Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH265P**

SHEET 1 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835253.29 N 815593.71	PROJECT No. J3251
MACHINE & No. GS-10		DATE from 22/04/2009 to 05/05/2009
FLUSHING MEDIUM WATER	ORIENTATION Vertical	GROUND LEVEL + 7.70 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
												7.70	0.00			
22/04/2009	PX	08:00							A	D	0.45 0.50					Brown, silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
									B	D	0.95 1.00	6.70	1.00			
																Firm, reddish brown, sandy SILT with some subangular fine gravel sized rock fragments. (FILL)
									C	D	1.45 1.50					
									D	D	1.95 2.00					
									E	D	2.45 2.50	5.20	2.50			
									F	D	2.85 2.90	4.80	2.90			Firm to stiff, brown, mottled light grey, slightly sandy SILT with some subangular fine gravel sized rock fragments. (FILL)
				78												Light grey, angular to subangular coarse GRAVEL and COBBLES sized concrete fragments. (FILL)
									1	D	3.60	4.10	3.60			Greyish brown, silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
				78												
									2	D	4.60 4.70	3.00	4.70			
								3,4 1,1,1,2 N=5								Firm, brown, mottled red, sandy clayey SILT with some subangular fine to coarse gravel sized rock and cement fragments. (FILL)
									3	D	5.10 5.15					
				100					4	D						
									5	D	6.15 6.25	1.45	6.25			
								1,2 1,2,1,2 N=6	6	D						Loose, reddish brown, silty fine to medium SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
									7	D	6.65 6.70	1.00	6.70			
				78					8	D						Pinkish brown, sandy subangular coarse GRAVEL sized rock fragments. (FILL)
									9	D	7.40 7.50	0.20	7.50			
				78						T2IOI		-0.03	7.73			Grey, subangular coarse GRAVEL and COBBLES sized strong tuff fragments. (FILL)
22/04/2009	PX	5.20m at 18:00								T2IOI	7.90					
24/04/2009	HX 7.90	5.40m at 08:00		60					10	T2IOI	8.10	-0.40	8.10			Greenish grey, mottled pink, subangular COBBLES sized strong feldsparphyric rhyolite fragments. (FILL)
				58												Firm, brown, mottled grey, sandy CLAY/SILT. (FILL)
									11	D	8.60 8.70	-1.00	8.70			
				80						T2IOI						Grey and brown, subangular coarse GRAVEL and COBBLES sized rock fragments with silty sandy matrix. (FILL)
				85					12	D	9.00	-1.30	9.00			
																Firm, brown, mottled light brown, SILT with much subangular fine gravel sized quartz fragments. (ALLUVIUM)
												-2.30	10.00			

INSPECTION PIT

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 06/05/2009

CHECKED P O POON

DATE 07/05/2009

REMARKS

1. Inspection pit was dug to 2.90m depth.
2. Eastman tests were carried out at 5.00m, 10.00m, 15.00m, 20.00m and 25.00m depths.
3. Constant head permeability tests were carried out at 5.50m-7.00m and 26.50m-28.00m depths.
4. Standpipe was installed at 28.00m depth.

(to be continued...)

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH265P**

SHEET **2** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835253.29 N 815593.71	PROJECT No. J3251
MACHINE & No. GS-10		DATE from 22/04/2009 to 05/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 7.70 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
												-2.30	10.00			
								1,2 2,2,3,3 N=10	13 14		10.00 10.10	2.40	10.10			As sheet 1 of 6. Firm, brown and yellowish brown, slightly sandy SILT with much subangular fine gravel sized quartz fragments. (ALLUVIUM)
				0					15		10.50 10.55	-2.85	10.55			Firm, brown, sandy SILT with much subangular fine gravel sized quartz fragments. (ALLUVIUM)
		5.10m at 18:00							16		11.55 11.65	-3.95	11.65			
24/04/2009 25/04/2009		3.20m at 08:00		100					17							Firm, brown, SILT with much angular to subangular fine gravel sized quartz fragments. (ALLUVIUM)
								1,2 2,2,3,4 N=11	18 19		12.65 12.75	-5.05	12.75			Firm, brown, mottled white, slightly sandy SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
				100					20 21		13.15 13.20					
									22		14.20	-6.60	14.30			
								2,2 2,3,3,4 N=12	23		14.30				V	Extremely weak, brown, mottled white, completely decomposed GRANITE. (Firm, slightly sandy SILT with some subangular fine to coarse gravel sized rock fragments)
				95					24		14.70	-7.05	14.75		V	Extremely weak, orangish brown, mottled brown and white, completely decomposed GRANITE. (Firm to stiff, sandy SILT with some subangular fine gravel sized quartz fragments)
									25		14.75					
									26		15.75					
								2,2 3,3,3,4 N=13	27		15.85					
									28		16.25	-8.60	16.30		V	Extremely weak, pinkish brown, mottled orange, completely decomposed GRANITE. (Silty fine to coarse SAND with some angular fine gravel sized quartz fragments)
				95					29		16.30					
									30		17.30	-9.70	17.40		V	Extremely weak, light pink, completely decomposed GRANITE. (Firm, SILT with some subangular fine gravel sized quartz fragments)
								2,3 3,4,4,6 N=17	31		17.40					
									32		17.80	-10.15	17.85		V	Extremely weak, light pink, completely decomposed GRANITE. (Firm, slightly sandy SILT with some subangular fine gravel sized quartz fragments)
				85					33		17.85					
									34		18.85	-11.25	18.95		V	Extremely weak, brown, mottled pink, completely decomposed GRANITE. (Firm, sandy SILT with some subangular fine gravel sized quartz fragments)
								2,3 4,5,5,6 N=20	35		18.95					
									36		19.35					
				95					37		19.40					
												-12.30	20.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 06/05/2009

CHECKED P O POON

DATE 07/05/2009

REMARKS

5. Acoustic televiewer survey was carried out at 29.50m-52.80m depth.
6. Packer (Water Absorption) test was carried out at 37.76m-42.76m depth.

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH265P**

SHEET 3 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835253.29 N 815593.71	PROJECT No. J3251
MACHINE & No. GS-10		DATE from 22/04/2009 to 05/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 7.70 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
				95								-12.30	20.00		V	As sheet 2 of 6.
		3.30m at 18:00						3,4 6,8,9,9 N=32	38		20.40					
									39		20.50					
25/04/2009									40		20.90	-13.25	20.95			
27/04/2009		5.80m at 08:00		80					41		20.95				V	Extremely weak, pink, mottled dark brown, completely decomposed GRANITE. (Silty fine to medium SAND with some subangular fine to coarse gravel sized rock fragments)
									42		21.95	-14.35	22.05			
								4,6 6,7,9,12 N=34	43		22.05				V	Extremely weak, pink, mottled light grey, completely decomposed GRANITE. (Very stiff, sandy SILT with some angular fine gravel sized quartz fragments)
									44		22.45					
				100					45		22.50					
									46		23.50					
								4,6 7,9,10,17 N=43	47		23.60					
									48		24.00	-16.35	24.05			
				95					49		24.05				V	Extremely weak, pink, mottled light grey, completely decomposed GRANITE. (Silty fine to coarse SAND with some angular fine to medium gravel sized quartz fragments)
									50		25.05	-17.45	25.15			
		2.25m at 18:00						4,6 7,9,12,16 N=44	51		25.15				V	Extremely weak, pink, mottled light grey, completely decomposed GRANITE. (Stiff, sandy SILT with some angular fine to medium gravel sized quartz fragments)
27/04/2009									52		25.55	-17.90	25.60			
28/04/2009		5.95m at 08:00		85					53		25.60				V	Extremely weak, brown, mottled light grey, completely decomposed GRANITE. (Stiff, slightly sandy SILT with some angular fine gravel sized quartz fragments)
									54		26.60					
								8,10 18,19,23,31 N=91	55		26.70					
									56		27.10	-19.45	27.15			
				100					57		27.15				V	Very weak, brown, mottled white, completely decomposed GRANITE. (Silty fine to coarse SAND with some angular fine to medium gravel sized rock fragments)
									58		28.15	-20.55	28.25			
								20,30/65mm 37,34,29/40mm 100blS/190mm	59		28.25				V	Extremely weak, pinkish brown, completely decomposed GRANITE. (Stiff, sandy SILT with some angular fine to medium gravel sized quartz fragments)
									60		28.53	-20.88	28.58			
				50					61		28.58				IV	Weak, brown, mottled white, highly decomposed medium grained GRANITE. (Sandy angular to subangular fine to coarse GRAVEL sized rock fragments)
28/04/2009	HX	5.15m at 18:00														
29/04/2009	29.08	5.55m at 08:00		98	65	37	N.I.		62		28.98	-21.38	29.08		III	
							10.5			T2101	29.60					
				100	59	13	N.I.			T2101			30.00			Moderately strong, pink, mottled light grey, spotted brown, moderately decomposed medium

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

REMARKS

LOGGED W K SIU

DATE 06/05/2009

CHECKED P O POON

DATE 07/05/2009

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH265P**

SHEET **4** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835253.29 N 815593.71	PROJECT No. J3251
MACHINE & No. GS-10		DATE from 22/04/2009 to 05/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 7.70 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
										-22.30	30.00			
29/04/2009		3.90m at 18:00		100	59	13	13.3		T2101 30.68				III	grained GRANITE. Joints are closely spaced, rough planar and undulating, extremely narrow, iron stained, chlorite coated, dipping 30°-40° and 60°-70°.
30/04/2009		5.80m at 08:00		97	85	74	N.I.			-23.16	30.86			
							7.8		T2101 31.89				III	Moderately strong, pink, mottled light grey, spotted light green and black, moderately decomposed chloritized medium grained GRANITE. Joints are closely, locally medium spaced, rough planar and undulating, extremely narrow, iron stained, chlorite coated, dipping 20°-30°, 50°-60° and 60°-70°.
				100	99	63								
							2.6		T2101 33.27					
							7.3							
				100	100	58			T2101 34.80					
				94	87	62								
				100	93	74			T2101 36.32					
							4.8			-29.42	37.12		III	Moderately strong, greyish pink, moderately decomposed fine grained GRANITE. Joints are medium, locally closely spaced, rough undulating, tight to extremely narrow, chlorite coated, dipping 20°-30°, 50°-60° and 60°-70°.
				98	92	79			T2101 37.77					
							11.8		T2101 38.96					
				100	97	88								
							3.0		T2101	-32.30	40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 06/05/2009

CHECKED P O POON

DATE 07/05/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH265P**

SHEET **5** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835253.29 N 815593.71	PROJECT No. J3251
MACHINE & No. GS-10		DATE from 22/04/2009 to 05/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 7.70 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
										-32.30	40.00			
30/04/2009		3.60m at 18:00		100	97	88			T2IOI 40.50				III	As sheet 4 of 6.
04/05/2009		6.30m at 08:00		100	99	99			T2IOI 41.88					
				100	100	91			T2IOI 43.41					
				100	100	100				-36.05	43.75			
				100	100	100			T2IOI 44.92				III	Moderately strong, pink and pinkish brown, streaked black, moderately decomposed slightly sheared fine grained GRANITE. Joints are medium spaced, rough planar and undulating, extremely narrow, iron and manganese stained, chlorite coated, dipping 20°-30°, 50°-60° and 60°-70°.
				100	100	100			T2IOI 46.47					
				99	88	88	5.5		T2IOI 48.00					
				100	97	84	5.1		T2IOI 49.54					
04/05/2009		2.90m at 18:00												
05/05/2009		6.52m at 08:00		100	98	85	N.I. 2.0		T2IOI	-42.30	50.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 06/05/2009

CHECKED P O POON

DATE 07/05/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH265P**

SHEET **6** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835253.29 N 815593.71	PROJECT No. J3251
MACHINE & No. GS-10		DATE from 22/04/2009 to 05/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 7.70 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
				100	98	85				-42.30	50.00		III	As sheet 5 of 6.
							0.4		T2101	-42.98	50.68		III	Moderately strong, pink, mottled light grey, spotted greyish green, moderately decomposed chloritized medium grained GRANITE. Joints are widely spaced, rough planar, tight, chlorite coated, dipping 10°-20°.
				100	100	100			51.07					
									T2101					
				100	100	100			52.22					
05/05/2009		5.20m at 18:00							T2101 53.05	-45.35	53.05			End of hole at 53.05m depth.
											60.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **06/05/2009**

CHECKED **P O POON**

DATE **07/05/2009**

REMARKS

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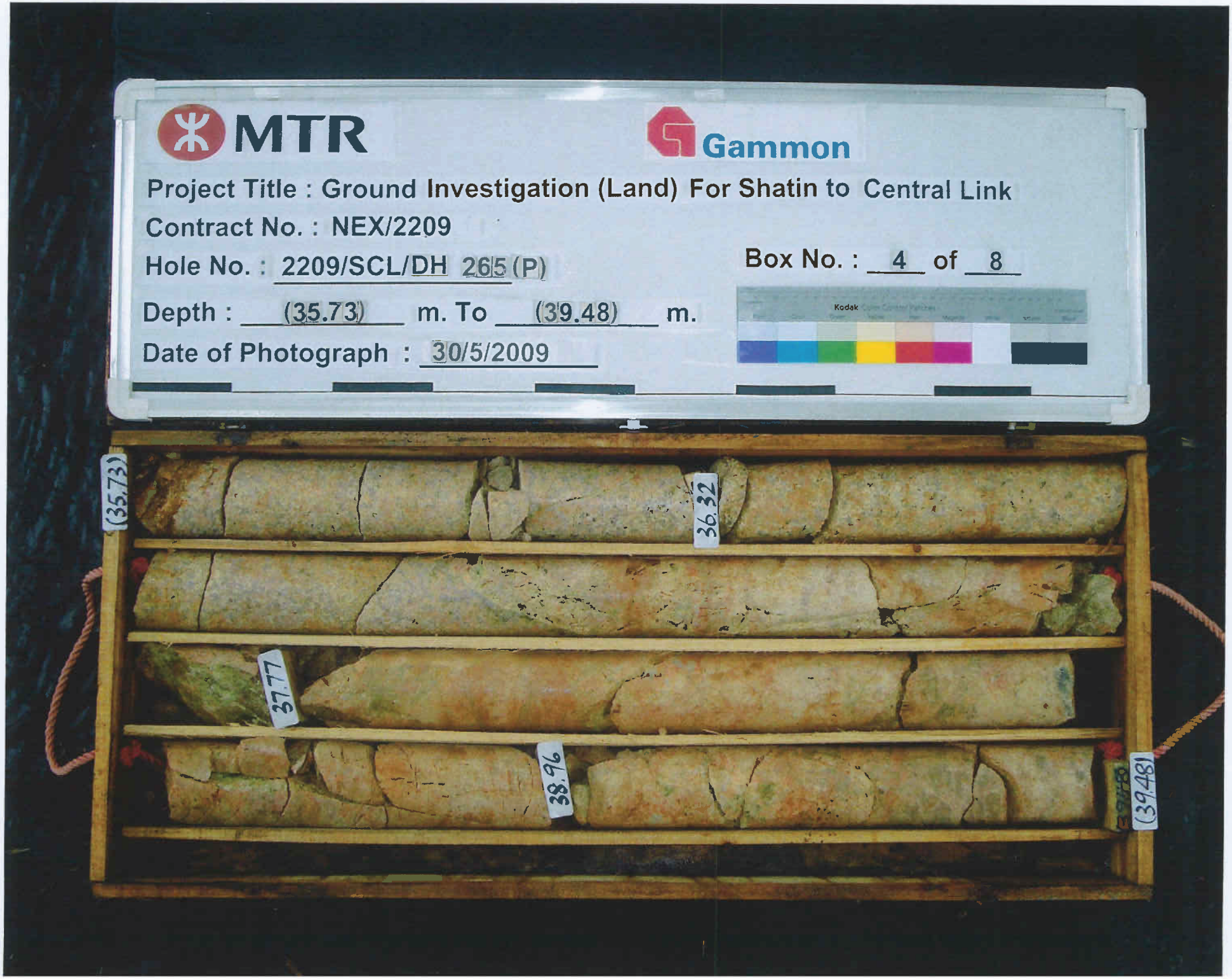
MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 265 (P)
Box No. : 1 of 8
Depth : 0.00 m. To 20.95 m.
Date of Photograph : 30/5/2009
Kodak Color Control Patches
0.00
2.90
3.60
7.50
7.90
8.10
8.10
8.70
9.00
20.95


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 265 (P)
Box No. : 2 of 8
Depth : 20.95 m. To 31.89 m.
Date of Photograph : 30/5/2009
Kodak Color Control Patches
20.95
29.08
29.60
30.68
31.89


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 265 (P)
Box No. : 3 of 8
Depth : 31.89 m. To (35.73) m.
Date of Photograph : 30/5/2009
31.89
33.27
34.80
(35.73)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 265 (P)
Box No. : 4 of 8
Depth : (35.73) m. To (39.48) m.
Date of Photograph : 30/5/2009
(35.73)
36.32
37.77
38.96
(39.48)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 265 (P)
Box No. : 5 of 8
Depth : (39.48) m. To (43.14) m.
Date of Photograph : 30/5/2009
(39.48)
40.50
41.88
(43.14)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 265 (P)
Box No. : 6 of 8
Depth : (43.14) m. To (46.79) m.
Date of Photograph : 30/5/2009
(43.14)
43.41
44.92
46.47
(46.79)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 265 (P)
Box No. : 7 of 8
Depth : (46.79) m. To (50.18) m.
Date of Photograph : 30/5/2009
(46.79)
48.00
49.54
(50.18)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 265 (P)
Box No. : 8 of 8
Depth : (50.18) m. To 53.05 m.
Date of Photograph : 30/5/2009
(50.81)
51.07
52.22
53.05
END

Gammon

STANDPIPE DETAIL AND RESPONSE TEST RECORD

CONTRACT NO. NEX/2209

DRILLHOLE No.
2209/SCL/DH265P
S 1

Project : Ground Investigation (Land) for Shatin to Central Link

Date Installed :	07/05/2009	**Project No. :**	J3251
Date Tested :	09/05/2009	**Co-ordinates :**	
Initial Water Level :	5.60 **m below G.L.**	**E** 835253.29	**N** 815593.71
Tested / Supervised by :	Raymond Lau	**Ground Level :**	7.70 **mPD**
Checked by :	P O POON	**Standpipe tip level :**	-20.30 **mPD**

Time Elapsed (minutes)	Depth of Water from Top of Pipe (m)
0.00	0.00
0.25	5.51
0.50	5.55
0.75	5.55

