with some subangular to subrounded fine to coarse gravel of highly decomposed rock fragments, subangular to subrounded cobble sized highly decomposed Tuff and subangular boulder sized moderately decomposed and slightly decomposed Tuff up to 220mm.(COLLUVIUM 1)
4 (1.30-1.50)	1.30		1.30			
5 (1.50)	1.50		1.50			Stiff, moist, brown (7.5YR 5/4), dappled light brown and light grey, subrounded BOULDER sized moderately decomposed Tuff up to 400mm with gravelly slightly sandy silt and subangular cobble sized highly decomposed Tuff. (COLLUVIUM 2)
	2.00		2.00			End of Trial Pit at 1.50m.
	2.50		2.50			
	3.00		3.00			
	3.50		3.50			
	4.00		4.00			
	4.50		4.50			
	5.00		5.00			

Sketch: Face A 1.50 m | Face B 1.50 m | Face C 1.50 m | Face D 1.50 m

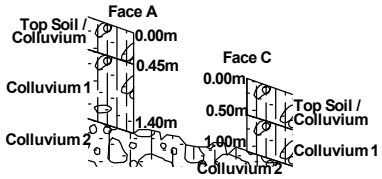


PLAN



SECTION

TKO/NT-TP06



SYMBOL

- Small Disturbed Sample
- Large Disturbed Sample
- Undisturbed Sample Hori.
- Undisturbed Sample Vert.
- Block Sample
- En Environmental Sample
- In Situ Density Test
- Water Seepage
- Water Sample
- Standpipe Tip
- N - Schmidt Hammer Test

REMARKS

Shoring : Timber shoring over the full height
Water Seepage : NIL
Stability : Stable
Maximum Depth : 1.30 m
Average Depth : 1.30 m

1. All sample depths are related to mid-point of Face A below ground level.
2. Small disturbed samples were taken at 0.50m, 1.00m and 1.50m.
3. A large disturbed sample was taken at 0.50m.
4. A block sample was taken at 1.00m.
5. The termination of trial pit at 1.50m was due to the obstruction by boulders.

VIBRO

Contract No. : GE/2013/21

Project : Ground Investigation - New Territories East (Term Contract)
Agreement No. CE21/2012(WS), Desalination Plant at Tseung Kwan O - Feasibility Study (Natural Terrain)

Works Order No. : GE/2013/21.45B

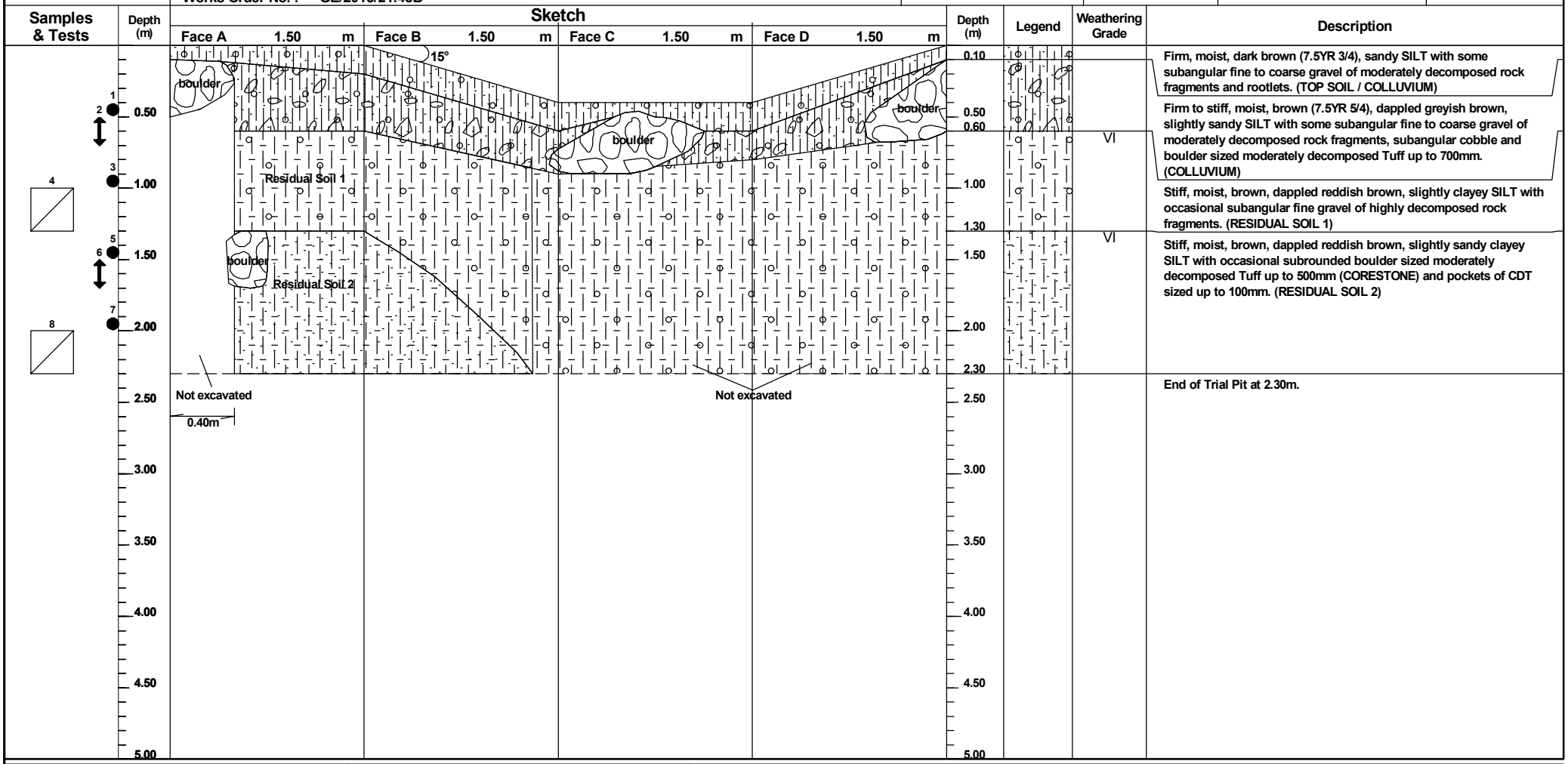
LOGGED BY : T. C. Yip
DATE : 03/02/2015
CHECKED BY : Y. M. Leung
DATE : 04/02/2015

CO-ORDINATES :
E 846731.08
N 814311.71

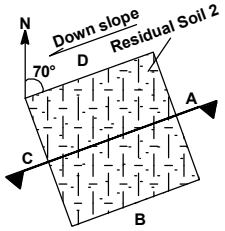
GROUND LEVEL : + 63.10 mPD
EXCAVATION DATES : 27/01/2015 to 02/02/2015
BACKFILL DATES : 03/03/2015

TRIAL PIT NO. TKO/NT-TP07

TRIAL PIT RECORD

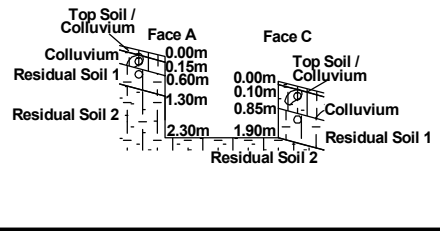


PLAN



SECTION

TKO/NT-TP07



SYMBOL

- Small Disturbed Sample
- Large Disturbed Sample
- Undisturbed Sample Hori.
- Undisturbed Sample Vert.
- Block Sample
- En Environmental Sample
- In Situ Density Test
- Water Seepage
- Water Sample
- Standpipe Tip
- N - Schmidt Hammer Test

REMARKS

Shoring : Timber shoring over the full height
Water Seepage : NIL
Stability : Stable
Maximum Depth : 2.30 m
Average Depth : 2.10 m

1. All sample depths are related to mid-point of Face A below ground level.
2. Small disturbed samples were taken from 0.50m to 2.00m at 0.50m intervals.
3. Large disturbed samples were taken at 0.50m and 1.50m.
4. Block samples were taken at 1.00m and 2.00m.
5. Dynamic probe test No. P7 was carried out at the base of trial pit.