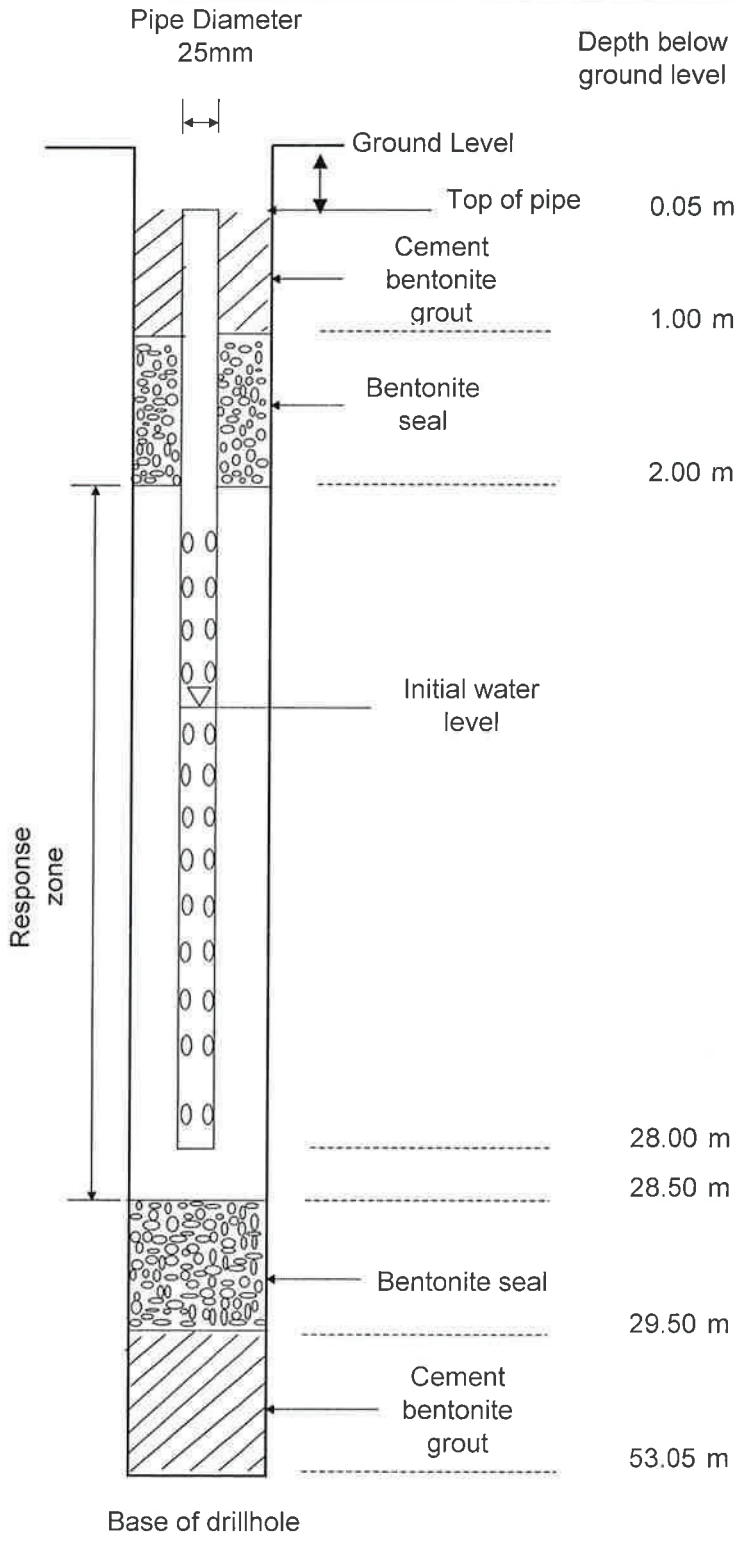
Filter material :

10-16mm Aggregates

Material surrounding response zone :

2.00-9.00: FILL
9.00-14.30: ALLUVIUM
14.30-28.50 Completely Decomposed GRANITE. (SILT/ SAND with gravel)

Remarks :



Gammon

STANDPIPE AND PIEZOMETER MONITORING RESULTS

Contract No. NEX/2209

Job No. J3251

Project : Ground Investigation (Land) for Shatin to Central Link

DATE	Recorded by	Drillhole No. / Pipe No.		
		2209/SCL/DH265P-S (28.00m) below G.L.		
09/05/2009	W F LI	5.55		
11/05/2009	W F LI	5.67		
12/05/2009	W F LI	5.62		
13/05/2009	W F LI	5.62		
14/05/2009	W F LI	5.63		
15/05/2009	W F LI	5.66		
16/05/2009	W F LI	5.66		

I:\QUALITY\GEOFORMS\MONI_B.XLS

Depths are from pipe top

Checked by: P O POON

Date: 18/05/2009

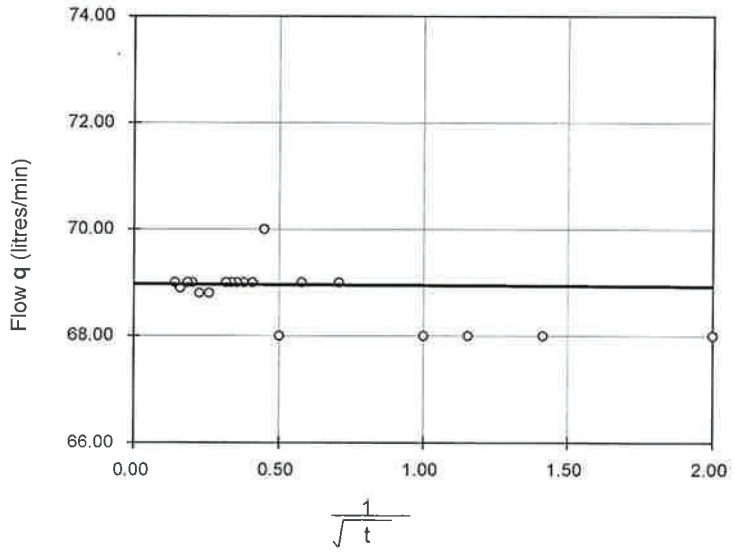
Gammon

CONSTANT HEAD PERMEABILITY TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH265P

Contract No. : NEX/2209	**Job No.:** J3251	**Test Date :** 23/04/2009	
Project : Ground Investigation (Land) for Shatin to Central Link		**Co-ordinates :** E 835253.29 N 815593.71	
Standpipe Tip Level :	6.85 **m below G.L.**	**Ground Level :**	7.70 **mPD**
Initial Water Level before test :	4.63 **m below G.L.**	**Tested / Supervised by :** Raymond Lau	
Depth of Base of Reponse Zone :	7.00 **m below G.L.**		
Flowmeter I.D. : FM370		**Checked by :** P O POON	

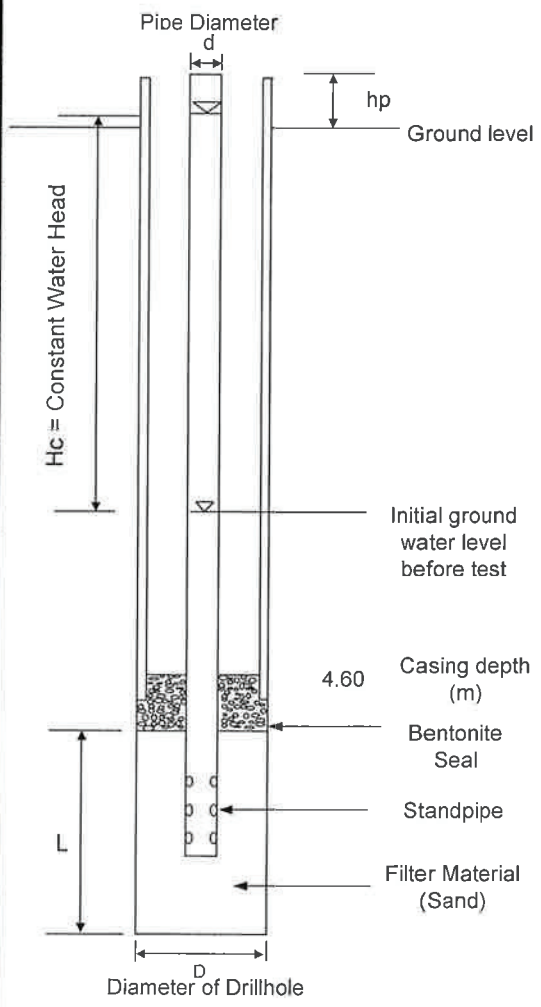
Elapsed Time t (minutes)	$\frac{1}{\sqrt{t}}$	Intake Flow Q (litres)	Flow q $\frac{\Delta Q}{\Delta t}$ (litres / min.)
0.00	∞	9772.00	0.00
0.25	2.00	9789.00	68.00
0.50	1.41	9806.00	68.00
0.75	1.15	9823.00	68.00
1.00	1.00	9840.00	68.00
2.00	0.71	9909.00	69.00
3.00	0.58	9978.00	69.00
4.00	0.50	10046.00	68.00
5.00	0.45	10116.00	70.00
6.00	0.41	10185.00	69.00
7.00	0.38	10254.00	69.00
8.00	0.35	10323.00	69.00
9.00	0.33	10392.00	69.00
10.00	0.32	10461.00	69.00
15.00	0.26	10805.00	68.80
20.00	0.22	11149.00	68.80
25.00	0.20	11494.00	69.00
30.00	0.18	11839.00	69.00
40.00	0.16	12528.00	68.90
50.00	0.14	13218.00	69.00



From graph, when t → ∞ (i.e. when $\frac{1}{\sqrt{t}}$ → 0)

q = 68.97 litres/min.

1.150E-03 m^3 / sec.



d = 0.025 m
D = 0.140 m
L = 1.50 m

hp = 0.47 m
Hc = 5.10 m

Where :

Shape Factor = F (in metres)

$$F = \frac{2.4\,\pi\,L}{\ln\left[1.2(L/D) + \sqrt{(1 + (1.2L/D)^2)}\right]} = 3.4815$$

Permeability: $k = \frac{q}{F\,Hc}$

k = 6.47E-05 m/sec

Material Surrounding Response Zone :

5.50-6.25m: Sandy clayey SILT with gravels (FILL)

6.25-6.70m: Silty SAND with gravels (FILL)

6.70-7.00m: Sandy subangular GRAVELS (FILL)

Gammon

CONSTANT HEAD PERMEABILITY TEST RECORD SHEET

DRILLHOLE No. **2209/SCL/DH265P**

Contract No. :	NEX/2209	**Job No.:**	J3251
Project :	Ground Investigation (Land) for Shatin to Central Link		
Standpipe Tip Level :	27.85	**m below G.L.**	
Initial Water Level before test :	3.97	**m below G.L.**	
Depth of Base of Reponse Zone :	28.00	**m below G.L.**	
Flowmeter I.D. :	FM370		

Test Date : 29/04/2009

Co-ordinates :

E 835253.29 **N** 815593.71

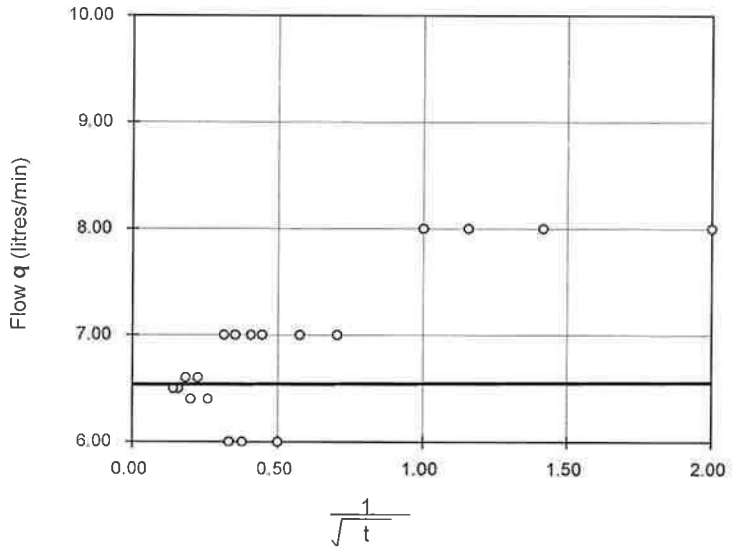
Ground Level : 7.70 **mPD**

Tested / Supervised by :

Raymond Lau

Checked by : P O POON

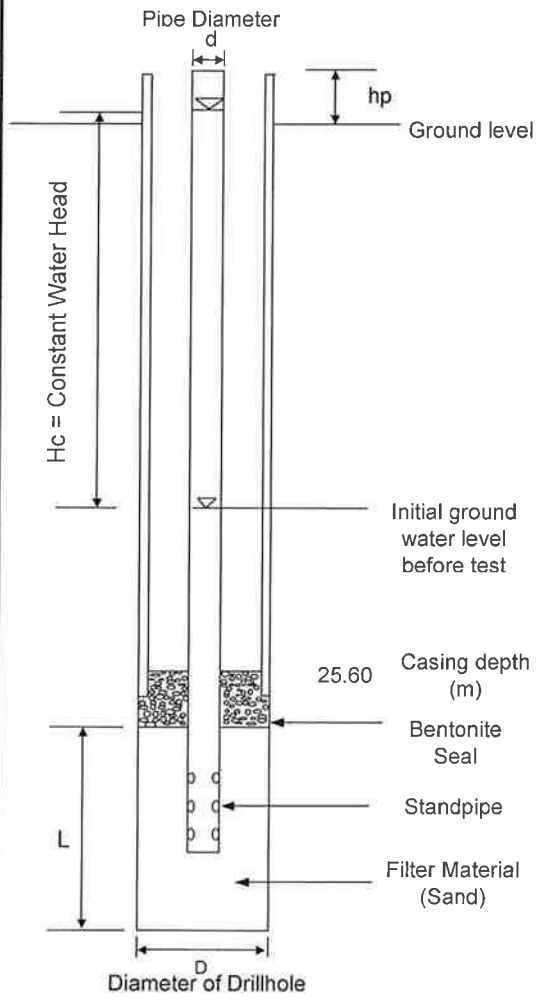
Elapsed Time t (minutes)	$\frac{1}{\sqrt{t}}$	Intake Flow Q (litres)	Flow q $\frac{\Delta Q}{\Delta t}$ (litres / min.)
0.00	∞	14458.00	0.00
0.25	2.00	14460.00	8.00
0.50	1.41	14462.00	8.00
0.75	1.15	14464.00	8.00
1.00	1.00	14466.00	8.00
2.00	0.71	14473.00	7.00
3.00	0.58	14480.00	7.00
4.00	0.50	14486.00	6.00
5.00	0.45	14493.00	7.00
6.00	0.41	14500.00	7.00
7.00	0.38	14506.00	6.00
8.00	0.35	14513.00	7.00
9.00	0.33	14519.00	6.00
10.00	0.32	14526.00	7.00
15.00	0.26	14558.00	6.40
20.00	0.22	14591.00	6.60
25.00	0.20	14623.00	6.40
30.00	0.18	14656.00	6.60
40.00	0.16	14721.00	6.50
50.00	0.14	14786.00	6.50



From graph, when t → ∞ (i.e. when $\frac{1}{\sqrt{t}}$ → 0)

q = 6.54 litres/min.

1.089E-04 m^3 / sec.



d = 0.038 m

D = 0.140 m

L = 1.50 m

hp = 1.58 m

Hc = 5.55 m

Where :

Shape Factor = F (in metres)

$$F = \frac{2.4\,\pi\,L}{\ln\left[1.2(L/D) + \sqrt{(1 + (1.2L/D)^2)}\right]} = 3.4815$$

Permeability:

$$k = \frac{q}{F\,Hc}$$

k = 5.64E-06 m/sec

Material Surrounding Response Zone :

26.50-27.15m: Completely Decomposed GRANITE (sandy SILT with gravels)

27.15-28.00m: Completely Decomposed GRANITE (silty SAND with gravels)

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH265P

Contract No. : NEX/2209	**Test No. :** 1
Project No. : J3251	**Date of test :** 05/05/2009
Project : Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :** W M LAU
Test Section : 37.76 **m** **to** 42.76 **m**	**Checked by :** P O POON

Packer type :	Double	Depth of hole at time of test :	53.05 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	25901	Rock type : Grade III GRANITE	Casing Details : Hx 29.08m

Pressure gauge height above ground level :	0.56 m
Depth to centre of test section (measured down line of drillhole) :	40.26 m
Depth to groundwater level (measured down line of drillhole) :	5.20 m

FIRST PERIOD — Gauge Pressure 228.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	14732.0	14761.0	14790.0	14817.0		
Water take	(litres/min)		5.80	5.80	5.40		5.67

SECOND PERIOD — Gauge Pressure 456.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	14877.0	14915.0	14953.0	14992.0		
Water take	(litres/min)		7.60	7.60	7.80		7.67

THIRD PERIOD — Gauge Pressure 684.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	15071.0	15124.0	15176.0	15228.0		
Water take	(litres/min)		10.60	10.40	10.40		10.47

FOURTH PERIOD — Gauge Pressure 456.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	15294.0	15336.0	15378.0	15421.0		
Water take	(litres/min)		8.40	8.40	8.60		8.47

FIFTH PERIOD — Gauge Pressure 228.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	15481.0	15512.0	15543.0	15574.0		
Water take	(litres/min)		6.20	6.20	6.20		6.20

Gammon

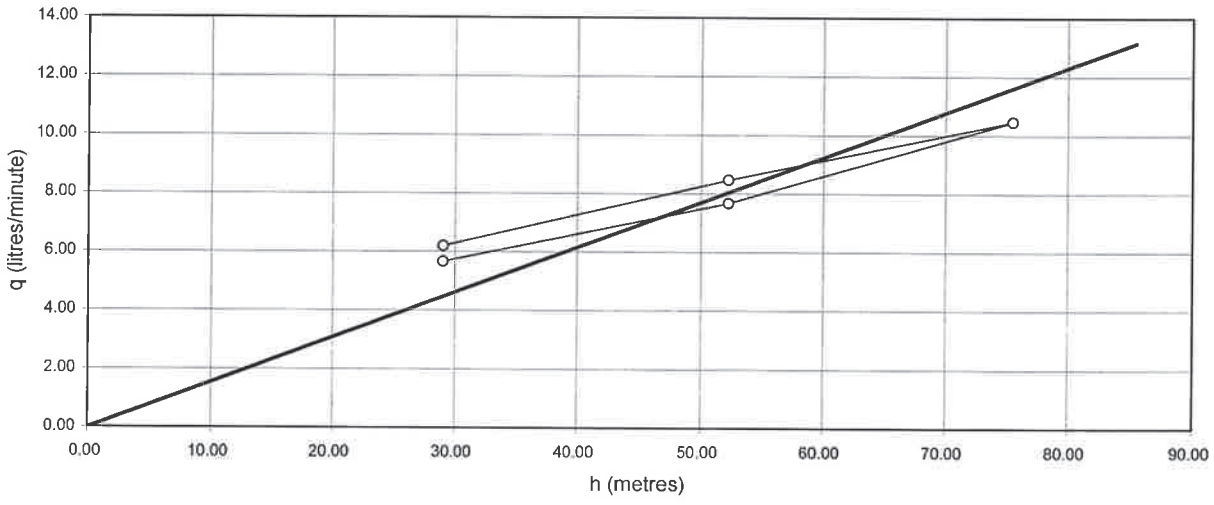
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH265P