DRILLHOLE RECORD

Gammon

HOLE No. D1

CONTRACT No. GE/2012/03

SHEET 1 of 3

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. FDR-06	E 846766.33 N 814045.60	DATE from 26/09/2013 to 30/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -2.35 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
26/09/2013	SX	07:00		0				17 bls			0.00	-2.35	0.00			Light greenish grey (5BG 7/1), fine to coarse SAND with some shell fragments. (MARINE DEPOSIT)
				48				33 bls	1		0.45					
									2		0.50					
									3		0.95	-3.35	1.00		V	Extremely weak, light grey (N7), dappled orangish brown and black, completely decomposed TUFF. (Silty fine to medium SAND)
								3,4 4,4,5,6 N=19	4		1.00					
									5		1.40 1.45					
				85					6		2.50					
									7		3.50	-5.95	3.60		V	Extremely weak, light brown (7.5YR 6/4), mottled orangish brown and spotted white, completely decomposed TUFF. (Silty fine to medium SAND)
								1,1 1,1,2,3 N=7	8		3.60					
		19:00							9		4.00 4.05					
26/09/2013 27/09/2013		07:00														
	SX 5.50 HX			60					10		5.45					
									11		5.50					
	HX 6.60	19:00							12		6.50 6.60	-8.95	6.60			
27/09/2013 28/09/2013		07:00		100	93	84	>20					-9.10	6.75		III II	Strong, grey and dark grey, spotted white, locally striped white, slightly decomposed coarse ash crystal TUFF. Joints are medium to closely, locally very closely spaced, rough and smooth planar, tight to very narrow, iron stained, kaolin and chlorite coated, dipping 0°-10°, 30°-40°, 40°-50° and 70°-80°. 6.60 - 6.75m: Moderately strong, light brown, moderately decomposed.
							7.7									
							2.0									
							9.1									
							2.9									
				100	100	33	10.0			T2IO1	8.08					
				100	100	85	3.1			T2IO1	8.38					
							>20									
							5.0					-11.40	9.05		III	9.05 - 9.22m: Moderately strong, brown, moderately decomposed. 9.22 - 10.11m: Streaked dark green.
										T2IO1		-11.57	9.22		II	
							16.7 4.8									
							10.0				9.75					
				100	100	96	2.3			T2IO1		-12.35	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 02/10/2013

CHECKED T T FUNG

DATE 03/10/2013

REMARKS

1. Constant head permeability test was carried out at 2.60m to 4.10m depth.
2. Pressuremeter test was carried out at 4.50m-5.50m depth
3. Acoustic televiewer survey was carried out at 7.00m-21.92m depth.
4. Packer (Water Absorption) tests were carried out at 8.50m to 11.50m and 13.50m-16.50m depths.

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DRILLHOLE RECORD

Gammon

HOLE No. D1

CONTRACT No. GE/2012/03

SHEET 2 of 3

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. FDR-06	E 846766.33 N 814045.60	DATE from 26/09/2013 to 30/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -2.35 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100	100	96	5.4			-12.35	10.00		II	As sheet 1 of 3.
							>20		T2IOI	-12.46	10.11			
							4.3			-13.32	10.97			10.97 - 12.78m: Light greenish grey.
				100	100	90	6.5		11.02					
							3.2		T2IOI					
							11.1		11.88					
				100	100	100	3.4		T2IOI					
									12.78	-15.13	12.78			
				100	100	87			T2IOI				II	Strong, grey, dappled greenish grey and spotted white, locally striped white, slightly decomposed crystal bearing fine ash vitric TUFF. Joints are closely, locally medium and very closely spaced, rough and smooth planar, extremely narrow, chlorite and kaolin coated, iron and manganese stained, dipping 0°-10°, 40°-50°, 50°-60° and 70°-80°.
							10.8			-15.58	13.23			13.23 - 13.42m: Greenish grey, streaked dark green, coarse ash crystal TUFF.
							2.7			-15.77	13.42			
				100	100	92			13.75					13.99 - 14.16m: Greenish grey, spotted dark green, coarse ash crystal TUFF.
							8.3		T2IOI	-16.34	13.99			
										-16.51	14.16			
				100	100	66			14.71					
							>20		T2IOI	-17.22	14.87		III	14.87 - 14.97m: Moderately strong, brown, moderately decomposed.
							5.2			-17.32	14.97		II	
		19:00								-17.64	15.29			15.29 - 15.43m: Greenish grey, streaked dark green, coarse ash crystal TUFF.
28/09/2013										-17.78	15.43			
30/09/2013		07:00		100	94	83	18.7		15.78					
							3.1							
							5.7		T2IOI					
										-18.99	16.64		II	Strong, light greyish green, streaked dark green and spotted black, slightly decomposed coarse ash crystal TUFF. Joints are medium to closely, locally very closely spaced, rough and smooth planar, tight to very narrow, clean, kaolin coated, iron and manganese stained, dipping 0°-10°, 40°-50° and 60°-70°.
				100	100	85			17.19					
							>20		T2IOI					
							3.5							
				100	100	93			18.29					
							13.3		T2IOI					
							7.0			-21.30	18.95			18.95 - 20.18m: Dark grey, spotted white, crystal bearing fine ash vitric TUFF.
				100	100	79			19.18					
									T2IOI					
							>20			-22.35	20.00			
							8.2							

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 02/10/2013

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DATE 03/10/2013

REMARKS

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DRILLHOLE RECORD

Gammon

HOLE No. **D1**

CONTRACT No. GE/2012/03

SHEET 3 of 3

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES E 846766.33 N 814045.60	WORK ORDER NO. GE/2012/03.27
MACHINE & No. FDR-06		DATE from 26/09/2013 to 30/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -2.35 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100	100	79				-22.53	20.18		II	As sheet 2 of 3.
				94	94	66	4.8		T2|01 20.28					
							8.9		T2|01 20.78					
				100	100	86	3.4		T2|01					
							12.5 5.1		21.98					
30/09/2013		19:00								-24.33	21.98			End of hole at 21.98m depth.
										-32.35	30.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 02/10/2013

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REMARKS

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DRILLHOLE RECORD

Gammon

HOLE No. **D2**

CONTRACT No. GE/2012/03

SHEET 1 of 6

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES E 847010.00 N 814140.00	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29		DATE from 11/09/2013 to 21/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -11.05 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
11/09/2013	ZX	07:00		90					1		0.00	-11.05	0.00			Soft, greenish grey (5GY 5/1), CLAY. (MARINE DEPOSIT)
								V	2		0.95 1.00					
				100					3		2.00	-13.05	2.00			Soft, greenish grey (5GY 5/1), CLAY with occasional shell fragments. (MARINE DEPOSIT)
								V	4		2.95 3.00					
				100					5		4.00					
								V	6		4.95 5.00					
				100					7		6.00					
								V	8		6.95 7.00					
				100					9		8.00					
								V	10		8.95 9.00	-21.05	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 23/09/2013

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DATE 24/09/2013

REMARKS

1. Constant head permeability test was carried out at 20.00m-21.50m depth.
2. Pressuremeter test was carried out at 22.00m-23.00m depth.
3. Vane shear tests were carried out at 1.00m, 3.00m, 5.00m, 7.00m, 9.00m and 11.00m depths.