Contract No. :	NEX/2209	**Test No. :**	1
Project No. :	J3251	**Test Date :**	05/05/2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	37.76 **m** **to** 42.76 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	53.05 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	101 mm
Presure gauge No. :	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	25901.00	Rock type : Grade III GRANITE	Casing Details : Hx 29.08m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 5.20 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	5.67	228.00	23.24			29.00	3.91
	7.67	456.00	46.48			52.24	2.93
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.56 m (3)	10.47	684.00	69.72			75.48	2.77
	8.47	456.00	46.48			52.24	3.24
	6.20	228.00	23.24			29.00	4.28



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **3.08** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section



DRAWING NO SCL/Z/00/CIV/C05/206

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE

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LEGEND :

- MTR PROTECTION ZONE
- 2209/SCL/DH008 — DRILLHOLES
- 2209/SCL/DH010(P) — DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/IDH013 — INCLINED DRILLHOLES
- 2209/SCL/TT015 — TRIAL TRENCHES
- 2209/SCL/EDH001 — ENVIRONMENTAL DRILLHOLES
- 2209/SCL/EDH001(P) — ENVIRONMENTAL DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/CH001 — INCLINED COREHOLE
- 2209/SCL/SS001 — SLOPE SURFACE STRIPPING

AS-BUILT CO-ORDINATES FOR DRILLHOLES / TRIAL TRENCHES

No.	EASTING	NORTHING
2209/SCL/DH264	835316.53	815631.77
2209/SCL/DH265(P)	835253.29	815593.71
2209/SCL/DH266(P)	835240.76	815593.86
2209/SCL/DH267(P)	835182.95	815590.57
2209/SCL/DH323(P)	835240.96	815609.92
2209/SCL/DH324(P)	835205.68	815564.67
2209/SCL/DH330(P)	835201.40	815557.93
2209/SCL/DH331	835213.89	815501.55
2209/SCL/DH345	835288.52	815616.16
2209/SCL/DH384	835098.73	815492.77
2209/SCL/DH385	835142.13	815486.40
2209/SCL/EDH165(P)	835190.10	815560.00
2209/SCL/TT161	835312.91	815630.58
2209/SCL/TT185	835186.65	815598.58
2209/SCL/TT187	835238.52	815562.72
2209/SCL/TT188	835167.92	815549.24
2209/SCL/TT189	835192.39	815543.08
2209/SCL/TT190	835203.27	815520.33
2209/SCL/TT191	835159.17	815537.12

REVISION	DESCRIPTION	BY	DATE	APPROVED
A	AS-BUILT RECORD FOR BD SUBMISSION	YKYONG	FEB 10	AMG

Registered Geotechnical Engineer

HUI TUNG MAN

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR
MTR CORPORATION LIMITED PROJECTS DIVISION | CIVIL ENGINEERING DEPARTMENT

TITLE
CONTRACT NEX2209
AS-BUILT DRILLHOLES AND TRIAL TRENCHES LAYOUT PLAN (SCHEDULED AREA)

SHEET 7

SCALE	1 : 1000 (A1)	CAD REF	SCL_Z00_CIV_C05_206	AS BUILT APPROVED	
DATE	03 APR 2008	AS BUILT DWG NO			
DRAWN	CL WONG	DESIGNED	D CHOW	DRAWING NO	REV
CHECKED	TM HUI	APPROVED	AMG	SCL/Z/00/CIV/C05/206	A

CAD REF X:\EP\SCL\P\active\2009\34-08-0008\34issue\NEX2209_(As-built)\SCL_Z00_CIV_C05_206A.dgn

PLOTTING TIME 28/04/10 9:11am

D:\pdf_conversion_procedure\New-project_driver\pdf_kcrc_150dpi.plt

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號 :
OUR REF 本署檔號 : BD 3/7001/08
FAX 圖文傳真 : 2973 0561
TEL 電話 : 2626 1577
www.bd.gov.hk

22 October 2009

Mr. HUI Tung-man
MTR Corporation Limited
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Hung Hom, Kowloon.

Dear Sir,

South Island Line (East)

I acknowledge receipt of your Form BA 14 submitted on **30 September 2009** in respect of the ground investigation field works (Stage I) for the above together with Ground Investigation Field Works Report, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Civil Engineering Department, MTRCL
MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

AP **Mr. YEUNG Sze-wai, Wilfred**
Architect Department,
8/F Citylink Plaza, Shatin, N.T.

香港九龍旺角彌敦道 750 號先驅中心 12 樓至 18 樓 12/F-18/F Pioneer Centre, 750 Nathan Road, Mongkok, Kowloon, Hong Kong.

屋宇署
BUILDINGS DEPARTMENT

5

YOUR REF 來函檔號：
OUR REF 本署檔號： **BD 3/7004/08 (Pt.II)**
FAX 圖文傳真： **2718 1477**
TEL 電話： **3105 3216**
www.info.gov.hk/bd

Mr. Stephen CHIK
MTR Corporation Limited,
Project Division,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

27 May 2010

Dear Sir,

Shatin to Central Link (SCL)

I herewith acknowledge your letter dated 12 May 2010 and received on 17 May 2010 enclosing the Form BA14 to certify the completion of Stage I Ground Investigation Works in both scheduled area and non-scheduled area at the captioned, and RGE's letter dated 26 May 2010 regarding clarification on the above records, the content of which has been noted.

PE-CIVIL & PLANNING DEPT.
CIVIL ENGINEERING SECTION
File No. /
SP#
Rec'd - 1 JUN 2010 Encl.

Name	Info.	Action	Initial
G S Harris			
C K Ho			
Edward Ngai (C)			
Linda Yeung			
Evan Tsui			
[illegible]			
Edward Ngai (M)			

Yours sincerely,

(WONG Wing-keung)
Senior Structural Engineer
for Building Authority

c.c. **RGE- Mr. HUI Tung-man**
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

AP - Yeung Sze-wai Wilfred
Architects Department,
8/F, Citylink Plaza,
Shatin,
N.T.

S.L. 4 (1/92)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH266P**

SHEET 1 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835240.76 N 815593.86	PROJECT No. J3251
MACHINE & No. MSK-2		DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.14 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
14/04/2009	PX	08:00								6.14	0.00			Brown and orangish brown, silty fine to medium SAND with some angular fine to coarse gravel sized rock fragments. (FILL)
									A 0.45 0.50 B 0.95 1.00 C 1.45 1.50 D 1.95 2.00 E 2.45 2.50 F 2.95 3.00 G 3.45 3.50					
									INSPECTION PIT	2.64	3.50			
		Dry at 18:00		100					1 3.50 2 3.90 4.00	2.14	4.00			Brown and dark grey, silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
14/04/2009 15/04/2009		Dry at 08:00		78					PX	2.03	4.11			Grey and pinkish brown, COBBLES and BOULDER sized strong tuff and granite. (FILL) 4.11 - 4.52m: BOULDER.
				89					4.40	1.62	4.52			
		Dry at 18:00							PX	1.25	4.89			Light grey, CONCRETE. (FILL)
15/04/2009 16/04/2009		4.70m at 08:00		79					5.15 PX 5.39 PX 5.61 PX 5.82 PX					
				82										
		4.30m at 18:00		98										
16/04/2009				96										
17/04/2009		4.10m at 08:00		88					6.08	0.06	6.08			Light pink and grey, BOULDER sized strong granite and tuff. (FILL)
									T2101 6.83	-0.86	7.00			Grey and light grey, BOULDER sized strong tuff with some subangular coarse gravel sized rock fragments. (FILL)
				86					T2101 7.48	-1.34	7.48			Grey and light grey, subangular coarse GRAVEL and COBBLES sized rock fragments. (FILL)
				67					T2101 8.00	-1.86	8.00			Grey and brown, slightly sandy subangular coarse GRAVEL sized rock fragments. (FILL)
				0										
				0					3 9.00 9.10	-2.96	9.10			Firm, brown, mottled orangish brown, SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
										-3.86	10.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 28/04/2009

CHECKED P O POON

DATE 29/04/2009

REMARKS

1. Inspection pit was dug to 3.50m depth.
2. Eastman tests were carried out at 5.00m, 10.00m, 15.00m, 20.00m, 25.00m depths.
3. Standpipe was installed at 23.32m depth.

t:\gintw\library\1july2009.glb\drillhole (1 feb 09) (ADM)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH266P**

SHEET **2** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835240.76 N 815593.86	PROJECT No. J3251
MACHINE & No. MSK-2		DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.14 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
												-3.86	10.00			
									4		10.10					As sheet 1 of 6.
									5		10.20	-4.06	10.20			
		3.90m at 18:00						1,2 1,1,1,2 N=5								Firm, light brown, mottled brown, SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
17/04/2009									6		10.60	-4.51	10.65			
18/04/2009		4.40m at 08:00		100					7		10.65				V	Extremely weak, orangish red, mottled white and brown, completely decomposed GRANITE. (Firm, SILT with some subangular fine to medium gravel sized quartz fragments)
	PX 11.00 HX															
									8		11.65					
								1,1 2,2,2,3 N=9	9		11.75					
									10		12.15	-6.06	12.20			
				85					11		12.20				V	Extremely weak, brown, mottled white and black, completely decomposed GRANITE. (Firm, sandy SILT with some subangular fine gravel sized quartz fragments)
		4.00m at 18:00														
18/04/2009									12		13.20					
20/04/2009		4.45m at 08:00						2,2 2,3,3,3 N=11	13		13.30					
				0					14		13.70					
											13.75					
									15		14.75	-8.71	14.85			
				0							14.85				V	Extremely weak, pink, mottled brown and white, completely decomposed GRANITE. (Firm to stiff, SILT with some subangular fine gravel sized quartz fragments)
									16		15.85					
								2,2 3,3,4,5 N=15	17		15.95					
									18		16.35	-10.26	16.40			
				100					19		16.40				V	Extremely weak, pink, mottled brown and white, completely decomposed GRANITE. (Firm to stiff, slightly sandy SILT with some subangular fine gravel sized quartz fragments)
		3.50m at 18:00														
20/04/2009									20		17.40					
21/04/2009		4.65m at 08:00						4,6 7,7,9,11 N=34	21		17.50					
									22		17.90	-11.81	17.95			
				90					23		17.95				V	Extremely weak, pink, mottled white, completely decomposed GRANITE. (Stiff, sandy SILT with some angular fine gravel sized feldspar fragments)
									24		18.95	-12.91	19.05			
								9,11 15,23,30,36 N=104	25		19.05				V	Extremely weak, dark reddish brown, completely decomposed GRANITE. (Stiff, sandy SILT with some angular fine gravel sized feldspar fragments)
									26		19.45	-13.36	19.50		V	
				100					27		19.50					Extremely weak, pink, mottled white, completely
													20.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **28/04/2009**

CHECKED **P O POON**

DATE **29/04/2009**

REMARKS

t:\gintwlibrary\1july2009.glb\drillhole (1 feb 09) (ADM)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH266P**

SHEET **3** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835240.76 N 815593.86	PROJECT No. J3251
MACHINE & No. MSK-2		DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.14 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
												-13.86	20.00			
				100					28		20.50				V	decomposed GRANITE. (Stiff, sandy SILT with some angular fine gravel sized feldspar fragments)
											20.60	-14.46	20.60			
				80				19,31/10mm 100/40mm 100bls/40mm	29		20.675				V	Extremely weak, pink, completely decomposed GRANITE. (Silty fine to medium SAND)
									30		20.725 20.74					
		3.00m at 18:00														
21/04/2009									31		21.74	-15.70	21.84			
22/04/2009		4.95m at 08:00						7,19 25,40,35/40mm 100bls/190mm	32		21.84				V	Extremely weak, pink, mottled grey, completely decomposed GRANITE. (Stiff, sandy SILT)
									33		22.13	-16.04	22.18			
				90					34		22.18				V	Very weak, greyish brown, completely decomposed GRANITE. (Slightly silty fine to coarse SAND with some subangular fine gravel sized rock fragments)
									35		23.18	-17.14	23.28			
								3,4 6,11,25,50 N=92	36		23.28				V	Extremely weak, orangish brown, mottled greyish brown, completely decomposed GRANITE. (Stiff, sandy SILT with occasional subangular fine gravel sized quartz fragments)
									37		23.68	-17.59	23.73			
				100					38		23.73				IV	Weak, pink, mottled brown, highly decomposed GRANITE. (Sandy angular fine to coarse GRAVEL sized rock fragments)
									39		24.22	-18.18	24.32			
				100	83	52	18.8				24.32				III	Moderately strong, pink, mottled light grey, spotted black, moderately decomposed medium grained GRANITE. Joints are medium to closely, locally very closely spaced, rough planar and undulating, tight to extremely narrow, chlorite coated, dipping 30°-40°, 60°-70° and subvertical.
							6.9			T2IOI						
				100	100	100	1.4				25.50					
										T2IOI						
		4.80m at 18:00														
22/04/2009	HX 26.97										26.97					
23/04/2009		5.05m at 08:00		98	95	79	11.4					-21.18	27.32			27.32 - 28.55m: With subvertical joints.
							2.6			T2IOI						
											28.45					
				100	98	98				T2IOI		-22.41	28.55			
											29.40					
				100	95	89				T2IOI						
												-23.86	30.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 28/04/2009

CHECKED P O POON

DATE 29/04/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH266P**

SHEET **4** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. MSK-2	E 835240.76 N 815593.86	DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.14 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	95	89				-23.86	30.00		III	As sheet 3 of 6.
									T2101 30.88	-24.66	30.80		III	Moderately strong, greyish pink, moderately decomposed fine grained GRANITE. Joints are medium to closely, locally very closely spaced, rough planar, extremely to very narrow, iron stained, kaolin coated, dipping 20°-30° and 50°-60°.
				100	99	55	8.9							
									T2101 32.37	-25.76	31.90			31.90 - 32.12m: PEGMATITE vein.
										-25.98	32.12			
				100	95	70	3.2							
									T2101 33.85					
				98	96	90								
		4.97m at 18:00							T2101 35.40					
23/04/2009														
24/04/2009		5.18m at 08:00		100	76	55	N.I. 11.1							
							>20 10.5		T2101 36.87					
							>20 8.5							
				100	98	57				-31.48	37.62		IV/III	37.62 - 37.73m: Weak to moderately weak, highly to moderately decomposed.
									T2101 38.40	-31.59	37.73		III	
										-31.83	37.97		IV/III	37.97 - 38.08m: Weak to moderately weak, highly to moderately decomposed.
										-31.94	38.08		III	
										-32.03	38.17		IV/III	38.17 - 38.22m: Weak to moderately weak, highly to moderately decomposed.
				100	96	71	>20 4.1			-32.08	38.22		III	
									T2101 39.91					
							10.6			-33.86	40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **28/04/2009**

CHECKED **P O POON**

DATE **29/04/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH266P**

SHEET **5** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835240.76 N 815593.86	PROJECT No. J3251
MACHINE & No. MSK-2		DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.14 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
										-33.86	40.00			
				100	94	73				-34.16	40.30		III	As sheet 4 of 6. 40.30 - 42.54m: Streaked dark brown.
							5.4		T2IO1					
									41.33					
				97	86	48			T2IO1					
		4.30m at 18:00					>20		42.68	-36.40	42.54			
24/04/2009 25/04/2009		4.72m at 08:00		99	92	80	9.8			-36.64	42.78			42.78 - 43.80m: Streaked greyish green.
									T2IO1	-37.21	43.35		IV/III	43.35 - 43.58m: Weak to moderately weak, highly to moderately decomposed.
										-37.44	43.58		III	
							1.7			-37.66	43.80			
				99	99	99			44.21					
									T2IO1					
										-39.06	45.20		III	Moderately strong, pink, mottled light grey, spotted black, moderately decomposed medium grained GRANITE. Joints are medium spaced, rough planar and undulating, tight, kaolin and chlorite coated, dipping 30°-40° and 50°-60°.
									45.70					
									T2IO1					
		4.28m at 18:00							46.63					
25/04/2009 27/04/2009		4.87m at 08:00		100	100	100								
									T2IO1					
							5.3		47.96					
				100	93	88			T2IO1					
									48.55					
				100	94	83			T2IO1					
										-43.86	50.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **28/04/2009**

CHECKED **P O POON**

DATE **29/04/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH266P**

SHEET **6** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. MSK-2	E 835240.76 N 815593.86	DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.14 mPD

Drilling Progress	Casing depth/size	Water Depth (m)	Water Recovery %	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
				100	100	83			No. Type Depth 50.09 T2101 51.59				III	As sheet 5 of 6.
27/04/2009		18:00								-45.45	51.59			End of hole at 51.59m depth.
											60.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **28/04/2009**

CHECKED **P O POON**

DATE **29/04/2009**

REMARKS

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MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 1 of 10
Depth : 0.0 0 m. To (7.03) m.
Date of Photograph : 30/5/2009
0.00
4.00
4.40
5.15
5.39
5.61
5.82
6.08
6.83
(7.03)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 2 of 10
Depth : (7.03) m. To (25.32) m.
Date of Photograph : 30/5/2009
(7.03)
7.48
8.00
24.32
(25.32)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 3 of 10
Depth : (25.32) m. To (28.67) m.
Date of Photograph : 30/5/2009
(25.32)
25.50
26.97
28.45
(28.67)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 4 of 10
Depth : (28.67) m. To 32.37 m.
Date of Photograph : 30/5/2009
Kodak Color Control Patches
(28.67)
29.40
30.88
32.37