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DRILLHOLE RECORD

Gammon

HOLE No. D2

CONTRACT No. GE/2012/03

SHEET 2 of 6

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 847010.00 N 814140.00	DATE from 11/09/2013 to 21/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -11.05 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100					11		10.00	-21.05	10.00			As sheet 1 of 6.
									12		10.95 11.00					
				100					13		12.00	-23.05	12.00			Firm, brownish grey (5YR 5/2), CLAY. (MARINE DEPOSIT)
									14		12.95 13.00					
				82					15		14.00	-25.05	14.00			Grey (N6), clayey silty fine to coarse SAND. (MARINE DEPOSIT)
								0,0 0,0,0,0 N=0	16		15.00 15.10	-26.15	15.10			
									17							Very soft, dark grey (N3), SILT. (MARINE DEPOSIT)
									18	•	15.50 15.55	-27.05	16.00			
				69					19		16.00					Grey (N6) and dark grey (N3), clayey fine to coarse SAND. (MARINE DEPOSIT)
	ZX	19:00														
11/09/2013	16.72								20		16.62 16.72	-27.77	16.72		II	Strong, dark grey, spotted white, slightly decomposed fine ash vitric TUFF. Joints are medium to closely spaced, rough and smooth planar, extremely narrow, iron stained, chlorite and kaolin coated, dipping 10°-20° and 30°-40°. 17.05 - 17.37m: No recovery. Inferred as completely decomposed TUFF.
12/09/2013	SX	07:00		71	71	71	6.1					-28.10	17.05		V	
							N.R.					-28.42	17.37		II	
							4.7					-28.85	17.80		V	
				80					21		17.80					Extremely weak, light yellowish brown (10YR 6/4), spotted white, completely decomposed TUFF. (Clayey silty fine to medium SAND)
		19:00							22		18.80					
12/09/2013 13/09/2013		07:00						1,3 3,6,11,18 N=38	23		18.90					
									24	•	19.30 19.35					
				98					25		19.80	-31.05	20.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 23/09/2013

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REMARKS

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DRILLHOLE RECORD

Gammon

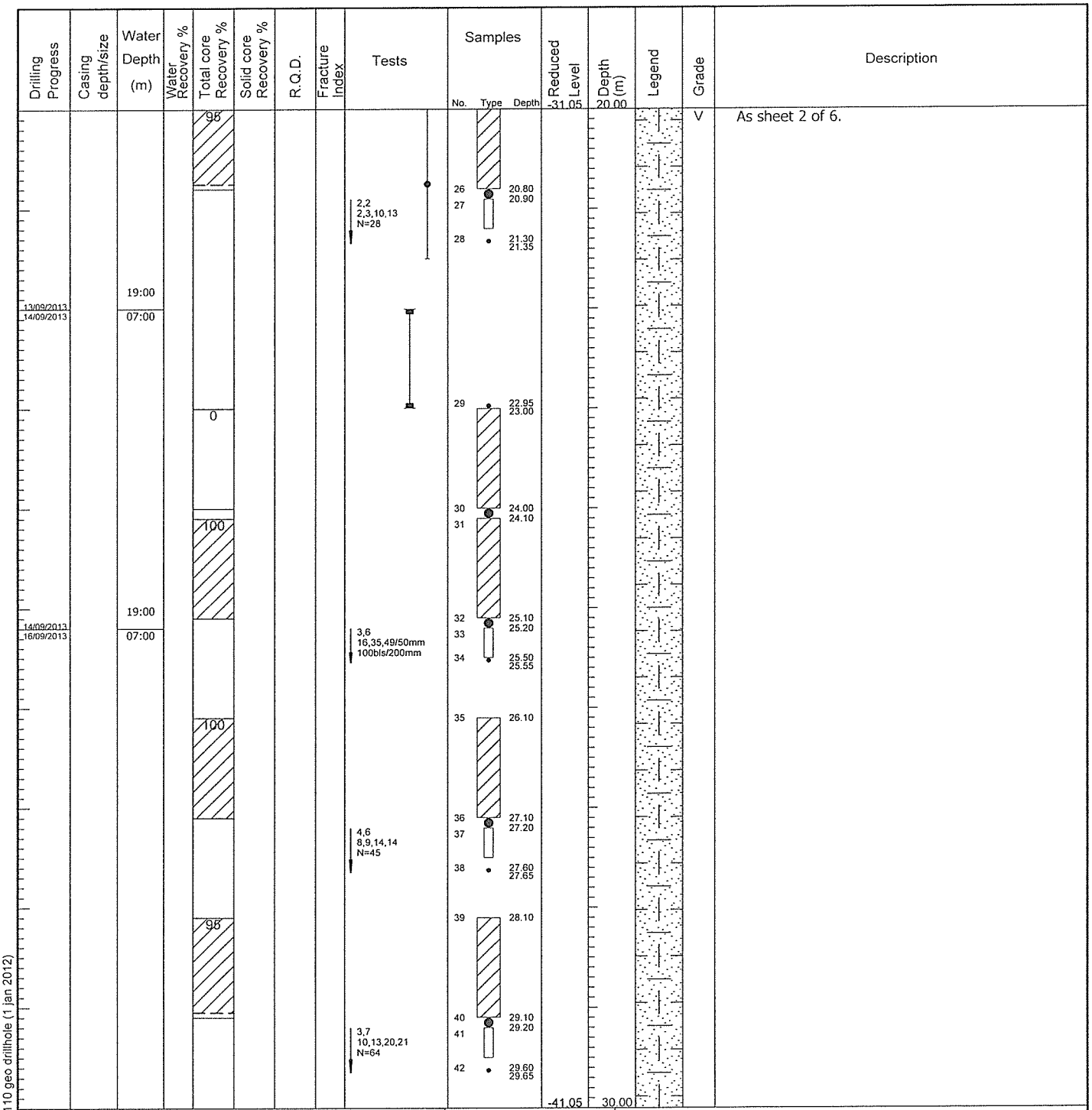
HOLE No. D2

CONTRACT No. GE/2012/03

SHEET 3 of 6

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 847010.00 N 814140.00	DATE from 11/09/2013 to 21/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -11.05 mPD



- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 23/09/2013

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DATE 24/09/2013

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DRILLHOLE RECORD

Gammon

HOLE No. **D2**

CONTRACT No. GE/2012/03

SHEET 4 of 6

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 847010.00 N 814140.00	DATE from 11/09/2013 to 21/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -11.05 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
									-41.05	30.00			V	As sheet 3 of 6.
				85					43 30.10					
									44 31.10					
								3,5 8,12,17,19 N=56	45 31.20					
									46 31.60 31.65					
				100					47 32.10					
									48 33.10					
								6,12 16,20,23,27 N=86	49 33.20					
									50 33.60 33.65					
									51 34.10	-45.15	34.10		V	Very weak, greyish brown (10YR 5/2), completely decomposed TUFF. (Silty fine to coarse SAND with much angular to subangular fine to coarse gravel sized rock fragments)
				50					52 35.10	-46.25	35.20		IV	Weak, brown (10YR 5/4), highly decomposed TUFF. (Angular to subangular fine to coarse GRAVEL sized rock fragments in sandy matrix)
	SX 35.20								53 35.20					
	HX			48										
	HX 36.30	19:00							54 36.20 36.30	-47.35	36.30		III	Moderately strong, light brown and light greyish brown, spotted black and white, moderately decomposed lithic bearing fine ash vitric TUFF. Joints are very closely, locally closely spaced, rough planar and undulating, extremely narrow to narrow, iron and manganese stained, dipping 0°-10°, 30°-40°, 60°-70° and 80°-90°.
16/09/2013 17/09/2013		07:00		100	0	0	N.I.		T2IOI					
				100	62	22	10.5		37.12					
							19.0		T2IOI					
				91	33	0	N.I. >20		37.92					
									T2IOI					
				100	26	0			38.50					
				100	0	0			T2IOI 38.73					
				100	94	13			T2IOI 38.96					
							7.7		T2IOI					
							20.0							
							11.3		39.97	-51.05	40.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 23/09/2013

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DATE 24/09/2013

REMARKS

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DRILLHOLE RECORD

Gammon

HOLE No. D2

CONTRACT No. GE/2012/03

SHEET 5 of 6

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 847010.00 N 814140.00	DATE from 11/09/2013 to 21/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -11.05 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m) 40.00	Legend	Grade	Description
				100	73	30	>20		39.97	-51.05			III	As sheet 4 of 6.
							10.7		T2IOI					
		19:00							40.89					
17/09/2013				100	0	0	>20		41.00					
18/09/2013		07:00		98	98	47	11.7		T2IOI					
									41.55					
				100	100	0			41.65					
				100	72	24	5.6		T2IOI					
							17.6							
							>20							
							11.1		42.41					
				100	0	0	N.I.		T2IOI					
									42.92					
				100	0	0			43.05					
				100	0	0			T2IOI					
									43.25	-54.30	43.25		III	
				100	78	66	11.1			-54.55	43.50		II	Moderately strong, light brown, moderately decomposed fine ash vitric TUFF. Joints are closely, locally medium and very closely spaced, rough planar and undulating, extremely narrow to narrow, iron and manganese stained, dipping 0°-10° and 30°-40°.
							4.3		T2IOI					
				100	83	35	13.3		43.75	-54.90	43.85		III	
							5.3		T2IOI					
							>20							
				100	57	41	7.1		44.29					
							N.I.		T2IOI					
		19:00							44.90					43.50 - 43.85m: Strong, grey, slightly decomposed.
18/09/2013									T2IOI					
19/09/2013		07:00		94	18	0			45.07					
				100	28	0			T2IOI					
				98	81	75	3.7		45.25	-56.30	45.25		II	
							>20		T2IOI	-56.54	45.49		III	45.25 - 45.49m: Strong, grey, slightly decomposed.
				100	95	83	7.4		45.73	-56.78	45.73			
							2.4		T2IOI	-56.98	45.93			45.73 - 45.93m: Coarse ash crystal TUFF.
													II	Strong, grey, dappled light grey and spotted white, slightly decomposed lithic bearing fine ash vitric TUFF. Joints are medium, locally widely, closely and very closely spaced, rough planar and undulating, tight to very narrow, iron and manganese stained, dipping 0°-10°, 30°-40°, 40°-50° and 60°-70°.
							>20							
				97	86	78	1.6		47.05					
									T2IOI					
							9.5			-58.78	47.73			47.73 - 47.81m: Light grey, fine ash vitric TUFF.
										-58.86	47.81			47.81 - 47.99m: Coarse ash crystal TUFF.
										-59.04	47.99			47.99 - 48.33m: Light grey, fine ash vitric TUFF.
				97	97	91	3.0		47.99					
									T2IOI	-59.38	48.33			
		19:00												48.33 - 49.44m: Lithic bearing coarse ash crystal TUFF.
19/09/2013									48.69					
21/09/2013		07:00		100	100	92	>20							
							3.1		T2IOI					
										-60.49	49.44			49.44 - 49.60m: Light grey, fine ash vitric TUFF.
										-60.65	49.60			49.60 - 49.92m: Crystal bearing fine ash vitric TUFF.
							5.3			-60.97	49.92			
										-61.05	50.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

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DATE 23/09/2013

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REMARKS

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DRILLHOLE RECORD

Gammon

HOLE No. D2

CONTRACT No. GE/2012/03

SHEET 6 of 6

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 847010.00 N 814140.00	DATE from 11/09/2013 to 21/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -11.05 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
										-61.05	50.00			
				100	100	92			T2IOI 50.27	-61.37	50.32		II	49.92 - 50.32m: Light greenish grey.
				100	95	90	>20 3.0							
							9.1 2.8		T2IOI 51.46					
				100	100	86	>20 1.3							
									T2IOI	-62.98	51.93			51.93 - 52.38m: Light grey, crystal bearing fine ash vitric TUFF.
21/09/2013		19:00							52.38	-63.43	52.38			
														End of hole at 52.38m depth.
										-71.05	60.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 23/09/2013

CHECKED T T FUNG

DATE 24/09/2013

REMARKS

I:\gintw\library\1july2009.glb\3110 geo drillhole (1 jan 2012)

DRILLHOLE RECORD

Gammon

HOLE No. **D3**

CONTRACT No. GE/2012/03

SHEET 1 of 3

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G36	E 846743.00 N 813870.00	DATE from 24/09/2013 to 27/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -8.80 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
24/09/2013	ZX	07:00		100					1 0.00 2 0.95 1.00	-8.80	0.00			Loose, greenish grey (5GY 5/1), clayey silty fine to coarse SAND with some subangular fine to coarse gravel sized rock and shell fragments. (MARINE DEPOSIT)
				100				22 blis 1,2 1,1,1,3 N=6	3 2.00 4 2.45 5 2.50 6 2.90 2.95					
	ZX 4.50	19:00		100				111 blis	7 4.00 8 4.45 4.50	-13.30	4.50			
24/09/2013 25/09/2013		07:00		62					T2IOI					Grey (N6) and brown (10YR 5/4), angular to subangular medium to coarse GRAVEL and COBBLE sized rock fragments. (ALLUVIUM)
				76					5.10 T2IOI					
				100	0	0	N.I.		6.25 T2IOI	-15.05	6.25		III	Moderately weak, dark grey and light brown, moderately decomposed crystal bearing fine ash vitric TUFF. Highly fractured and joints are closely to very closely spaced, rough planar, very narrow to narrow, iron and manganese stained, dipping 0°-10°, 20°-30° and 80°-90°.
				100	0	0			6.80 T2IOI					
				84	0	0			7.50 T2IOI					
				62	0	0			8.00 T2IOI					
							N.R.			-17.60	8.80		V	8.80 - 9.56m: No recovery. Inferred as completely decomposed TUFF.
				74	14	10			9.30 T2IOI	-18.36	9.56		III	
							N.I.			-18.65	9.85			9.85 - 10.44m: Moderately strong, light brown,
							13.3			-18.80	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 28/09/2013

CHECKED T T FUNG

DATE 30/09/2013

REMARKS

1. Acoustic televiewer survey was carried out at 9.70m-25.40m depth.
2. Packer (Water Absorption) tests were carried out at 12.00m-15.00m and 16.00m-19.00m depths.