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 5 of 10
Depth : 32.37 m. To (35.71) m.
Date of Photograph : 30/5/2009
Kodak
3237
3385
3540
(3571)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 6 of 10
Depth : (35.71) m. To (39.27) m.
Date of Photograph : 30/5/2009
Kodak Color Control Patches
(35.71)
36.87
38.40
(39.27)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 7 of 10
Depth : (39.27) m. To (42.78) m.
Date of Photograph : 30/5/2009
Kodak Color Control Patches
(39.27)
39.91
41.33
42.68
(42.78)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 8 of 10
Depth : (42.78) m. To (46.33) m.
Date of Photograph : 30/5/2009
Kodak Color Control Patches
(42.78)
42.78
44.21
45.70
(46.33)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 9 of 10
Depth : (46.33) m. To (49.93) m.
Date of Photograph : 30/5/2009
(46.33)
46.63
47.96
48.55
(49.93)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 266(P)
Box No. : 10 of 10
Depth : (49.93) m. To 51.59 m.
Date of Photograph : 30/5/2009
(49.93)
50.09
51.59
END

Gammon

STANDPIPE DETAIL AND RESPONSE TEST RECORD

CONTRACT NO. NEX/2209

DRILLHOLE No.
2209/SCL/DH266P
S 1

Project : Ground Investigation (Land) for Shatin to Central Link

Date Installed :	29/04/2009	**Project No. :**	J3251
Date Tested :	30/04/2009	**Co-ordinates :**	
Initial Water Level :	4.17 **m below G.L.**	**E** 835240.76	**N** 815593.86
Tested / Supervised by :	Raymond Lau	**Ground Level :**	6.14 **mPD**
Checked by :	P O POON	**Standpipe tip level :**	-17.18 **mPD**

Time Elapsed (minutes)	Depth of Water from Top of Pipe (m)
0.00	0.00
0.25	2.70
0.50	4.12
0.75	4.12

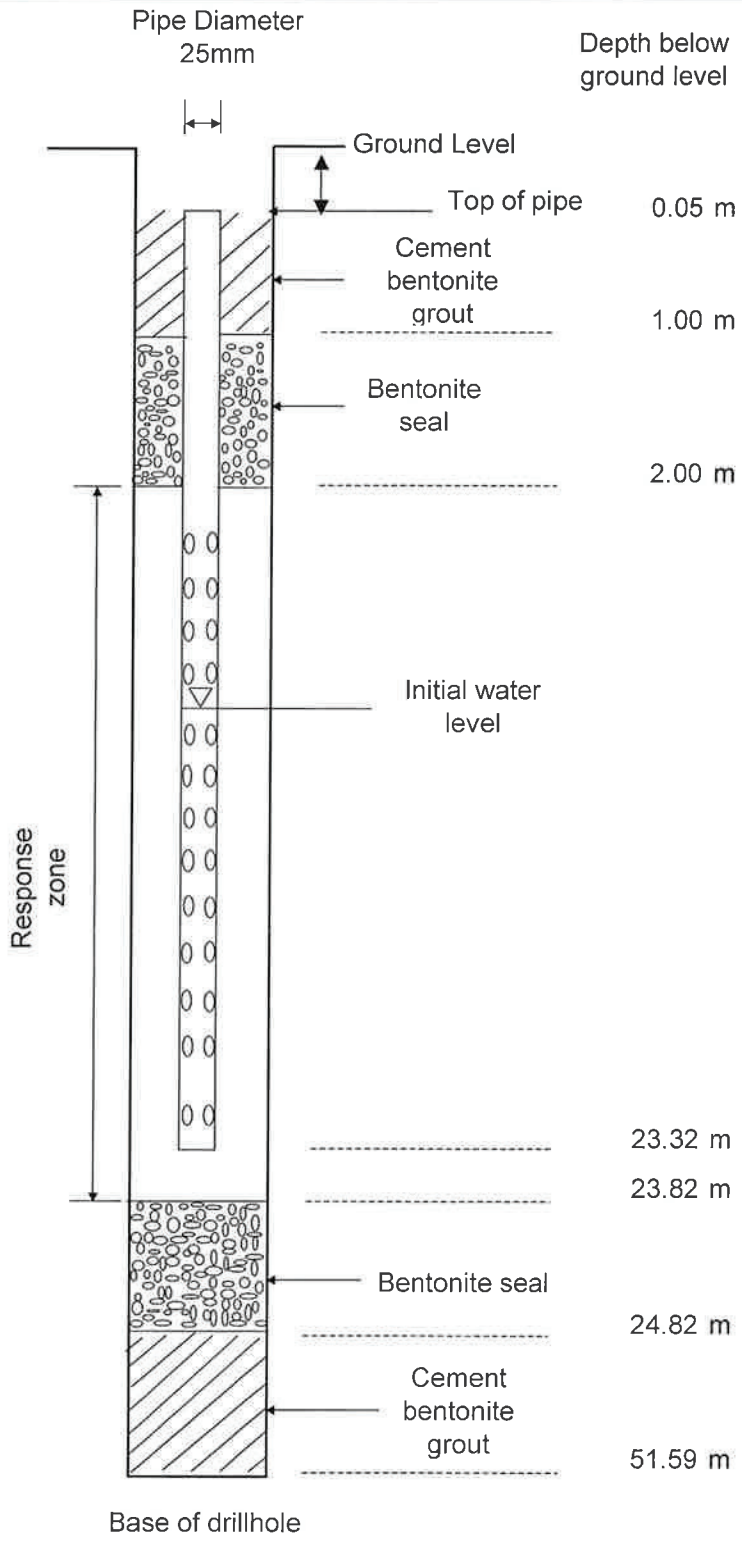
Filter material :

10-16mm Aggregates

Material surrounding response zone :

2.00-9.10: FILL
9.10-10.65: ALLUVIUM
10.65-23.73: Completely Decomposed GRANITE
23.73-23.82: Highly Decomposed GRANITE

Remarks :



Gammon

STANDPIPE AND PIEZOMETER MONITORING RESULTS

Contract No. NEX/2209

Job No. J3251

Project : Ground Investigation (Land) for Shatin to Central Link

DATE	Recorded by	Drillhole No. / Pipe No.		
		2209/SCL/DH266P-S (23.32m) below G.L.		
02/05/2009	W F LI	4.12		
04/05/2009	W F LI	4.11		
05/05/2009	W F LI	4.13		
06/05/2009	W F LI	4.11		
07/05/2009	W F LI	4.11		
08/05/2009	W F LI	4.09		
09/05/2009	W F LI	4.09		

I:\QUALITY\GEOFORMS\MONI_B.XLS

Depths are from pipe top

Checked by: P O POON

Date: 11/05/2009



DRAWING NO SCL/Z/00/CIV/C05/206

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE

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LEGEND :

- MTR PROTECTION ZONE
- 2209/SCL/DH008 — DRILLHOLES
- 2209/SCL/DH010(P) — DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/IDH013 — INCLINED DRILLHOLES
- 2209/SCL/TT015 — TRIAL TRENCHES
- 2209/SCL/EDH001 — ENVIRONMENTAL DRILLHOLES
- 2209/SCL/EDH001(P) — ENVIRONMENTAL DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/CH001 — INCLINED COREHOLE
- 2209/SCL/SS001 — SLOPE SURFACE STRIPPING

AS-BUILT CO-ORDINATES FOR DRILLHOLES / TRIAL TRENCHES

No.	EASTING	NORTHING
2209/SCL/DH264	835316.53	815631.77
2209/SCL/DH265(P)	835253.29	815593.71
2209/SCL/DH266(P)	835240.76	815593.86
2209/SCL/DH267(P)	835182.95	815590.57
2209/SCL/DH323(P)	835240.96	815609.92
2209/SCL/DH324(P)	835205.68	815564.67
2209/SCL/DH330(P)	835201.40	815557.93
2209/SCL/DH331	835213.89	815501.55
2209/SCL/DH345	835288.52	815616.16
2209/SCL/DH384	835098.73	815492.77
2209/SCL/DH385	835142.13	815486.40
2209/SCL/EDH165(P)	835190.10	815560.00
2209/SCL/TT161	835312.91	815630.58
2209/SCL/TT185	835186.65	815598.58
2209/SCL/TT187	835238.52	815562.72
2209/SCL/TT188	835167.92	815549.24
2209/SCL/TT189	835192.39	815543.08
2209/SCL/TT190	835203.27	815520.33
2209/SCL/TT191	835159.17	815537.12

REVISION	DESCRIPTION	BY	DATE	APPROVED
A	AS-BUILT RECORD FOR BD SUBMISSION	YKYONG	FEB 10	AMG

Registered Geotechnical Engineer

HUI TUNG MAN

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR
MTR CORPORATION LIMITED PROJECTS DIVISION | CIVIL ENGINEERING DEPARTMENT

TITLE
CONTRACT NEX2209
AS-BUILT DRILLHOLES AND TRIAL TRENCHES LAYOUT PLAN (SCHEDULED AREA)

SHEET 7

SCALE	1 : 1000 (A1)	CAD REF	SCL_Z00_CIV_C05_206	AS BUILT APPROVED	
DATE	03 APR 2008	AS BUILT DWG NO			
DRAWN	CL WONG	DESIGNED	D CHOW	DRAWING NO	REV
CHECKED	TM HUI	APPROVED	AMG	SCL/Z/00/CIV/C05/206	A

CAD REF X:\EP\SCL\P\active\2009\34-08-0008\34base\NEX2209_(As-built)\SCL_Z00_CIV_C05_206A.dgn

PLOTTING TIME 28/04/10 9:11am

D:\pdf_conversion_procedure\New-project_driver\pdf_kcrc_150dpi.plt

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號 :
OUR REF 本署檔號 : BD 3/7001/08
FAX 圖文傳真 : 2973 0561
TEL 電話 : 2626 1577
www.bd.gov.hk

22 October 2009

Mr. HUI Tung-man
MTR Corporation Limited
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Hung Hom, Kowloon.

Dear Sir,

South Island Line (East)

I acknowledge receipt of your Form BA 14 submitted on **30 September 2009** in respect of the ground investigation field works (Stage I) for the above together with Ground Investigation Field Works Report, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Civil Engineering Department, MTRCL
MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

AP **Mr. YEUNG Sze-wai, Wilfred**
Architect Department,
8/F Citylink Plaza, Shatin, N.T.

香港九龍旺角彌敦道 750 號先驅中心 12 樓至 18 樓 12/F-18/F Pioneer Centre, 750 Nathan Road, Mongkok, Kowloon, Hong Kong.

屋宇署
BUILDINGS DEPARTMENT

5

YOUR REF 來函檔號：
OUR REF 本署檔號： **BD 3/7004/08 (Pt.II)**
FAX 圖文傳真： **2718 1477**
TEL 電話： **3105 3216**
www.info.gov.hk/bd

Mr. Stephen CHIK
MTR Corporation Limited,
Project Division,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

27 May 2010

Dear Sir,

Shatin to Central Link (SCL)

I herewith acknowledge your letter dated 12 May 2010 and received on 17 May 2010 enclosing the Form BA14 to certify the completion of Stage I Ground Investigation Works in both scheduled area and non-scheduled area at the captioned, and RGE's letter dated 26 May 2010 regarding clarification on the above records, the content of which has been noted.

PE-CIVIL & PLANNING DEPT.
CIVIL ENGINEERING SECTION
File No. /
SP#
Rec'd - 1 JUN 2010 Encl.

Name	Info.	Action	Initial
G S Harris			
C K Ho			
Edward Ngai (C)			
Linda Yeung			
Evan Tsui			
[illegible]			
Edward Ngai (M)			

Yours sincerely,

(WONG Wing-keung)
Senior Structural Engineer
for Building Authority

c.c. **RGE- Mr. HUI Tung-man**
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

AP - Yeung Sze-wai Wilfred
Architects Department,
8/F, Citylink Plaza,
Shatin,
N.T.

S.L. 4 (1/92)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH267P**

SHEET 1 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835182.95 N 815590.57	PROJECT No. J3251
MACHINE & No. MSK-2		DATE from 30/04/2009 to 14/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.67 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
												6.67	0.00			
30/04/2009	PX	08:00							A		0.45 0.50	6.17	0.50			Light brown, silty fine to medium SAND with some subangular coarse gravel sized rock fragments. (FILL)
									B		0.95 1.00					Brown, silty fine to medium SAND with some subangular coarse gravel sized rock and concrete fragments and broken PVC pipe. (FILL)
									C		1.45 1.50					
									D		1.95 2.00	4.67	2.00			Light brown and grey, sandy subangular fine to coarse GRAVEL sized rock fragments. (FILL)
		0.95m at 18:00							E		2.35 2.40	4.27	2.40			
30/04/2009											2.40 2.50	4.17	2.50			Light grey, CONCRETE. (FILL)
04/05/2009		Dry at 08:00		100 0												Stiff, brown, sandy SILT with some subangular fine to coarse gravel sized rock and brick fragments. (FILL)
									1		3.40 3.50	3.27 3.17	3.40 3.50			3.40 - 3.50m: Dark brown, decayed wood pieces. (FILL)
				100					2		3.60					
									3		4.60	1.97	4.70			
								2,2 3,4,3,2 N=12	4		4.70					Medium dense, brown, slightly silty fine to coarse SAND with some subangular coarse gravel sized rock fragments. (FILL)
									5		5.10 5.15	1.52	5.15			Stiff, brown, sandy SILT with some subangular fine gravel sized rock fragments. (FILL)
				98					6							
									7		6.15					
								1,1 0,1,0,2 N=3	8		6.25					
									9		6.65					
				88					10		6.70					
									11		7.70	-1.13	7.80			
								1,2 3,3,2,4 N=12	12		7.80					Firm, brown, mottled orangish brown, sandy CLAY/SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
									13		8.20 8.25	-1.58	8.25			
				100					14							Firm, light pink, CLAY/SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
		0.95m at 18:00							15		9.25 9.35	-2.68	9.35			
04/05/2009																
05/05/2009		1.20m at 08:00						1,1 2,3,4,4 N=13	16							Firm to stiff, brown, mottled light pink, CLAY/SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
	PX 9.80 HX			100					17		9.75 9.80	-3.13	9.80			
									18				10.00			

INSPECTION PIT

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 15/05/2009

CHECKED P O POON

DATE 16/05/2009

REMARKS

1. Inspection pit was dug to 2.40m depth.
2. Eastman tests were carried out at 5.00m, 10.00m, 15.00m, 20.00m and 25.00m depths.
3. Constant head permeability tests were carried out at 7.50m-9.00m and 15.50m-17.00m depths.
4. Standpipe was installed at 16.10m depth.

(to be continued...)

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH267P**

SHEET **2** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835182.95 N 815590.57	PROJECT No. J3251
MACHINE & No. MSK-2		DATE from 30/04/2009 to 14/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.67 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 -3.33	Depth (m) 10.00	Legend	Grade	Description
				100					19 10.80 10.90	-4.23	10.90			Firm, reddish brown, slightly sandy SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
05/05/2009		3.92m at 18:00												
06/05/2009		4.45m at 08:00						2,2 3,2,4,5 N=14	20				V	Extremely weak, orangish brown, completely decomposed GRANITE. (Stiff, sandy SILT with some subangular fine gravel sized quartz fragments)
									21 11.30 11.35	-4.68	11.35			
				100					22				V	Extremely weak, white, mottled pink, completely decomposed GRANITE. (Firm, slightly sandy SILT with some angular to subangular fine gravel sized quartz fragments)
									23 12.35 12.45					
								2,2 3,4,7,8 N=22	24					
									25 12.85 12.90	-6.23	12.90			
				100					26				V	Extremely weak, pink, mottled white and light brown, completely decomposed GRANITE. (Firm to stiff, sandy SILT with some to much angular fine to medium gravel sized quartz fragments)
									27 13.90 14.00					
								1,2 2,4,7,10 N=23	28					
									29 14.40 14.45					
				100					30					
									31 15.45 15.55	-8.88	15.55		V	Extremely weak, reddish brown, completely decomposed GRANITE. (Stiff, sandy SILT)
								2,4 7,7,9,13 N=36	32					
									33 15.95 16.00	-9.33	16.00		V/IV	Very weak, pink, completely to highly decomposed fine grained GRANITE. (Sandy subangular fine to coarse GRAVEL sized quartz and feldspar fragments)
				100					34					
		4.73m at 18:00							35 17.00 17.10	-10.43	17.10			
06/05/2009														
07/05/2009		5.03m at 08:00		97	62	34	N.I.		T2IOI	-10.64	17.31		III	Moderately strong, pink, mottled light grey and light green, moderately decomposed slightly chloritized medium grained GRANITE. Joints are medium, locally closely spaced, rough planar, tight to extremely narrow, iron stained, chlorite coated, dipping 30°-40° and 60°-70°. 17.10 - 17.31m: Pink, fine grained GRANITE. 17.56 - 18.36m: Pink, fine grained GRANITE.
	HX 17.71	4.96m at 08:00		100	34	34	1.4		17.42	-10.89	17.56			
07/05/2009									T2IOI 17.71					
08/05/2009		5.21m at 08:00		98	93	93			T2IOI 18.16	-11.69	18.36			
				100	100	100			T2IOI 18.94	-12.25	18.92			18.92 - 19.76m: Pink, fine grained GRANITE and with subvertical joint.
				100	100	100			T2IOI	-13.09	19.76			
											20.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **15/05/2009**

CHECKED **P O POON**

DATE **16/05/2009**

REMARKS

5. Acoustic televiewer survey was carried out at 17.55m-52.64m depth.
6. Packer (Water Absorption) tests were carried out at 24.49m-29.49m and 37.49m-42.49m depths.