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DRILLHOLE RECORD

Gammon

HOLE No. **D3**

CONTRACT No. GE/2012/03

SHEET 2 of 3

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G36	E 846743.00 N 813870.00	DATE from 24/09/2013 to 27/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -8.80 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				74	14	10	>20		T2IOI 10.30	-18.80	10.00		III	moderately decomposed.
				100	88	73	8.1		T2IOI 10.70	-19.24	10.44		II	Strong, light grey, dappled greenish grey and spotted white, slightly decomposed, slightly altered coarse ash crystal TUFF. Joints are widely to closely, locally very closely spaced, rough and smooth planar, tight to extremely narrow, chlorite and kaolin coated, locally iron stained, dipping 0°-10°, 10°-20°, 40°-50° and 60°-70°.
				100	100	81	2.6		T2IOI 11.60					
		19:00					9.7							
25/09/2013							3.6							
26/09/2013		07:00		100	96	82			T2IOI 12.85					
							11.9							
				97	97	72	2.1		T2IOI 13.50	-22.47	13.67			13.67 - 14.10m: Streaked dark green.
				100	100	77			T2IOI 14.10	-22.90	14.10			
				100	97	72	14.3							
							7.0							
							13.5							
							4.4		T2IOI 15.55					
				100	100	81								
							6.3		T2IOI 16.76					
				100	98	84	>20 7.7							
							>20 4.0							
							>20 2.4		T2IOI 18.22					
							7.1							
				100	77	43	>20 3.6		T2IOI 19.26					
		19:00					>20							
26/09/2013														
27/09/2013		07:00		100	100	85	1.5		T2IOI	-28.80	20.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 28/09/2013

CHECKED T T FUNG

DATE 30/09/2013

REMARKS

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DRILLHOLE RECORD

Gammon

HOLE No. **D3**

CONTRACT No. GE/2012/03

SHEET 3 of 3

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G36	E 846743.00 N 813870.00	DATE from 24/09/2013 to 27/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -8.80 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100	100	85	3.1			-28.80	20.00		II	As sheet 2 of 3.
							11.1							
				100	100	95	3.4		T2IOI 20.53					
							1.1		T2IOI	-30.04	21.24			
										-30.15	21.35			21.24 - 21.35m: Streaked dark green.
				100	100	100	>20 6.2		21.98					
							1.1		T2IOI					
				100	100	100			22.90					
										-32.33	23.53			
									T2IOI	-32.68	23.88			23.53 - 23.88m: Light grey, dappled white, altered coarse ash crystal TUFF fused with quartz vein.
							2.8							
				100	100	92	10.0		24.40					
							3.7		T2IOI					
27/09/2013		19:00							25.59	-34.39	25.59			
														End of hole at 25.59m depth.
										-38.80	30.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 28/09/2013

CHECKED T T FUNG

DATE 30/09/2013

REMARKS

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DRILLHOLE RECORD

Gammon

HOLE No. **D4**

CONTRACT No. GE/2012/03

SHEET 1 of 2

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES E 846720.00 N 813721.00	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29		DATE from 24/09/2013 to 27/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -14.75 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
25/09/2013	ZX	07:00		75					1		0.00	-14.75	0.00			Dense, greenish grey (5GY 5/1), silty fine to coarse SAND with some subangular fine gravel sized rock and shell fragments. (MARINE DEPOSIT)
									2		0.95 1.00					
				100				51 bls	3		2.00					
								4,6 10,10,11,13 N=44	4		2.45 2.50					
									5							
									6		2.90 2.95					
	ZX 3.80										3.80	-18.55	3.80			
	PX			60						T2IOI						Dark grey (N3) and light grey (N7), angular coarse GRAVEL and COBBLE sized rock fragments. (ALLUVIUM)
	PX 4.30										4.30	-19.19	4.44			
	HX			86							4.44					
	HX 4.62			94	94	94	5.4			T2IOI	4.62				II	Strong, dark grey, spotted white and dark green, slightly decomposed fine ash vitric TUFF with moderately decomposed zone along joint margin. Joints are medium to closely, locally widely and very closely spaced, rough planar, extremely narrow to narrow, iron and manganese stained, dipping 10°-20°, 30°-40° and 60°-70°.
				100	93	84	16.7 3.7			T2IOI	5.29	-19.93	5.18		III	
				88	59	41	>20 7.7			T2IOI	5.70	-20.45	5.70		II	5.18 - 5.70m: Moderately strong, light brown, moderately decomposed.
				100	100	100	2.3			T2IOI	6.48					
				100	100	90				T2IOI	7.15	-21.78	7.03		III	7.03 - 7.30m: Moderately strong, brown, moderately decomposed.
		19:00					14.3					-22.05	7.30		II	
25/09/2013 26/09/2013		07:00		100	94	64	5.8			T2IOI						
							13.2					-22.81	8.06		III	8.06 - 8.25m: Moderately strong, light grey, dappled brown, moderately decomposed.
				98	98	98	2.0			T2IOI	8.25	-23.00	8.25		II	
											9.27					
				100	100	90	1.1			T2IOI		-24.75	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 28/09/2013

CHECKED T T FUNG

DATE 30/09/2013

REMARKS

1. Acoustic televiewer survey was carried out at 4.70m-18.90m depth.
2. Packer (Water Absorption) tests were carried out at 5.50m-8.50m and 9.50m-12.50m depths.

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DRILLHOLE RECORD

Gammon

HOLE No. D4

CONTRACT No. GE/2012/03

SHEET 2 of 2

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES E 846720.00 N 813721.00	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29		DATE from 24/09/2013 to 27/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -14.75 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100	100	90	7.1			-24.75	10.00		II	As sheet 1 of 2.
				100	94	89	>20		T2IOI 10.52	-25.27	10.52		II	Strong, light greenish grey, slightly decomposed lithic bearing coarse ash crystal TUFF. Joints are medium to closely, locally very closely spaced, rough and smooth planar, tight to very narrow, chlorite and kaolin coated, iron and manganese stained, dipping 0°-10°, 30°-40°, 60°-70° and 70°-80°.
							7.8			-25.42	10.67		III	
										-25.60	10.85		II	
									T2IOI					
									11.94	-26.09	11.34		III	10.67 - 10.85m: Moderately strong, light brown, moderately decomposed.
										-26.54	11.79		II	11.34 - 11.79m: Moderately strong, grey, dappled orangish brown, moderately decomposed.
				98	92	85	3.8		T2IOI					
							8.3		13.30					
		19:00					>20							
26/09/2013									T2IOI					
27/09/2013		07:00		100	100	100	2.7		14.66					
									T2IOI	-29.89	15.14			15.14 - 16.18m: Dark grey, fine ash vitric TUFF.
				100	100	100	10.3		15.75	-30.63	15.88			15.88 - 16.39m: Dark green, calcite vein (2-4mm thick), dipping 70°-80°.
							2.7			-30.93	16.18			
				100	100	87	8.2		T2IOI	-31.14	16.39			
							3.8		16.95					
				100	100	60	14.3		T2IOI					
				98	92	88	5.7		17.53					
							3.4		T2IOI					
							7.1		18.94					
				100	80	80	>20		T2IOI					
							8.3							
		19:00					2.1		19.69	-34.44	19.69			
27/09/2013							>20							End of hole at 19.69m depth.
										-34.75	20.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 28/09/2013

CHECKED T T FUNG

DATE 30/09/2013

REMARKS

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Gammon

GRAB SAMPLE

HOLE No. **GS1**

CONTRACT No. GE/2012/03

SHEET 1 of 1

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD GRAB	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 846970.00 N 814150.00	DATE from 02/10/2013 to 02/10/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -9.20 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/10/2013 07:00												-9.20	0.00			
02/10/2013 09:00											0.00 0.10	-9.30	0.10			Greenish grey (5GY 5/1), clayey silty fine to coarse SAND with some shell fragments. (MARINE DEPOSIT) End of grab sample at 0.10m depth.
												-19.20	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 03/10/2013

CHECKED T T FUNG

DATE 04/10/2013

REMARKS

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GRAB SAMPLE

Gammon

HOLE No. **GS2**

CONTRACT No. GE/2012/03

SHEET 1 of 1

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD GRAB	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 846950.00 N 814090.00	DATE from 02/10/2013 to 02/10/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -9.50 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/10/2013		12:00									0.00	-9.50	0.00			
02/10/2013		10:00									0.10	-9.60	0.10			Greenish grey (5GY 5/1), clayey silty fine to coarse SAND with some shell fragments. (MARINE DEPOSIT) End of grab sample at 0.10m depth.
												-19.50	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 03/10/2013

CHECKED T T FUNG

DATE 04/10/2013

REMARKS

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Gammon

GRAB SAMPLE

HOLE No. **GS3**

CONTRACT No. GE/2012/03

SHEET 1 of 1

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD GRAB	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 846720.00 N 813800.00	DATE from 02/10/2013 to 02/10/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -10.50 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/10/2013		16:00									0.00	-10.50	0.00			
02/10/2013		14:00									0.10	-10.60	0.10			Greenish grey (5GY 5/1), clayey silty fine to coarse SAND with some shell fragments. (MARINE DEPOSIT) End of grab sample at 0.10m depth.
												-20.50	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 03/10/2013

CHECKED T T FUNG

DATE 04/10/2013

REMARKS

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Gammon

GRAB SAMPLE

HOLE No. **GS4**

CONTRACT No. GE/2012/03

SHEET 1 of 1

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD GRAB	CO-ORDINATES E 846680.00 N 813730.00	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29		DATE from 02/10/2013 to 02/10/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -10.70 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/10/2013		18:00									0.00	-10.70	0.00			
02/10/2013		16:00									0.10	-10.80	0.10			Greenish grey (5GY 5/1), clayey silty fine to coarse SAND with some shell fragments. (MARINE DEPOSIT) End of grab sample at 0.10m depth.
												-20.70	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 03/10/2013

CHECKED T T FUNG

DATE 04/10/2013

REMARKS

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VIBROCORE RECORD

Gammon

HOLE No. **SD1**

CONTRACT No. GE/2012/03

SHEET 1 of 1

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Vibrocore	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. LAM8	E 846766.50 N 814046.70	DATE from 10/09/2013 to 10/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -2.45 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
10/09/2013				230					1	V100	0.00	-2.45	0.00			Brownish grey (5YR 5/2), silty clayey fine to coarse SAND. (MARINE DEPOSIT)
		08:00							2		0.30 0.40	-2.85	0.40			
10/09/2013		18:00														End of hole at 0.40m depth.
												-12.45	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 11/09/2013

CHECKED T T FUNG

DATE 12/09/2013

REMARKS

1. The vibrocore sample was sent to the laboratory.

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VIBROCORE RECORD

Gammon

HOLE No. **SD2**

CONTRACT No. GE/2012/03

SHEET 1 of 2

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Vibrocore	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 847007.00 N 814139.00	DATE from 02/10/2013 to 02/10/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -11.20 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
02/10/2013 07:00	ZX			100					1	U100	0.00	-11.20	0.00			Very soft, brownish grey (5YR 5/2), CLAY. (MARINE DEPOSIT)
				100					2		0.85	-12.10	0.90			
									3	U100	0.90					Very soft, grey (N6), CLAY. (MARINE DEPOSIT)
				100					4		1.85	-13.10	1.90			
									5	U100	1.90					Soft to firm, greenish grey (5GY 5/1), CLAY with occasional shell fragments. (MARINE DEPOSIT)
				100					6		2.85					
									7	U100	2.90					
				100					8		3.80					
									9	U100	3.90					
				100					10		4.85					
									11	U100	4.90					
				100					12		5.85					
									13	U100	5.90					
				100					14		6.85					
									15	U100	6.90					
	ZX 7.90								16		7.80					
				100					17	U100	7.90					
				100					18		8.85					
									19	U100	8.90					
									20		9.85	-21.20	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 03/10/2013

CHECKED T T FUNG

DATE 04/10/2013

REMARKS

1. The vibrocore samples were sent to the laboratory.

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Gammon

VIBROCORE RECORD

HOLE No. **SD2**

CONTRACT No. GE/2012/03

SHEET 2 of 2

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Vibrocore	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29	E 847007.00 N 814139.00	DATE from 02/10/2013 to 02/10/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -11.20 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100					21			-21.20	10.00			AS sheet 1 of 2.
									22	U100	10.85	-22.10	10.90			
				100					23		10.90					Stiff, grey (N6), silty sandy CLAY. (MARINE DEPOSIT)
02/10/2013		19:00							24	U100	11.80 11.90	-23.10	11.90			
																End of hole at 11.90m depth.
												-31.20	20.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 03/10/2013

CHECKED T T FUNG

DATE 04/10/2013

REMARKS

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VIBROCORE RECORD

HOLE No. **SD3**

CONTRACT No. GE/2012/03

SHEET 1 of 1

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Vibrocore	CO-ORDINATES	WORK ORDER NO. GE/2012/03.27
MACHINE & No. LAM8	E 846735.40 N 813871.70	DATE from 10/09/2013 to 10/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -7.15 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples (No / Type / Depth)	Reduced Level	Depth (m)	Legend	Grade	Description
10/09/2013 08:00				60					1 V100 0.00					Greenish grey (5GY 5/1), clayey silty fine to coarse SAND with much shell fragments. (MARINE DEPOSIT)
10/09/2013 18:00									2 0.60 0.70	-7.85	0.70			End of hole at 0.70m depth.
										-17.15	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 11/09/2013