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH267P**

SHEET 3 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. MSK-2	E 835182.95 N 815590.57	DATE from 30/04/2009 to 14/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.67 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
										-13.33	20.00			
				100	100	100			T2101 20.40	-13.51	20.18		III	20.18 - 21.05m: Pink, fine grained GRANITE and with chlorite (<5mm) infills.
				100	100	97				-14.38	21.05			
		5.13m at 18:00							T2101 21.90					
08/05/2009 09/05/2009		5.38m at 08:00		100	100	94								
							9.5		T2101 23.45					
							1.5							
				100	100	97								
									T2101 24.99	-17.63	24.30			
										-17.83	24.50			24.30 - 24.50m: PEGMATITE.
				95	95	74				-18.33	25.00			25.00 - 25.40m: Fine grained GRANITE.
							5.0			-18.73	25.40			
									T2101 26.48	-19.78	26.45			
				100	100	86				-19.81	26.48			26.45 - 26.48m: PEGMATITE.
										-20.53	27.20			
							7.0		T2101 27.72				III	Moderately strong, pink, moderately decomposed fine grained GRANITE. Joints are closely spaced, smooth planar, extremely narrow, iron stained, chlorite coated, dipping 30°-40°, 50°-60° and 60°-70°.
		4.70m at 18:00												
09/05/2009 11/05/2009		5.41m at 08:00		100	100	68								
				97	97	70			T2101 29.14					
										-23.33	30.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 15/05/2009

CHECKED P O POON

DATE 16/05/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH267P**

SHEET **4** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. MSK-2	E 835182.95 N 815590.57	DATE from 30/04/2009 to 14/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.67 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
				97	97	70			T2IO1 30.69	-23.33	30.00		III	As sheet 3 of 6.
				99	99	99	1.2		T2IO1 32.19	-24.23	30.90		III	Moderately strong, pink, mottled light grey and light green, moderately decomposed slightly chloritized medium grained GRANITE. Joints are widely to medium, locally closely spaced, rough planar and undulating, tight to extremely narrow, iron stained, chlorite coated, calcite infilled, dipping 50°-60° and 60°-70°.
				99	97	97			T2IO1 33.74					
				100	100	100			T2IO1 35.19					
11/05/2009		4.80m at 18:00												
12/05/2009		5.48m at 08:00		100	100	100			T2IO1 36.65					
				100	100	97			T2IO1 38.20	-31.18	37.85			37.85 - 38.10m: With dark green, mafic mineral.
				100	100	100	5.9		T2IO1 39.70	-31.43	38.10			
				100	100	100	2.0		T2IO1	-33.33	40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **15/05/2009**

CHECKED **P O POON**

DATE **16/05/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH267P**

SHEET **5** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835182.95 N 815590.57	PROJECT No. J3251
MACHINE & No. MSK-2		DATE from 30/04/2009 to 14/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.67 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				-33.33	40.00		III	As sheet 4 of 6.
									T2101 41.20					
				100	100	100								
									T2101 42.67	-35.53	42.20			
										-35.58	42.25			42.20 - 42.25m: PEGMATITE.
		4.82m at 18:00								-35.96	42.63			
12/05/2009 13/05/2009		5.63m at 08:00		100	89	72	7.4							42.63 - 42.97m: With dark green, mafic mineral and rough slickensided joints.
										-36.30	42.97			
							2.1		T2101 44.01					
				100	100	100								
									T2101 45.56					
				100	100	100				-39.07	45.74			
										-39.25	45.92			45.74 - 45.92m: PEGMATITE.
									T2101 47.02					
				100	90	90				-40.63	47.30			
														47.30 - 48.20m: PEGMATITE with chlorite coated joints, dipping 60°-70°.
		4.97m at 18:00					2.6		T2101 48.36	-41.53	48.20			
13/05/2009 14/05/2009		5.72m at 08:00		100	100	100								
									T2101 49.86	-43.33	50.00			
				100	100	87								

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **15/05/2009**

CHECKED **P O POON**

DATE **16/05/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH267P**

SHEET **6** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835182.95 N 815590.57	PROJECT No. J3251
MACHINE & No. MSK-2		DATE from 30/04/2009 to 14/05/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.67 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	87				-43.33	50.00		III	As sheet 5 of 6.
							4.2		T2101 51.32					
				100	92	92				-44.99	51.66			51.66 - 52.12m: With dark green, mafic mineral.
									T2101	-45.45	52.12			
14/05/2009		18:00							52.84	-46.17	52.84			End of hole at 52.84m depth.
											60.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **15/05/2009**

CHECKED **P O POON**

DATE **16/05/2009**

REMARKS

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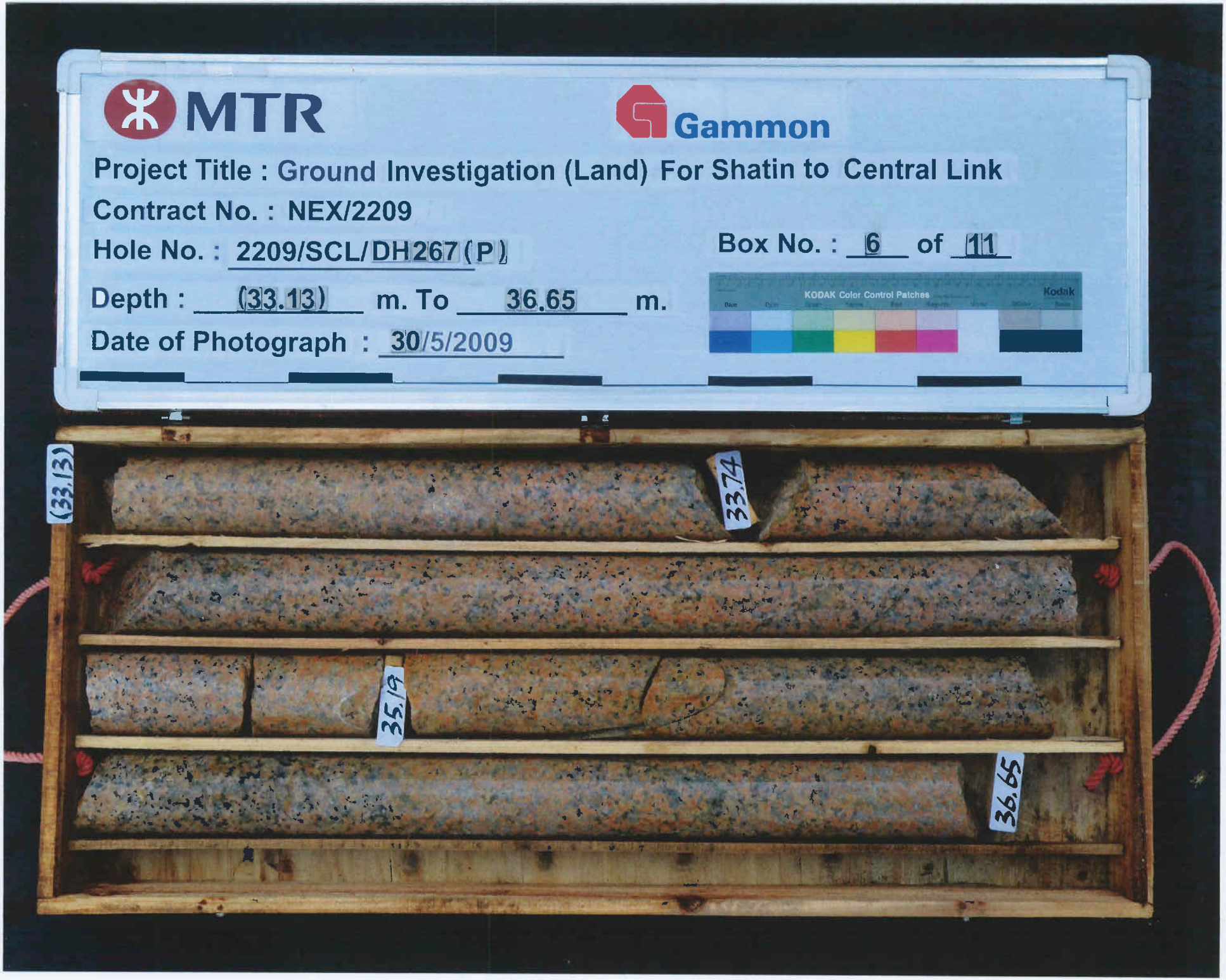
MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267(P)
Box No. : 1 of 11
Depth : 0.00 m. To (18.75) m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
Kodak
0.00
2.40
2.40
2.50
17.10
17.42
17.71
18.16
(18.75)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267(P)
Box No. : 2 of 11
Depth : (18.75) m. To (22.32) m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
Kodak
(18.75)
18.94
20.40
21.90
(22.32)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267 (P)
Box No. : 3 of 11
Depth : (22.32) m. To (25.93) m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
Kodak
(22.32)
23.45
24.99
(25.93)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267(P)
Box No. : 4 of 11
Depth : (25.93) m. To (29.53) m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
Kodak
(25.93)
26.48
27.72
29.14
(29.53)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267(P)
Box No. : 5 of 11
Depth : (29.53) m. To (33.13) m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
Kodak
(29.53)
30.69
32.19
32.17
(33.13)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267(P)
Box No. : 6 of 11
Depth : (33.13) m. To 36.65 m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
Kodak
(33.13)
33.74
35.19
36.65


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267(P)
Box No. : 7 of 11
Depth : 36.65 m. To (40.15) m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
Kodak
36.65
38.20
39.70
(40.15)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267 (P)
Box No. : 8 of 11
Depth : (40.15) m. To (43.70) m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
Kodak
(40.15)
41.20
42.67
(43.70)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267(P)
Box No. : 9 of 11
Depth : (43.70) m. To (47.30) m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
(43.70)
44.01
45.56
47.02
(47.30)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267(P)
Box No. : 10 of 11
Depth : (47.30) m. To (50.79) m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
Kodak
(47.30)
48.36
49.86
(50.79)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH267(P)
Box No. : 11 of 11
Depth : (50.79) m. To 52.84 m.
Date of Photograph : 30/5/2009
KODAK Color Control Patches
(50.79)
51.32
52.84
END

Gammon

STANDPIPE DETAIL AND RESPONSE TEST RECORD

CONTRACT NO. NEX/2209

DRILLHOLE No.
2209/SCL/DH267P
S 1

Project : Ground Investigation (Land) for Shatin to Central Link

Date Installed :	18/05/2009	**Project No. :**	J3251
Date Tested :	20/05/2009	**Co-ordinates :**	
Initial Water Level :	4.38 **m below G.L.**	**E** 835182.95	**N** 815590.57
Tested / Supervised by :	Raymond Lau	**Ground Level :**	6.67 **mPD**
Checked by :	P O POON	**Standpipe tip level :**	-9.43 **mPD**

Time Elapsed (minutes)	Depth of Water from Top of Pipe (m)
0.00	0.00
0.25	1.10
0.50	2.30
0.75	3.50
1.00	3.65
2.00	4.00
3.00	4.20
4.00	4.27
5.00	4.28
6.00	4.31
7.00	4.32
8.00	4.33

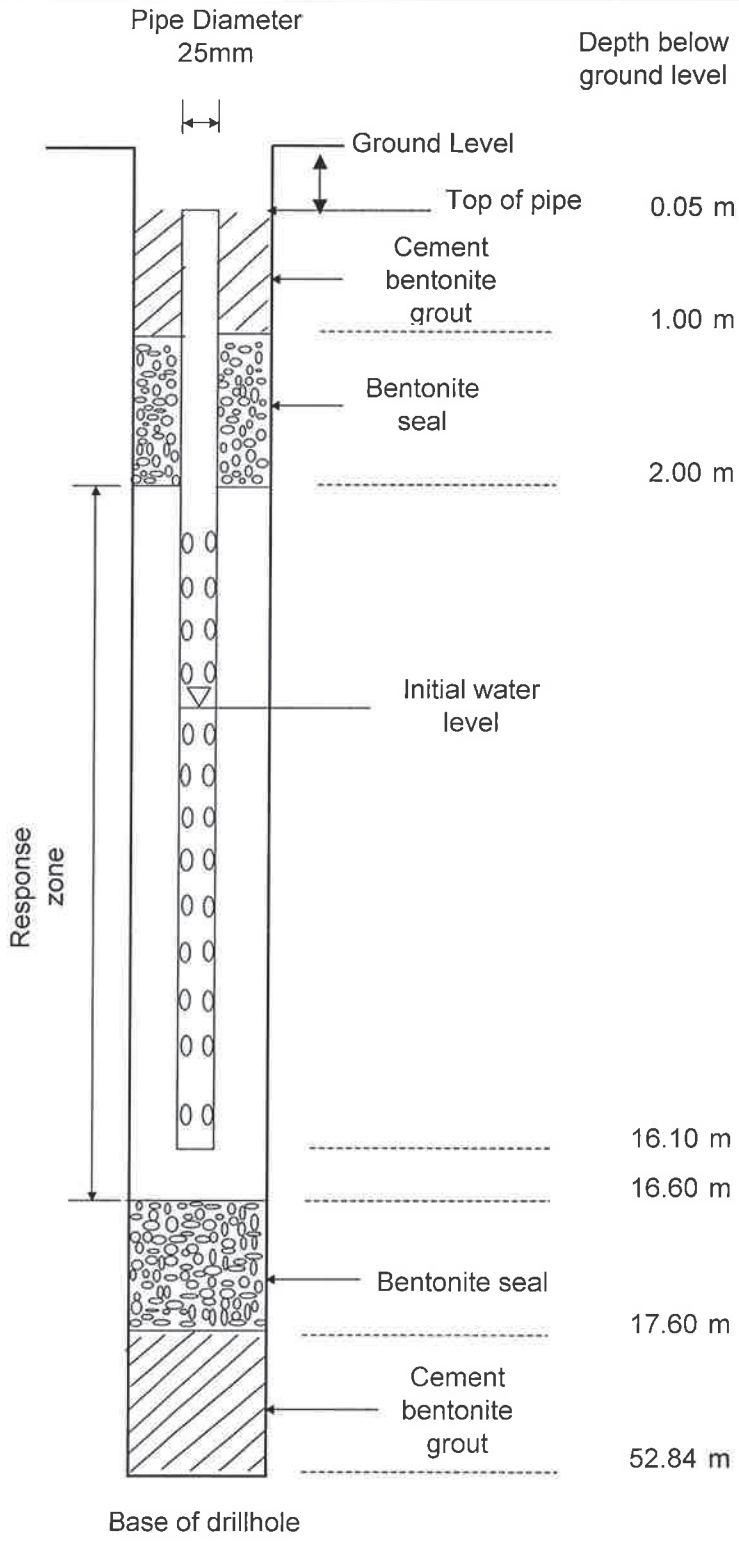
Filter material :

10-16mm Aggregates

Material surrounding response zone :

2.00-7.80: FILL
7.80-10.90: ALLUVIUM
10.90-16.00: Completely Decomposed GRANITE
16.00-16.60: Completely to Highly Decomposed GRANITE

Remarks :



Gammon	STANDPIPE AND PIEZOMETER MONITORING RESULTS Contract No. NEX/2209	Job No. J3251

Project : Ground Investigation (Land) for Shatin to Central Link

DATE	Recorded by	Drillhole No. / Pipe No.		
		2209/SCL/DH267P-S (16.10m) below G.L.		
20/05/2009	W F LI	4.33		
21/05/2009	W F LI	4.45		
22/05/2009	W F LI	4.39		
23/05/2009	W F LI	4.45		
25/05/2009	W F LI	4.40		
26/05/2009	W F LI	4.41		
27/05/2009	W F LI	4.41		

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Depths are from pipe top

Checked by: P O POON

Date: 29/05/2009

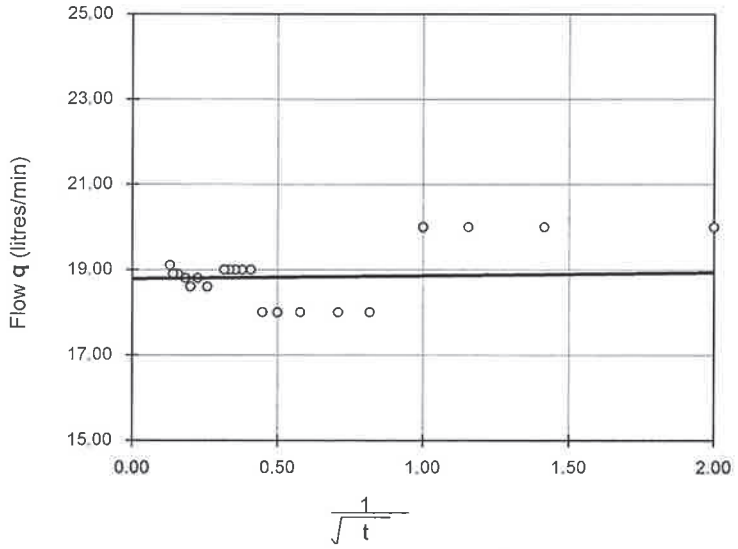
Gammon

CONSTANT HEAD PERMEABILITY TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH267P

Contract No. : NEX/2209	**Job No.:** J3251	**Test Date :** 05/05/2009	
Project : Ground Investigation (Land) for Shatin to Central Link		**Co-ordinates :** E 835182.95 N 815590.57	
Standpipe Tip Level :	8.70 **m below G.L.**	**Ground Level :**	6.67 **mPD**
Initial Water Level before test :	1.55 **m below G.L.**	**Tested / Supervised by :**	
Depth of Base of Reponse Zone :	9.00 **m below G.L.**	Raymond Lau	
Flowmeter I.D. : FM370		**Checked by :**	P O POON

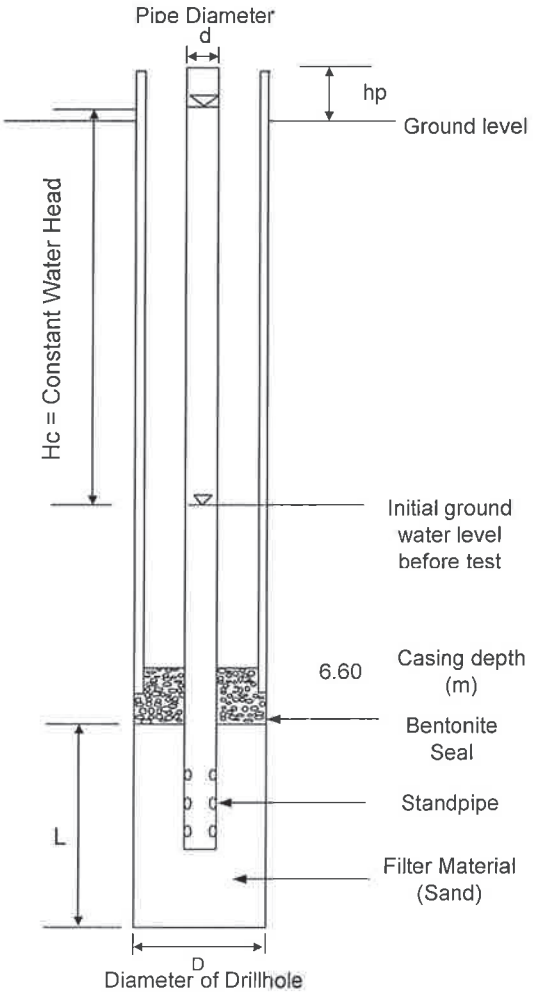
Elapsed Time t (minutes)	$\frac{1}{\sqrt{t}}$	Intake Flow Q (litres)	Flow q $\frac{\Delta Q}{\Delta t}$ (litres / min.)
0.00	∞	13902.00	0.00
0.25	2.00	13907.00	20.00
0.50	1.41	13912.00	20.00
0.75	1.15	13917.00	20.00
1.00	1.00	13922.00	20.00
1.50	0.82	13931.00	18.00
2.00	0.71	13940.00	18.00
3.00	0.58	13958.00	18.00
4.00	0.50	13976.00	18.00
5.00	0.45	13994.00	18.00
6.00	0.41	14013.00	19.00
7.00	0.38	14032.00	19.00
8.00	0.35	14051.00	19.00
9.00	0.33	14070.00	19.00
10.00	0.32	14089.00	19.00
15.00	0.26	14182.00	18.60
20.00	0.22	14276.00	18.80
25.00	0.20	14369.00	18.60
30.00	0.18	14463.00	18.80
40.00	0.16	14652.00	18.90
50.00	0.14	14841.00	18.90
60.00	0.13	15032.00	19.10



From graph, when t → ∞ (i.e. when $\frac{1}{\sqrt{t}}$ → 0)

q = 18.79 litres/min.