CHECKED T T FUNG

DATE 12/09/2013

REMARKS

1. The vibrocore sample was sent to the laboratory.

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VIBROCORE RECORD

Gammon

HOLE No. **SD4**

CONTRACT No. GE/2012/03

SHEET 1 of 1

PROJECT Agreement No. CE 21/2012 (WS) Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Vibrocore	CO-ORDINATES E 846722.00 N 813722.00	WORK ORDER NO. GE/2012/03.27
MACHINE & No. G29		DATE from 30/09/2013 to 30/09/2013
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -15.00 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
30/09/2013 07:00				100					1	W100	0.00	-15.00	0.00			Greenish grey (5GY 5/1), clayey silty fine to coarse SAND with much shell fragments. (MARINE DEPOSIT)
									2		0.85					
				100					3	W100	0.90					
30/09/2013 19:00									4		1.90 2.00	-17.00	2.00			End of hole at 2.00m depth.
												-25.00	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 02/10/2013

CHECKED T T FUNG

DATE 03/10/2013

REMARKS

1. The vibrocore sample was sent to the laboratory.

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DRILLHOLE RECORD

Gammon

HOLE No. **D5**

CONTRACT No. GE/2013/37

SHEET 1 of 5

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2013/37.11
MACHINE & No. G36	E 846752.00 N 813583.00	DATE from 05/09/2014 to 13/09/2014
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -13.35 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
05/09/2014	ZX	08:00		100					1 0.50 2 1.45 1.50	-13.35	0.00			Soft, greenish grey (5GY 5/1), slightly sandy SILT with occasional shell fragments. (MARINE DEPOSIT)
				100					3 2.50	-15.85	2.50			Very soft, greenish grey (5GY 5/1), SILT with occasional shell fragments. (MARINE DEPOSIT)
				100					4 3.45 3.50 5 4.50					
				100					6 5.45 5.50 7 6.50					
	ZX 7.50 SX			100					8 7.45 7.50					
				100					9 8.50 10 9.45 9.50	-21.85	8.50			Firm, greenish grey (5GY 5/1), SILT with occasional shell fragments. (MARINE DEPOSIT)
										-23.35	10.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 15/09/2014

CHECKED T T FUNG

DATE 16/09/2014

REMARKS

1. Pressuremeter test was carried out at 15.10m-16.10m depth.
2. Constant head permeability test was carried out at 18.15m-19.65m depth.
3. Acoustic televiewer survey was carried out at 26.51m-41.68m depth.
4 .Vane shear tests were carried out at 2.00m, 4.00m, 6.00m, 8.00m, 10.00m, 12.00m and 14.00m depths.

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Gammon

DRILLHOLE RECORD

HOLE No. **D5**

CONTRACT No. GE/2013/37

SHEET 2 of 5

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2013/37.11
MACHINE & No. G36	E 846752.00 N 813583.00	DATE from 05/09/2014 to 13/09/2014
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -13.35 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
									-23.35	10.00				As sheet 1 of 5.
				100					11 10.50					
									12 11.45 11.50					
									V					
05/09/2014		18:00							13 12.50					
06/09/2014		08:00		100										
									14 13.45 13.50					
				100					V 15 14.00	-27.35	14.00			Very stiff, light greenish grey (5BG 7/1), mottled orangish brown, SILT. (ALLUVIUM)
	SX 15.00 PX							1,1 2,2,3,4 N=11	16 15.00					
									17 15.10					
06/09/2014		18:00							18 15.50 15.55	-28.90	15.55			Soft, greenish grey (5GY 5/1), SILT. (ALLUVIUM)
08/09/2014		08:00		100					19 16.05					
									20 16.10					
									21 17.10					
								1,1 1,1,1,2 N=5	22 17.20					
									23 17.60 17.65					
				100					24 18.10					
									25 19.10					
									26 19.20					
08/09/2014		18:00						1,1 1,1,2,2 N=6	27 19.60 19.65					
10/09/2014		08:00								-33.35	20.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

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DATE **16/09/2014**

REMARKS

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DRILLHOLE RECORD

Gammon

HOLE No. **D5**

CONTRACT No. GE/2013/37

SHEET 3 of 5

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2013/37.11
MACHINE & No. G36	E 846752.00 N 813583.00	DATE from 05/09/2014 to 13/09/2014
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -13.35 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
										-33.35	20.00			
				90					28 20.10	-33.45	20.10			As sheet 2 of 5. Very dense, light brownish grey (10YR 6/2), mottled dark brown, very clayey silty fine to medium SAND. (ALLUVIUM)
								9,9 10,10,15,25 N=60	29 21.10 30 21.20 31 21.60 21.65					
									32 22.10 22.13	-35.45	22.10			
	PX 22.50 HX			100	37	14	8.1 18.8 5.3 N.I. >20		T2IO1	-35.48	22.13		III	No sample recovered. Moderately strong, greyish brown and dark grey, dappled light brown, moderately decomposed lithic bearing coarse ash crystal TUFF. Joints are closely to very closely spaced, rough and smooth, planar and undulating, extremely narrow to narrow, clean and iron stained, dipping 0°-10°, 50°-60°, 60°-70° and 80°-90°.
10/09/2014 11/09/2014		18:00 08:00		91	31	15	7.5 20.0 6.5 16.7		23.70 T2IO1 24.75					
				97	19	0	N.A. 17.6		T2IO1	-38.23	24.88		IV	24.88 - 25.39m: Weak, greyish brown, highly decomposed. (Subangular fine to coarse GRAVEL and COBBLE in sandy matrix)
				88	51	14	N.I. 9.1 11.5		25.73 T2IO1	-38.74	25.39		III	
	HX 26.50			100	92	92	1.6 2.3		26.51 T2IO1	-39.86	26.51		II	Strong, dark grey, spotted light grey, slightly decomposed, crystal bearing fine ash vitric TUFF. Joints are widely to medium, locally closely to very closely spaced, rough and smooth planar, tight to extremely narrow, clean, iron stained, chlorite and kaolin coated, dipping 0°-10°, 40°-50°, 60°-70° and 80°-90°.
11/09/2014 12/09/2014		18:00 08:00		100	100	95	1.1 12.5 3.1		27.49 T2IO1					
				100	100	100	0.7		29.02 T2IO1	-43.35	30.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 15/09/2014

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DATE 16/09/2014

REMARKS

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DRILLHOLE RECORD

Gammon

HOLE No. **D5**

CONTRACT No. GE/2013/37

SHEET 4 of 5

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2013/37.11
MACHINE & No. G36	E 846752.00 N 813583.00	DATE from 05/09/2014 to 13/09/2014
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -13.35 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100	100	100				-43.35	30.00		II	As sheet 3 of 5.
				100	97	95	5.3		T2IOI 30.57					
							>20							
							4.7		T2IOI					
				100	91	69	12.5		32.07					
							2.0							
							6.8		T2IOI					
										-46.29	32.94		III	32.94 - 33.32m: Moderately strong, grey, moderately decomposed with some kaolin infilled joints.
							18.5			-46.67	33.32		II	
							5.3							
				100	100	100	1.7		33.56					
							5.0		T2IOI					
							1.1			-47.96	34.61			34.61 - 34.71m: Lapilli bearing.
										-48.06	34.71			
				100	86	79	>20		35.13					
							2.4		T2IOI					
				100	92	81	10.0		36.00					
							7.1		T2IOI					
							2.4							
							4.2		37.18					
				100	100	85	>20		T2IOI					
							6.3							
							3.4							
							11.1							
							4.2							
							11.8							
12/09/2014		18:00					2.2		38.67					
13/09/2014		08:00		100	100	98			T2IOI					
							1.5			-53.35	40.00			

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED **W K SIU**

DATE **15/09/2014**

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DATE **16/09/2014**

REMARKS

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Gammon

DRILLHOLE RECORD

HOLE No. **D5**

CONTRACT No. GE/2013/37

SHEET 5 of 5

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Rotary	CO-ORDINATES	WORK ORDER NO. GE/2013/37.11
MACHINE & No. G36	E 846752.00 N 813583.00	DATE from 05/09/2014 to 13/09/2014
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	SEABED LEVEL -13.35 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100	100	100			40.10	-53.35	40.00		II	As sheet 3 of 5.
							4.8		T2101					
							1.7							
13/09/2014		18:00							41.68	-55.03	41.68			End of hole at 41.68m depth.

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample (100mm)
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 15/09/2014

CHECKED T T FUNG

DATE 16/09/2014

REMARKS

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Gammon

VIBROCORE RECORD

HOLE No. **SD5**

CONTRACT No. GE/2013/37

SHEET 1 of 2

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Vibrocore	CO-ORDINATES E 846753.00 N 813582.00	WORK ORDER NO. GE/2013/37.11
MACHINE & No. G36		DATE from 27/08/2014 to 27/08/2014
FLUSHING MEDIUM NA	ORIENTATION **Vertical**	SEABED LEVEL -14.15 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
27/08/2014		08:00		100					1	V100	0.00	-14.15	0.00			Very soft, greenish grey (5GY 5/1), SILT with occasional shell fragments. (MARINE DEPOSIT)
									2		0.85					
				100					3		0.90					
									4		1.85					
				100					5		1.90					
									6		2.85	-17.05	2.90			
				100					7		2.90					Soft to firm, greenish grey (5GY 5/1), SILT with occasional shell fragments. (MARINE DEPOSIT)
									8		3.90					
				100					9		4.00					
									10		4.85					
				100					11		4.90					
									12		5.85					
				100					13		5.90					
									14		6.85					
				100					15		6.90					
									16		7.85					
				100					17		7.90					
									18		8.85					
				100					19		8.90					
									20		9.85	-24.05	9.90			
											9.90					

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED **W K SIU**

DATE **28/08/2014**

CHECKED **T T FUNG**

DATE **29/08/2014**

REMARKS

1. The vibrocore samples 0.00-0.90m, 0.90-1.90m, 1.90-2.90m, 4.90-5.90m, 7.90-8.90m and 10.90-11.90m were sent to the laboratory.

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Gammon

VIBROCORE RECORD

HOLE No. **SD5**

CONTRACT No. GE/2013/37

SHEET 2 of 2

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD Vibrocore	CO-ORDINATES	WORK ORDER NO. GE/2013/37.11
MACHINE & No. G36	E 846753.00 N 813582.00	DATE from 27/08/2014 to 27/08/2014
FLUSHING MEDIUM NA	ORIENTATION **Vertical**	SEABED LEVEL -14.15 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Type	Depth	Reduced Level	Depth (m)	Legend	Grade	Description
				100					21	V100		-14.15	10.00			Stiff, greenish grey (5GY 5/1), SILT. (MARINE DEPOSIT)
									22		10.85					
				100					23	V100	10.90					
27/08/2014		18:00							24		11.90 12.00	-26.15	12.00			End of hole at 12.00m depth.

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

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DATE 28/08/2014

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DATE 29/08/2014

REMARKS

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Gammon

GRAB SAMPLE

HOLE No. **GS5**

CONTRACT No. GE/2013/37

SHEET 1 of 1

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD GRAB	CO-ORDINATES E 846718.10 N 813713.30	WORK ORDER NO. GE/2013/37.11
MACHINE & No. Vessel		DATE from 28/08/2014 to 28/08/2014
FLUSHING MEDIUM NA	ORIENTATION **Vertical**	SEABED LEVEL -13.41 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Samples Type	Samples Depth	Reduced Level	Depth (m)	Legend	Grade	Description
28/08/2014 08:00												-13.41	0.00			
28/08/2014 12:00										●	0.00 0.10	-13.51	0.10			Very soft, greenish grey (5GY 5/1), SILT with occasional shell fragments. (MARINE DEPOSIT) End of grab sample at 0.10m depth.

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 29/08/2014

CHECKED T T FUNG

DATE 30/08/2014

REMARKS

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Gammon

GRAB SAMPLE

HOLE No. **GS6**

CONTRACT No. GE/2013/37

SHEET 1 of 1

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD GRAB	CO-ORDINATES E 846742.20 N 813615.10	WORK ORDER NO. GE/2013/37.11
MACHINE & No. Vessel		DATE from 28/08/2014 to 28/08/2014
FLUSHING MEDIUM NA	ORIENTATION **Vertical**	SEABED LEVEL -13.63 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Samples Type	Samples Depth	Reduced Level	Depth (m)	Legend	Grade	Description
28/08/2014		13:00								●	0.00	-13.63	0.00			Very soft, greenish grey (5GY 5/1), SILT with occasional shell fragments. (MARINE DEPOSIT)
28/08/2014		15:00									0.10	-13.73	0.10			End of grab sample at 0.10m depth.

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 29/08/2014

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DATE 30/08/2014

REMARKS

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Gammon

GRAB SAMPLE

HOLE No. **GS7**

CONTRACT No. GE/2013/37

SHEET 1 of 1

PROJECT Desalination Plant at Tseung Kwan O - Feasibility Study

METHOD GRAB	CO-ORDINATES E 846969.30 N 814125.10	WORK ORDER NO. GE/2013/37.11
MACHINE & No. Vessel		DATE from 28/08/2014 to 28/08/2014
FLUSHING MEDIUM NA	ORIENTATION **Vertical**	SEABED LEVEL -13.29 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples No.	Samples Type	Samples Depth	Reduced Level	Depth (m)	Legend	Grade	Description
28/08/2014		15:00										-13.29	0.00			
28/08/2014		18:00								●	0.00 0.10	-13.39	0.10			Very soft, greenish grey (5GY 5/1), SILT with occasional shell fragments. (MARINE DEPOSIT) End of grab sample at 0.10m depth.

- Small disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Standard penetration test
- Vibrocore sample
- Water sample
- Piezometer / Standpipe tip
- Permeability test
- Packer (Water Absorption) test
- Impression packer test
- Acoustic Televiewer Survey Test
- In-situ vane shear test
- Pressuremeter Test

LOGGED W K SIU

DATE 29/08/2014

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DATE 30/08/2014

REMARKS

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