3.131E-04 m^3 / sec.



d = 0.038 m
D = 0.140 m
L = 1.50 m

hp = 1.58 m
Hc = 3.13 m

Where :

Shape Factor = F (in metres)

$$F = \frac{2.4\,\pi\,L}{\ln\left[1.2(L/D) + \sqrt{(1 + (1.2L/D)^2)}\right]} = 3.4815$$

Permeability: $k = \frac{q}{F\,Hc}$

k = 2.87E-05 m/sec

Material Surrounding Response Zone :

7.50-7.80m: Sandy SILT with gravels (FILL)

7.80-8.25m:Sandy CLAY/SILT with gravels(ALLUVIUM)

8.25-9.00m: CLAY/SILT with gravels (ALLUVIUM)

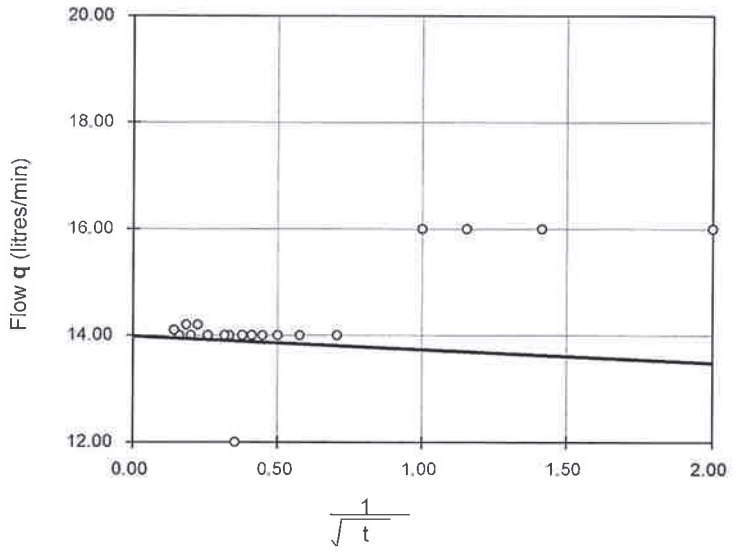
Gammon

CONSTANT HEAD PERMEABILITY TEST RECORD SHEET

DRILLHOLE No. **2209/SCL/DH267P**

Contract No. : NEX/2209	**Job No.:** J3251	**Test Date :** 07/05/2009	
Project : Ground Investigation (Land) for Shatin to Central Link		**Co-ordinates :** E 835182.95 N 815590.57	
Standpipe Tip Level :	16.85 **m below G.L.**	**Ground Level :**	6.67 **mPD**
Initial Water Level before test :	3.45 **m below G.L.**	**Tested / Supervised by :**	
Depth of Base of Reponse Zone :	17.00 **m below G.L.**	Raymond Lau	
Flowmeter I.D. : FM370		**Checked by :** P O POON	

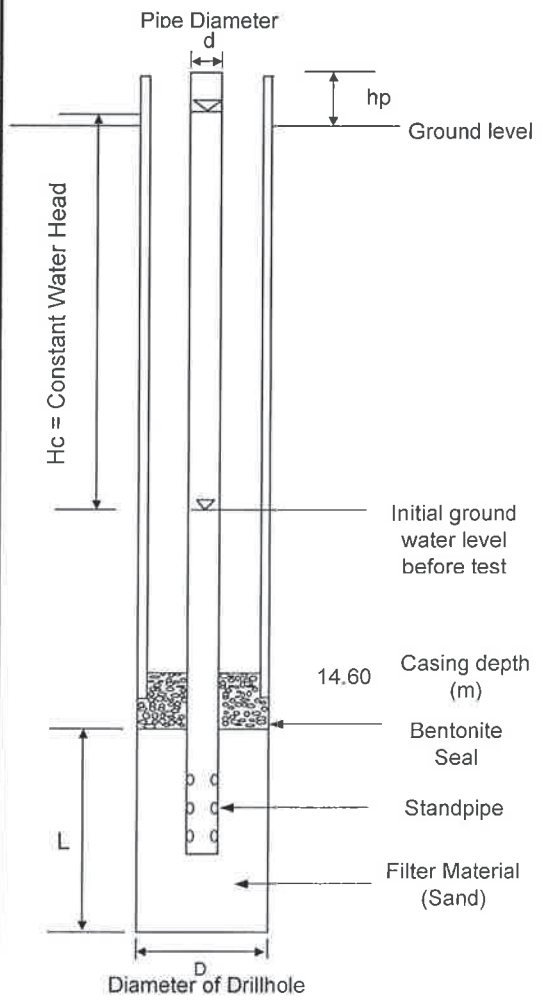
Elapsed Time t (minutes)	$\frac{1}{\sqrt{t}}$	Intake Flow Q (litres)	Flow q $\frac{\Delta Q}{\Delta t}$ (litres / min.)
0.00	∞	15605.00	0.00
0.25	2.00	15609.00	16.00
0.50	1.41	15613.00	16.00
0.75	1.15	15617.00	16.00
1.00	1.00	15621.00	16.00
2.00	0.71	15635.00	14.00
3.00	0.58	15649.00	14.00
4.00	0.50	15663.00	14.00
5.00	0.45	15677.00	14.00
6.00	0.41	15691.00	14.00
7.00	0.38	15705.00	14.00
8.00	0.35	15717.00	12.00
9.00	0.33	15731.00	14.00
10.00	0.32	15745.00	14.00
15.00	0.26	15815.00	14.00
20.00	0.22	15886.00	14.20
25.00	0.20	15956.00	14.00
30.00	0.18	16027.00	14.20
40.00	0.16	16167.00	14.00
50.00	0.14	16308.00	14.10



From graph, when t → ∞ (i.e. when $\frac{1}{\sqrt{t}}$ → 0)

q = 13.99 litres/min.

2.331E-04 m^3 / sec.



d = 0.038 m
D = 0.140 m
L = 1.50 m

hp = 1.58 m
Hc = 5.03 m

Where :

Shape Factor = F (in metres)

$$F = \frac{2.4\,\pi\,L}{\ln\left[1.2(L/D) + \sqrt{(1 + (1.2L/D)^2)}\right]} = 3.4815$$

Permeability: $k = \frac{q}{F\,Hc}$

k = 1.33E-05 m/sec

Material Surrounding Response Zone :

15.5-16.0m: Completely Decomposed GRANITE (sandy SILT)

16.0-17.0m: Completely and Highly Decomposed GRANITE (sandy subangular GRAVELS)

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH267P

Contract No. :	NEX/2209	**Test No. :**	1
Project No. :	J3251	**Date of test :**	15/05/2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	24.49 **m** **to** 29.49 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	52.84 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	25901	Rock type : Grade III GRANITE	Casing Details : Hx 17.71m

Pressure gauge height above ground level : 0.56 m

Depth to centre of test section (measured down line of drillhole) : 26.99 m

Depth to groundwater level (measured down line of drillhole) : 4.97 m

FIRST PERIOD — Gauge Pressure 162.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17595.0	17596.0	17597.0	17598.0		
Water take	(litres/min)		0.20	0.20	0.20		0.20

SECOND PERIOD — Gauge Pressure 324.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17599.0	17601.0	17603.0	17605.2		
Water take	(litres/min)		0.40	0.40	0.44		0.41

THIRD PERIOD — Gauge Pressure 486.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17608.0	17617.0	17626.0	17635.7		
Water take	(litres/min)		1.80	1.80	1.94		1.85

FOURTH PERIOD — Gauge Pressure 324.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17646.0	17649.0	17652.2	17655.3		
Water take	(litres/min)		0.60	0.64	0.62		0.62

FIFTH PERIOD — Gauge Pressure 162.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17657.0	17658.0	17659.0	17660.0		
Water take	(litres/min)		0.20	0.20	0.20		0.20

Gammon

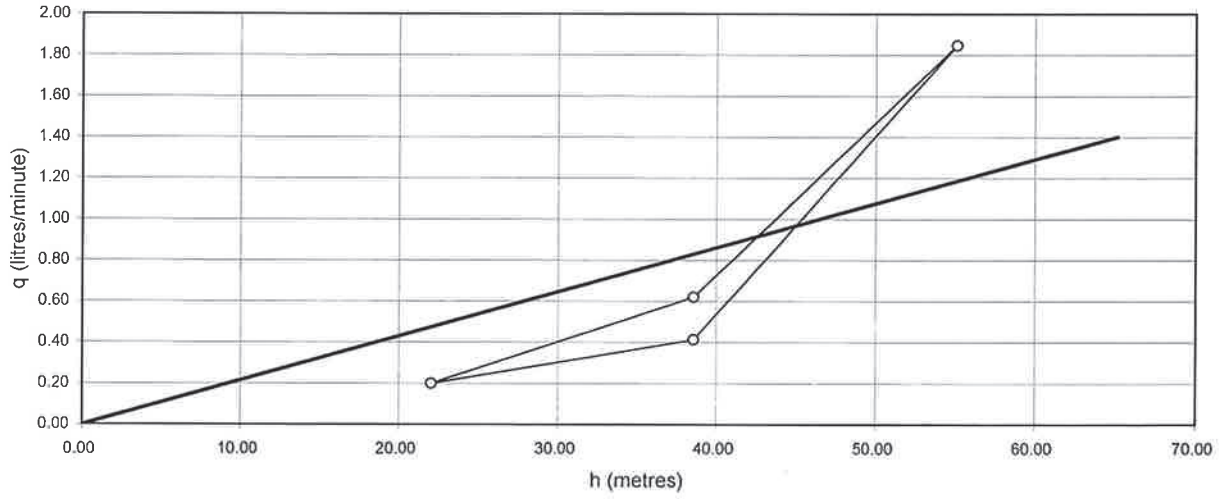
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH267P

Contract No. :	NEX/2209	**Test No. :**	1
Project No. :	J3251	**Test Date :**	15/05/2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	24.49 **m** **to** 29.49 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	52.84 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	101 mm
Presure gauge No. :	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	25901.00	Rock type : Grade III GRANITE	Casing Details : Hx 17.71m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD **h** (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 4.97 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	0.20	162.00	16.51			22.04	0.18
	0.41	324.00	33.03			38.56	0.21
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.56 m (3)	1.85	486.00	49.54			55.07	0.67
	0.62	324.00	33.03			38.56	0.32
	0.20	162.00	16.51			22.04	0.18



Type of Flow Dilation

$L = \frac{100}{lh} q =$ **0.43 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH267P

Contract No. :	NEX/2209	**Test No. :**	2
Project No. :	J3251	**Date of test :**	16/05/2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	37.49 **m** **to** 42.49 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	52.84 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	25901	Rock type : Grade III GRANITE	Casing Details : Hx 17.71m

Pressure gauge height above ground level : 0.56 m

Depth to centre of test section (measured down line of drillhole) : 39.99 m

Depth to groundwater level (measured down line of drillhole) : 5.63 m

FIRST PERIOD — Gauge Pressure 240.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17733.0	17791.0	17849.0	17908.0		
Water take	(litres/min)		11.60	11.60	11.80		11.67

SECOND PERIOD — Gauge Pressure 480.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18060.0	18130.0	18200.0	18270.0		
Water take	(litres/min)		14.00	14.00	14.00		14.00

THIRD PERIOD — Gauge Pressure 720.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18296.0	18392.0	18490.0	18586.0		
Water take	(litres/min)		19.20	19.60	19.20		19.33

FOURTH PERIOD — Gauge Pressure 480.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18701.0	18774.0	18847.0	18920.0		
Water take	(litres/min)		14.60	14.60	14.60		14.60

FIFTH PERIOD — Gauge Pressure 240.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	19022.0	19077.0	19134.0	19190.0		
Water take	(litres/min)		11.00	11.40	11.20		11.20

Gammon

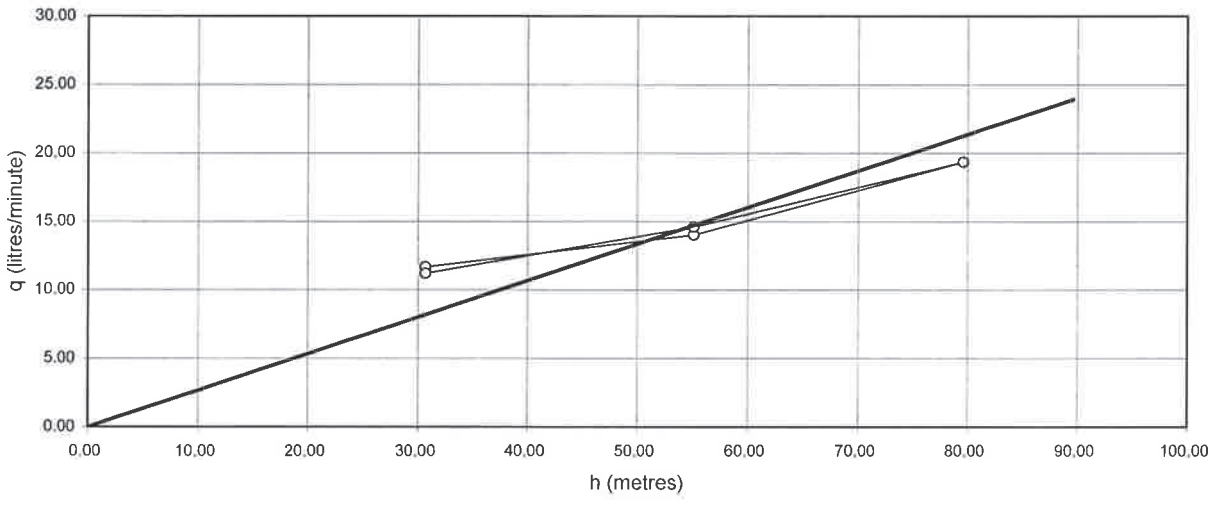
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH267P

Contract No. :	NEX/2209	**Test No. :**	2
Project No. :	J3251	**Test Date :**	16/05/2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	37.49 **m** **to** 42.49 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	52.84 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	101 mm
Presure gauge No. :	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	25901.00	Rock type : Grade III GRANITE	Casing Details : Hx 17.71m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
5.63 m (2)	11.67	240.00	24.46			30.65	7.61
	14.00	480.00	48.93			55.12	5.08
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	19.33	720.00	73.39			79.58	4.86
0.56 m (3)	14.60	480.00	48.93			55.12	5.30
	11.20	240.00	24.46			30.65	7.31



Type of Flow Turbulent

$L = \frac{100}{lh} q =$ **5.34** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section



DRAWING NO SCL/Z/00/CIV/C05/206

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE

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LEGEND :

- MTR PROTECTION ZONE
- 2209/SCL/DH008 — DRILLHOLES
- 2209/SCL/DH010(P) — DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/IDH013 — INCLINED DRILLHOLES
- 2209/SCL/TT015 — TRIAL TRENCHES
- 2209/SCL/EDH001 — ENVIRONMENTAL DRILLHOLES
- 2209/SCL/EDH001(P) — ENVIRONMENTAL DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/CH001 — INCLINED COREHOLE
- 2209/SCL/SS001 — SLOPE SURFACE STRIPPING

AS-BUILT CO-ORDINATES FOR DRILLHOLES / TRIAL TRENCHES

No.	EASTING	NORTHING
2209/SCL/DH264	835316.53	815631.77
2209/SCL/DH265(P)	835253.29	815593.71
2209/SCL/DH266(P)	835240.76	815593.86
2209/SCL/DH267(P)	835182.95	815590.57
2209/SCL/DH323(P)	835240.96	815609.92
2209/SCL/DH324(P)	835205.68	815564.67
2209/SCL/DH330(P)	835201.40	815557.93
2209/SCL/DH331	835213.89	815501.55
2209/SCL/DH345	835288.52	815616.16
2209/SCL/DH384	835098.73	815492.77
2209/SCL/DH385	835142.13	815486.40
2209/SCL/EDH165(P)	835190.10	815560.00
2209/SCL/TT161	835312.91	815630.58
2209/SCL/TT185	835186.65	815598.58
2209/SCL/TT187	835238.52	815562.72
2209/SCL/TT188	835167.92	815549.24
2209/SCL/TT189	835192.39	815543.08
2209/SCL/TT190	835203.27	815520.33
2209/SCL/TT191	835159.17	815537.12

REVISION	DESCRIPTION	BY	DATE	APPROVED
A	AS-BUILT RECORD FOR BD SUBMISSION	YKYONG	FEB 10	AMG

Registered Geotechnical Engineer

HUI TUNG MAN

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR
MTR CORPORATION LIMITED PROJECTS DIVISION | CIVIL ENGINEERING DEPARTMENT

TITLE
CONTRACT NEX2209
AS-BUILT DRILLHOLES AND TRIAL TRENCHES LAYOUT PLAN (SCHEDULED AREA)

SHEET 7

SCALE	1 : 1000 (A1)	CAD REF	SCL_Z00_CIV_C05_206	AS BUILT APPROVED	
DATE	03 APR 2008	AS BUILT DWG NO			
DRAWN	CL WONG	DESIGNED	D CHOW	DRAWING NO	REV
CHECKED	TM HUI	APPROVED	AMG	SCL/Z/00/CIV/C05/206	A

CAD REF X:\EP\SCL\P\active\2009\34-08-0008\34base\NEX2209_(As-built)\SCL_Z00_CIV_C05_206A.dgn

PLOTTING TIME 28/04/10 9:11am

D:\pdf_conversion_procedure\New-project_driver\pdf_kcrc_150dpi.plt

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號 :
OUR REF 本署檔號 : BD 3/7001/08
FAX 圖文傳真 : 2973 0561
TEL 電話 : 2626 1577
www.bd.gov.hk

22 October 2009

Mr. HUI Tung-man
MTR Corporation Limited
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Hung Hom, Kowloon.

Dear Sir,

South Island Line (East)

I acknowledge receipt of your Form BA 14 submitted on **30 September 2009** in respect of the ground investigation field works (Stage I) for the above together with Ground Investigation Field Works Report, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Civil Engineering Department, MTRCL
MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

AP **Mr. YEUNG Sze-wai, Wilfred**
Architect Department,
8/F Citylink Plaza, Shatin, N.T.

香港九龍旺角彌敦道 750 號先驅中心 12 樓至 18 樓 12/F-18/F Pioneer Centre, 750 Nathan Road, Mongkok, Kowloon, Hong Kong.

屋宇署
BUILDINGS DEPARTMENT

5

YOUR REF 來函檔號：
OUR REF 本署檔號： **BD 3/7004/08 (Pt.II)**
FAX 圖文傳真： **2718 1477**
TEL 電話： **3105 3216**
www.info.gov.hk/bd

Mr. Stephen CHIK
MTR Corporation Limited,
Project Division,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

27 May 2010

Dear Sir,

Shatin to Central Link (SCL)

I herewith acknowledge your letter dated 12 May 2010 and received on 17 May 2010 enclosing the Form BA14 to certify the completion of Stage I Ground Investigation Works in both scheduled area and non-scheduled area at the captioned, and RGE's letter dated 26 May 2010 regarding clarification on the above records, the content of which has been noted.

PE-CIVIL & PLANNING DEPT.
CIVIL ENGINEERING SECTION
File No. /
SP#
Rec'd - 1 JUN 2010 Encl.

Name	Info.	Action	Initial
G S Harris			
C K Ho			
Edward Ngai (C)			
Linda Yeung			
Evan Tsui			
[illegible]			
Edward Ngai (M)			

Yours sincerely,

(WONG Wing-keung)
Senior Structural Engineer
for Building Authority

c.c. **RGE- Mr. HUI Tung-man**
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

AP - Yeung Sze-wai Wilfred
Architects Department,
8/F, Citylink Plaza,
Shatin,
N.T.

S.L. 4 (1/92)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH324P**

SHEET 1 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835205.68 N 815564.67	PROJECT No. J3251
MACHINE & No. 20-0114		DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.08 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
												6.08	0.00			
14/04/2009	PX	08:00							A		0.45 0.50					Stiff, brown and light grey, sandy SILT with some subangular fine to coarse gravel sized rock and concrete fragments. (FILL)
									B		0.95 1.00					
									C		1.45 1.50	4.58	1.50			
									D		1.95 2.00					Stiff, brown and yellow, sandy clayey SILT with occasional subangular fine to coarse gravel sized rock fragments. (FILL)
									E		2.45 2.50					
									F		2.95 3.00	3.08	3.00			
				100					1							Stiff, brown and pink, sandy SILT with some subangular fine to coarse gravel sized rock fragments. (FILL)
									2		4.00 4.10	1.98	4.10			
								3,2 1,1,2,1 N=5	3							Firm, brown, mottled red, sandy SILT with some subangular fine gravel sized rock fragments. (ALLUVIUM)
									4		4.50 4.55	1.53	4.55			
				100					5							Firm, reddish brown, mottled brown, sandy CLAY/SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
		2.50m at 18:00							6		5.55 5.65	0.43	5.65			
14/04/2009 15/04/2009	PX	4.70m at 08:00						2,1 1,1,2,2 N=6	7							Soft to firm, brown, mottled white, CLAY/SILT with much angular fine to medium gravel sized quartz fragments. (ALLUVIUM)
	6.00 HX								8		6.05 6.10	-0.02	6.10			
				100					9							Firm to stiff, light brown, mottled white and reddish brown, slightly sandy SILT with much angular fine gravel sized quartz fragments. (ALLUVIUM)
									10		7.10 7.20	-1.12	7.20			
								2,1 1,1,2,1 N=5	11							Stiff, brown, mottled reddish brown, slightly sandy SILT with some angular fine gravel sized quartz fragments. (ALLUVIUM)
									12		7.60 7.65	-1.57	7.65			
				82					13							Dense, purplish red, clayey silty fine to coarse SAND with some angular to subangular fine to medium gravel sized quartz fragments. (ALLUVIUM)
									14		8.65 8.75	-2.67	8.75			
								1,1 1,1,2,4 N=8	15							Firm to stiff, reddish brown, mottled white and brown, slightly sandy SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
									16		9.15 9.20					
				100					17			-3.92	10.00			

INSPECTION PIT

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 28/04/2009

CHECKED P O POON

DATE 29/04/2009

REMARKS

1. Inspection pit was dug to 3.00m depth.
2. Eastman tests were carried out at 5.00m, 10.00m, 15.00m, 20.00m, 25.00m depths.
3. Constant head permeability tests were carried out at 5.00m-7.00m and 17.00m-18.50m depths.
4. Standpipe was installed at 18.85m depth.

(to be continued...)

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH324P**

SHEET 2 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835205.68 N 815564.67	PROJECT No. J3251
MACHINE & No. 20-0114		DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.08 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
												-3.92	10.00			As sheet 1 of 6.
15/04/2009 16/04/2009		3.20m at 18:00 4.75m at 08:00		100				1,1 1,2,2,4 N=9	18		10.20 10.30	-4.22	10.30			Firm to stiff, light green, mottled light grey, streaked brown, SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
									19							
									20		10.70 10.75	-4.67	10.75			
				100					21						V	Extremely weak, orangish brown, mottled white, completely decomposed GRANITE. (Firm, slightly sandy SILT with some subangular fine gravel sized quartz fragments)
									22		11.75 11.85	-5.77	11.85			
								2,2 2,3,3,5 N=13	23						V	Extremely weak, reddish brown, completely decomposed GRANITE. (Silty fine to medium SAND with some subangular fine gravel sized quartz fragments)
				100					24		12.25 12.30					
									25							
									26		13.30 13.40	-7.32	13.40			
								2,4 7,6,5,8 N=26	27						V	Extremely weak, pink, mottled black and light green, completely decomposed GRANITE. (Very stiff, slightly sandy SILT with some subangular fine gravel sized quartz fragments)
									28		13.80 13.85	-7.77	13.85		V	
				80					29							Extremely weak, reddish brown, completely decomposed GRANITE. (Silty fine to medium SAND with much subangular fine gravel sized quartz fragments)
		3.05m at 18:00														
16/04/2009 17/04/2009		4.70m at 08:00							30		14.85 14.95	-8.87	14.95			
								2,3 4,8,9,10 N=31	31						V	Extremely weak, light brownish green, mottled light grey, completely decomposed GRANITE. (Very stiff, sandy SILT with some subangular fine gravel sized quartz fragments)
									32		15.35 15.40	-9.32	15.40		V	
				0												Extremely weak, purplish red, completely decomposed GRANITE. (Silty fine to medium SAND with some subangular fine gravel sized rock fragments)
									33		16.40 16.50					
				83					34							
		3.10m at 18:00														
17/04/2009 18/04/2009		10.32m at 08:00							35		17.50 17.60	-11.52	17.60			
								3,4 6,8,10,12 N=36	36						V	Extremely weak, pink, completely decomposed GRANITE. (Firm, sandy SILT with some angular fine gravel sized quartz fragments)
18/04/2009 20/04/2009		4.70m at 18:00 4.20m at 08:00		0					37		18.00 18.05	-11.97	18.05		V	Very weak, pink, mottled white, completely decomposed GRANITE. (Silty fine to coarse SAND)
									38		19.05 19.15					
				100					39							
		3.90m at 18:00														
20/04/2009 21/04/2009	HX 19.85	4.40m		80	71	31	N.I.		40		19.75 19.85	-13.77	19.85 20.00		III	Moderately strong, greyish pink, moderately

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 28/04/2009

CHECKED P O POON

DATE 29/04/2009

REMARKS

5. Acoustic televiewer survey was carried out at 20.00m-30.00m and 32.00-42.00m depths.
6. Packer (Water Absorption) tests were carried out at 23.08m-28.08m and 36.09m-41.08m depths.

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH324P**

SHEET **3** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. 20-0114	E 835205.68 N 815564.67	DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.08 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
										-13.92	20.00			
		at 08:00		88	71	31	4.9		T2O1 20.20	-14.09	20.17		III	decomposed fine grained GRANITE. Joints are medium spaced, rough planar, tight to extremely narrow, chlorite coated, dipping 60°-70°. 20.17 - 20.29m: Medium grained GRANITE.
				97	83	83				-14.21	20.29			
				100	100	100	1.4		T2I01 20.56	-14.69	20.77		III	Moderately strong, pink, mottled light grey, spotted black and greyish green, moderately decomposed medium grained altered GRANITE. Joints are medium spaced, rough undulating, tight to extremely narrow, chlorite coated, dipping 50°-60°.
							4.5		T2I01 21.81					
				100	93	87								
							1.3		T2I01 23.25	-16.75	22.83		III/II	Moderately strong to strong, light pink, mottled light grey, spotted black, moderately to slightly decomposed medium grained GRANITE. Joints are widely spaced, rough planar, tight, chlorite coated, dipping 50°-60°.
21/04/2009		3.70m at 18:00												
22/04/2009		5.63m at 08:00		100	100	100								
				98	96	96			T2I01 24.62					
							3.6		T2I01 26.06	-19.08	25.16		III	Moderately strong, greyish pink and grey, spotted black, moderately decomposed fine grained GRANITE. Joints are widely to medium spaced, rough undulating, tight to extremely narrow, iron stained, chlorite coated, dipping 20°-30°, 50°-60° and 60°-70°.
				100	96	96								
							0.6		T2I01 27.42					
				98	96	96								
		3.90m at 18:00							T2I01 28.92					
22/04/2009							5.0							
23/04/2009		3.90m at 08:00		100	100	80			T2I01 29.32					
				100	100	97	3.8		T2I01	-23.92	30.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **28/04/2009**

CHECKED **P O POON**

DATE **29/04/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH324P**

SHEET **4** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835205.68 N 815564.67	PROJECT No. J3251
MACHINE & No. 20-0114		DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.08 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	97	0.8			-23.92	30.00			
										-24.04	30.12		III/II	As sheet 3 of 6.
				100	100	95			T2IOI 30.65					Moderately strong to strong, light pink, mottled light grey, spotted black, moderately to slightly decomposed medium grained GRANITE. Joints are widely to medium, locally closely spaced, rough planar, tight to extremely narrow, chlorite and calcite coated, dipping 30°-40° and 60°-70°.
										-24.67	30.75			30.75 - 30.90m: PEGMATITE vein.
										-24.82	30.90			
							2.3		T2IOI 32.09					
				100	100	100				-25.69	31.77			31.77 - 31.83m: PEGMATITE vein.
										-25.75	31.83			
							4.6		T2IOI 33.47					
				100	94	84			T2IOI 34.91					
23/04/2009		3.70m at 18:00												
24/04/2009		5.10m at 08:00		100	95	90			T2IOI 36.26					
				100	100	89	2.3		T2IOI 36.72					
				98	98	98								
									T2IOI 38.12					
				100	100	100	6.3		T2IOI 39.55					
				100	100	100			T2IOI	-33.92	40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 28/04/2009

CHECKED P O POON

DATE 29/04/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH324P**

SHEET **5** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. 20-0114	E 835205.68 N 815564.67	DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.08 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	1.9		T2IOI 41.03	-33.92	40.00		III/II	As sheet 4 of 6.
				100	100	97				-35.57	41.65			41.65 - 42.59m: Orangish pink, mottled light grey.
							7.3		T2IOI 42.47	-36.26	42.34		III	
24/04/2009		3.90m at 18:00								-36.33	42.41			42.34 - 42.41m: Moderately weak, moderately decomposed.
25/04/2009		4.20m at 08:00		100	100	100	1.3			-36.51	42.59		III/II	
									T2IOI 43.87					
				99	99	97								
									T2IOI 45.35					
				100	100	100								
									T2IOI 46.77					
				100	99	99								
									T2IOI 48.28					
				99	99	99								
									T2IOI 49.73					
							5.3			-43.22	49.30		III	Moderately strong, orangish pink, mottled light grey and black, moderately decomposed medium grained GRANITE. Joints are medium spaced, rough planar and undulating, extremely
25/04/2009		3.80m at 18:00												
27/04/2009		08:00		100	100	74					50.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 28/04/2009

CHECKED P O POON

DATE 29/04/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH324P**

SHEET **6** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. 20-0114	E 835205.68 N 815564.67	DATE from 14/04/2009 to 27/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 6.08 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	74			T2101	-43.92	50.00		III	narrow, chlorite and calcite coated, dipping 20°-30°, 30°-40° and 50°-60°.
27/04/2009		18:00							51.17	-45.09	51.17			End of hole at 51.17m depth.
											60.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 28/04/2009

CHECKED P O POON

DATE 29/04/2009

REMARKS

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MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 324 (P)
Box No. : 1 of 9
Depth : 0.0 0 m. To (21.39) m.
Date of Photograph : 30/5/2009
0.00
19.85
20.20
20.56
(21.39)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 324 (P)
Box No. : 2 of 9
Depth : (21.39) m. To (25.16) m.
Date of Photograph : 30/5/2009
(21.39)
21.81
23.25
24.62
(25.16)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 324(P)
Box No. : 3 of 9
Depth : (25.16) m. To 28.92 m.
Date of Photograph : 30/5/2009
(25.16)
26.06m
26.06
2742
28.92


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 324(P)
Box No. : 4 of 9
Depth : 28.90 m. To (32.49) m.
Date of Photograph : 30/5/2009
28.90
29.32
30.65
32.09
(32.49)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 324(P)
Box No. : 5 of 9
Depth : (32.49) m. To 36.26 m.
Date of Photograph : 30/5/2009
(32.49)
33.47
34.91
36.26


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 324(P)
Box No. : 6 of 9
Depth : 36.26 m. To (39.90) m.
Date of Photograph : 30/5/2009
36.26
36.72
38.12
(39.90)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 324(P)
Box No. : 7 of 9
Depth : (39.90) m. To (43.68) m.
Date of Photograph : 30/5/2009
(39.90)
41.03
42.47
(43.68)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 324(P)
Box No. : 8 of 9
Depth : (43.68) m. To (47.37) m.
Date of Photograph : 30/5/2009
(43.68)
43.87
45.35
46.77
(47.37)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 324(P)
Box No. : 9 of 9
Depth : (47.37) m. To 51.17 m.
Date of Photograph : 30/5/2009
(47.37)
48.28
49.73
51.17
END

Gammon

STANDPIPE DETAIL AND RESPONSE TEST RECORD

CONTRACT NO. NEX/2209

DRILLHOLE No.
2209/SCL/DH324P
S 1

Project : Ground Investigation (Land) for Shatin to Central Link

Date Installed :	29/04/2009	**Project No. :**	J3251
Date Tested :	30/04/2009	**Co-ordinates :**	
Initial Water Level :	3.75 **m below G.L.**	**E** 835205.68	**N** 815564.67
Tested / Supervised by :	Raymond Lau	**Ground Level :**	6.08 **mPD**
Checked by :	P O POON	**Standpipe tip level :**	-12.77 **mPD**

Time Elapsed (minutes)	Depth of Water from Top of Pipe (m)
0.00	0.00
0.25	1.60
0.50	1.82
0.75	1.95
1.00	2.10
2.00	3.10
3.00	3.30
4.00	3.52
5.00	3.55
6.00	3.59
7.00	3.62
8.00	3.66
9.00	3.70
10.00	3.70

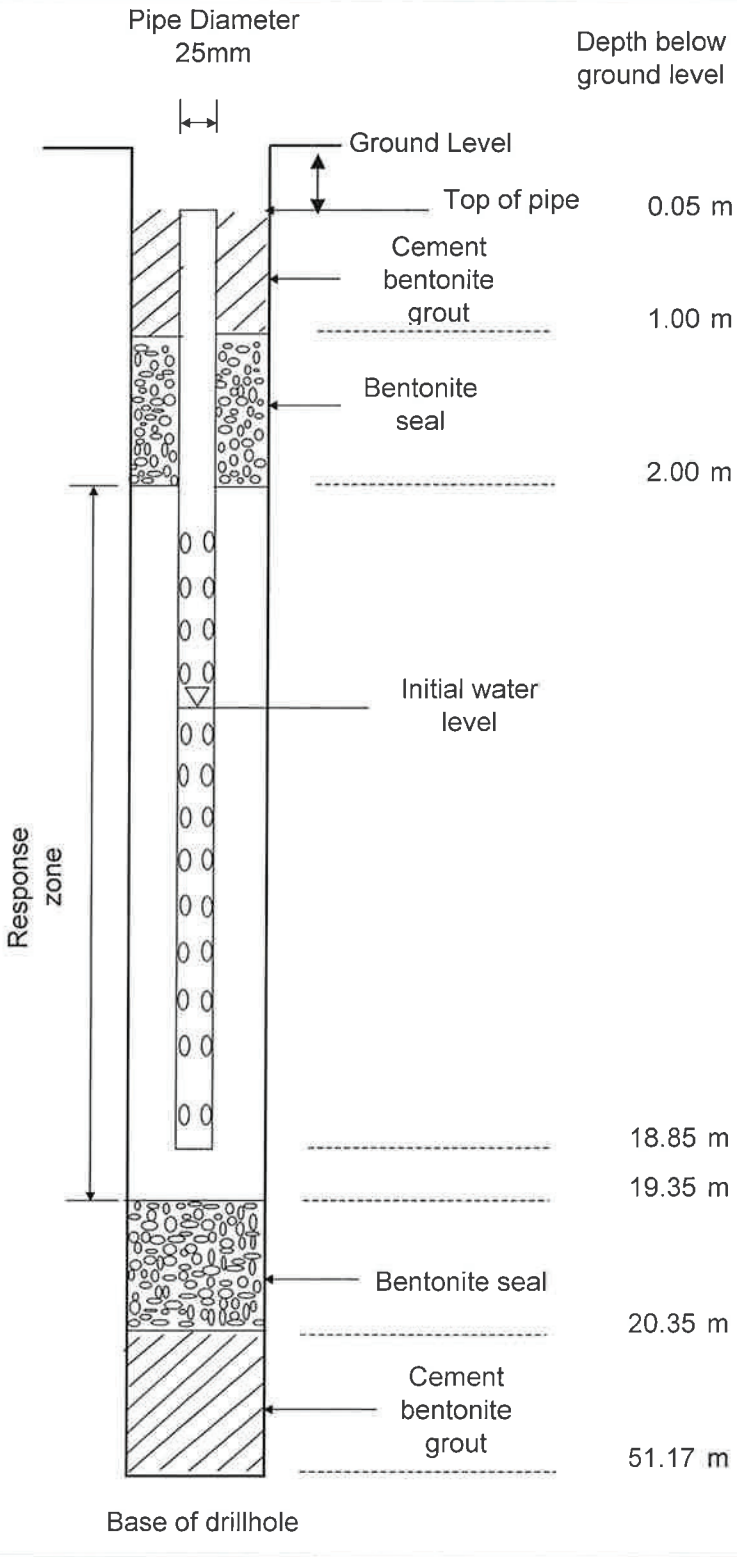
Filter material :

10-16mm Aggregates

Material surrounding response zone :

2.00-4.10: FILL
4.10-10.75: ALLUVIUM
10.75-19.35: Comlpetely Decomposed GRANITE, (SILT/ SAND with gravel)

Remarks :



Gammon

STANDPIPE AND PIEZOMETER MONITORING RESULTS

Contract No. NEX/2209

Job No. J3251

Project : Ground Investigation (Land) for Shatin to Central Link

DATE	Recorded by	Drillhole No. / Pipe No.		
		2209/SCL/DH324P-S (18.85m) below G.L.		
02/05/2009	W F LI	3.70		
04/05/2009	W F LI	3.71		
05/05/2009	W F LI	3.71		
06/05/2009	W F LI	3.71		
07/05/2009	W F LI	3.69		
08/05/2009	W F LI	3.70		
09/05/2009	W F LI	3.71		

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Depths are from pipe top

Checked by: P O POON

Date: 11/05/2009

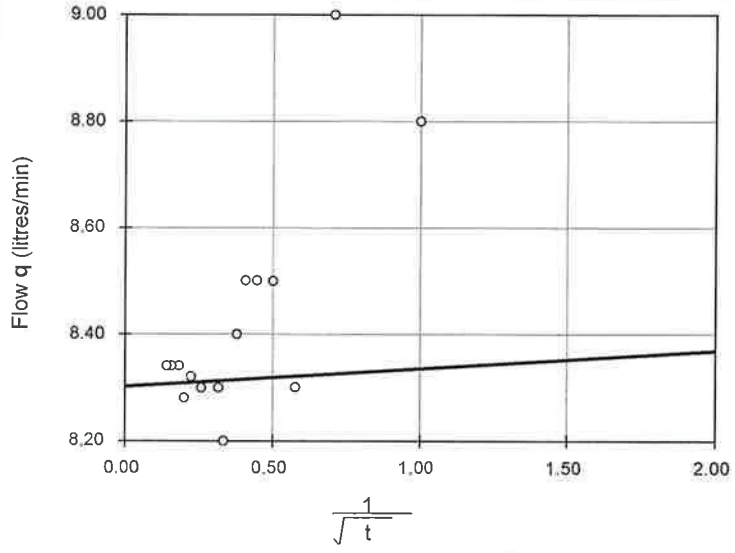
Gammon

CONSTANT HEAD PERMEABILITY TEST RECORD SHEET

DRILLHOLE No. **2209/SCL/DH324P**

Contract No. : NEX/2209	**Job No.:** J3251	**Test Date :** 15/04/2009	
Project : Ground Investigation (Land) for Shatin to Central Link		**Co-ordinates :** E 835205.68 N 815564.67	
Standpipe Tip Level : 6.85 **m below G.L.**		**Ground Level :** 6.08 **mPD**	
Initial Water Level before test : 3.79 **m below G.L.**		**Tested / Supervised by :** Raymond Lau	
Depth of Base of Reponse Zone : 7.00 **m below G.L.**			
Flowmeter I.D. : FM370		**Checked by :** P O POON	

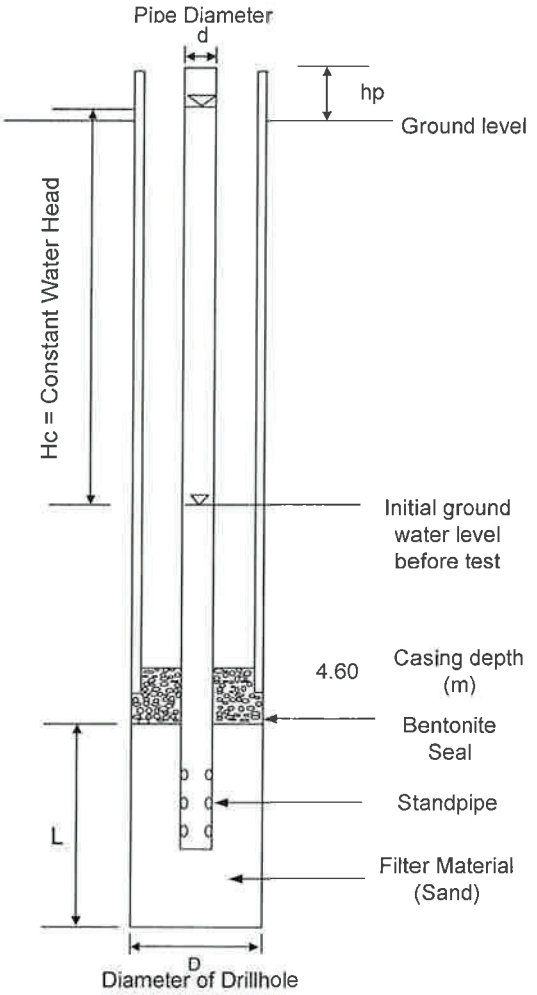
Elapsed Time t (minutes)	$\frac{1}{\sqrt{t}}$	Intake Flow Q (litres)	Flow q $\frac{\Delta Q}{\Delta t}$ (litres / min.)
0.00	∞	7376.00	0.00
0.25	2.00	7378.00	8.00
0.50	1.41	7380.00	8.00
0.75	1.15	7382.00	8.00
1.00	1.00	7384.20	8.80
2.00	0.71	7393.20	9.00
3.00	0.58	7401.50	8.30
4.00	0.50	7410.00	8.50
5.00	0.45	7418.50	8.50
6.00	0.41	7427.00	8.50
7.00	0.38	7435.40	8.40
8.00	0.35	7443.50	8.10
9.00	0.33	7451.70	8.20
10.00	0.32	7460.00	8.30
15.00	0.26	7501.50	8.30
20.00	0.22	7543.10	8.32
25.00	0.20	7584.50	8.28
30.00	0.18	7626.20	8.34
40.00	0.16	7709.60	8.34
50.00	0.14	7793.00	8.34



From graph, when t → ∞ (i.e. when $\frac{1}{\sqrt{t}}$ → 0)

q = 8.30 litres/min.

1.384E-04 m^3 / sec.



d = 0.038 m
D = 0.140 m
L = 1.50 m

hp = 0.91 m
Hc = 4.70 m

Where :

Shape Factor = F (in metres)

$$F = \frac{2.4\,\pi\,L}{\ln\left[1.2(L/D) + \sqrt{(1 + (1.2L/D)^2)}\right]} = 3.4815$$

Permeability: $k = \frac{q}{F\,Hc}$

k = 8.46E-06 m/sec

Material Surrounding Response Zone :

5.5-6.1m: CLAY/SILT with gravels (ALLUVIUM)

6.1-7.0m: sandy SILT with fragments (ALLUVIUM)

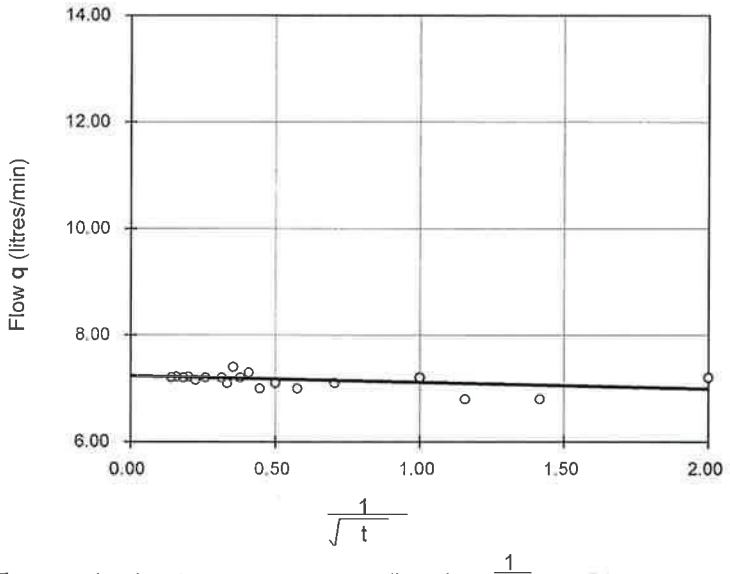
Gammon

CONSTANT HEAD PERMEABILITY TEST RECORD SHEET

DRILLHOLE No. **2209/SCL/DH324P**

Contract No. : NEX/2209	**Job No.:** J3251	**Test Date :** 29/04/2009	
Project : Ground Investigation (Land) for Shatin to Central Link		**Co-ordinates :** E 835205.68 N 815564.67	
Standpipe Tip Level :	18.35 **m below G.L.**	**Ground Level :**	6.08 **mPD**
Initial Water Level before test :	3.65 **m below G.L.**	**Tested / Supervised by :** Raymond Lau	
Depth of Base of Reponse Zone :	18.50 **m below G.L.**		
Flowmeter I.D. : FM370		**Checked by :** P O POON	

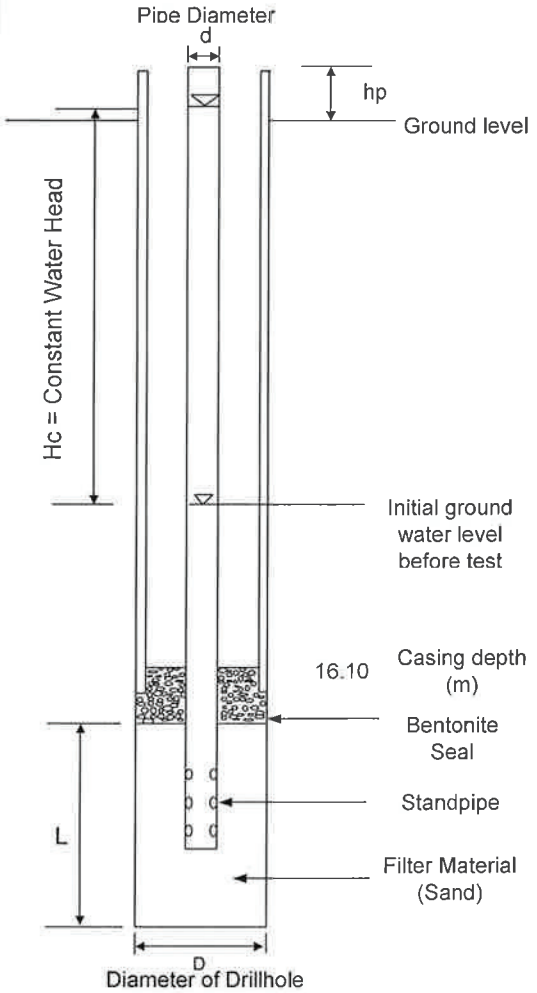
Elapsed Time t (minutes)	$\frac{1}{\sqrt{t}}$	Intake Flow Q (litres)	Flow q $\frac{\Delta Q}{\Delta t}$ (litres / min.)
0.00	∞	9015.00	0.00
0.25	2.00	9016.80	7.20
0.50	1.41	9018.50	6.80
0.75	1.15	9020.20	6.80
1.00	1.00	9022.00	7.20
2.00	0.71	9029.10	7.10
3.00	0.58	9036.10	7.00
4.00	0.50	9043.20	7.10
5.00	0.45	9050.20	7.00
6.00	0.41	9057.50	7.30
7.00	0.38	9064.70	7.20
8.00	0.35	9072.10	7.40
9.00	0.33	9079.20	7.10
10.00	0.32	9086.40	7.20
15.00	0.26	9122.40	7.20
20.00	0.22	9158.20	7.16
25.00	0.20	9194.30	7.22
30.00	0.18	9230.30	7.20
40.00	0.16	9302.50	7.22
50.00	0.14	9374.60	7.21



From graph, when t → ∞ (i.e. when $\frac{1}{\sqrt{t}}$ → 0)

q = 7.24 litres/min.

1.206E-04 m^3 / sec.



d = 0.038 m

D = 0.140 m

L = 1.50 m

hp = 0.55 m

Hc = 4.20 m

Where :

Shape Factor = F (in metres)

$$F = \frac{2.4\,\pi\,L}{\ln\left[1.2(L/D) + \sqrt{(1 + (1.2L/D)^2)}\right]} = 3.4815$$

Permeability: $k = \frac{q}{F\,Hc}$

k = 8.25E-06 m/sec

Material Surrounding Response Zone :

Completely decomposed GRANITE

(Silty SAND with gravels / Sandy SILT with gravels)

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH324P

Contract No. : NEX/2209	**Test No. :** 1
Project No. : J3251	**Date of test :** 28/04/2009
Project : Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :** K M LO
Test Section : 36.09 **m** **to** 41.08 **m**	**Checked by :** P O POON

Packer type :	Double	Depth of hole at time of test :	51.17 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	05453	Rock type : Grade III/II	Casing Details Hx 19.85m

Pressure gauge height above ground level :	0.75 m
Depth to centre of test section (measured down line of drillhole) :	38.59 m
Depth to groundwater level (measured down line of drillhole) :	4.15 m

FIRST PERIOD — Gauge Pressure 240.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	11840.0	11845.1	11849.9	11854.8		
Water take	(litres/min)		1.02	0.96	0.98		0.99

SECOND PERIOD — Gauge Pressure 470.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	11870.0	11882.1	11894.6	11906.7		
Water take	(litres/min)		2.42	2.50	2.42		2.45

THIRD PERIOD — Gauge Pressure 700.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	11930.0	11951.5	11972.4	11993.5		
Water take	(litres/min)		4.30	4.18	4.22		4.23

FOURTH PERIOD — Gauge Pressure 470.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	12010.0	12020.1	12030.0	12040.1		
Water take	(litres/min)		2.02	1.98	2.02		2.01

FIFTH PERIOD — Gauge Pressure 240.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	12050.0	12054.2	12058.4	12062.7		
Water take	(litres/min)		0.84	0.84	0.86		0.85

Gammon

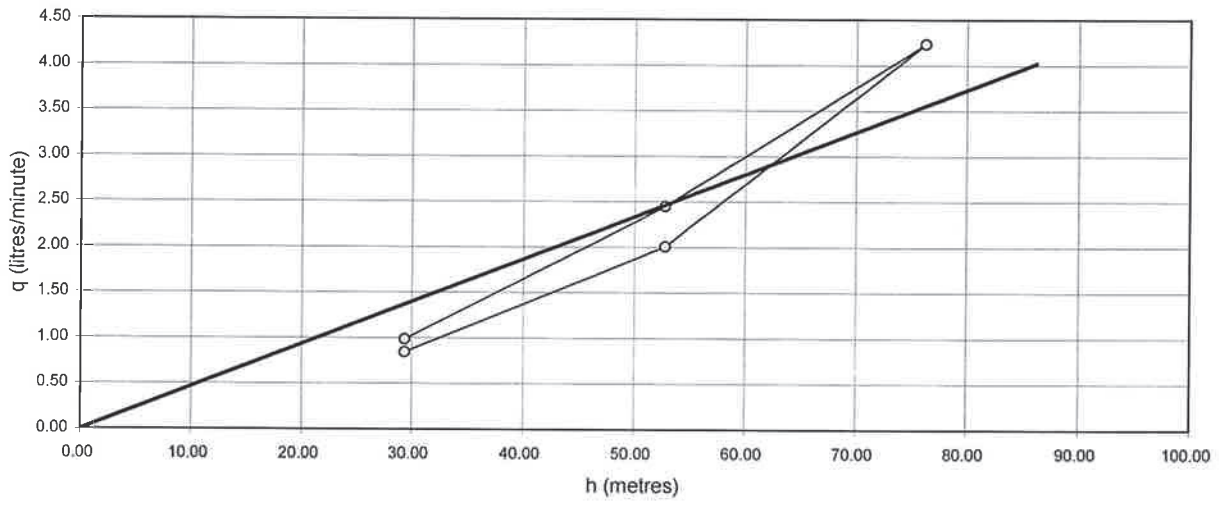
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH324P

Contract No. :	NEX/2209	**Test No. :**	1
Project No. :	J3251	**Test Date :**	28/04/2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	K M LO
Test Section :	36.09 **m** **to** 41.08 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	51.17 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	101 mm
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	05453	Rock type : Grade III/II	Casing Details : Hx 19.85m

LENGTH OF TEST SECTION 4.99 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 4.15 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	0.99	240.00	24.46			29.36	0.67
	2.45	470.00	47.91			52.81	0.93
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.75 m (3)	4.23	700.00	71.36			76.26	1.11
	2.01	470.00	47.91			52.81	0.76
	0.85	240.00	24.46			29.36	0.58



Type of Flow Turbulent

$L = \frac{100}{lh} q =$ **0.93** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH324P

Contract No. : NEX/2209	**Test No. :** 2
Project No. : J3251	**Date of test :** 28/04/2009
Project : Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :** K M LO
Test Section : 23.08 **m** **to** 28.08 **m**	**Checked by :** P O POON

Packer type :	Double	Depth of hole at time of test :	51.17 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	05453	Rock type : Grade III/II	Casing Details Hx 19.85m

Pressure gauge height above ground level :	0.75 m
Depth to centre of test section (measured down line of drillhole) :	25.58 m
Depth to groundwater level (measured down line of drillhole) :	4.15 m

FIRST PERIOD Gauge Pressure 160.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	12198.0	12200.9	12203.7	12206.5		
Water take	(litres/min)		0.58	0.56	0.56		0.57

SECOND PERIOD Gauge Pressure 310.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	12220.0	12229.3	12237.9	12246.4		
Water take	(litres/min)		1.86	1.72	1.70		1.76

THIRD PERIOD Gauge Pressure 460.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	12250.0	12268.6	12286.1	12303.7		
Water take	(litres/min)		3.72	3.50	3.52		3.58

FOURTH PERIOD Gauge Pressure 310.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	12330.0	12337.6	12345.1	12352.6		
Water take	(litres/min)		1.52	1.50	1.50		1.51

FIFTH PERIOD Gauge Pressure 160.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	12365.0	12367.1	12369.1	12371.2		
Water take	(litres/min)		0.42	0.40	0.42		0.41

Gammon

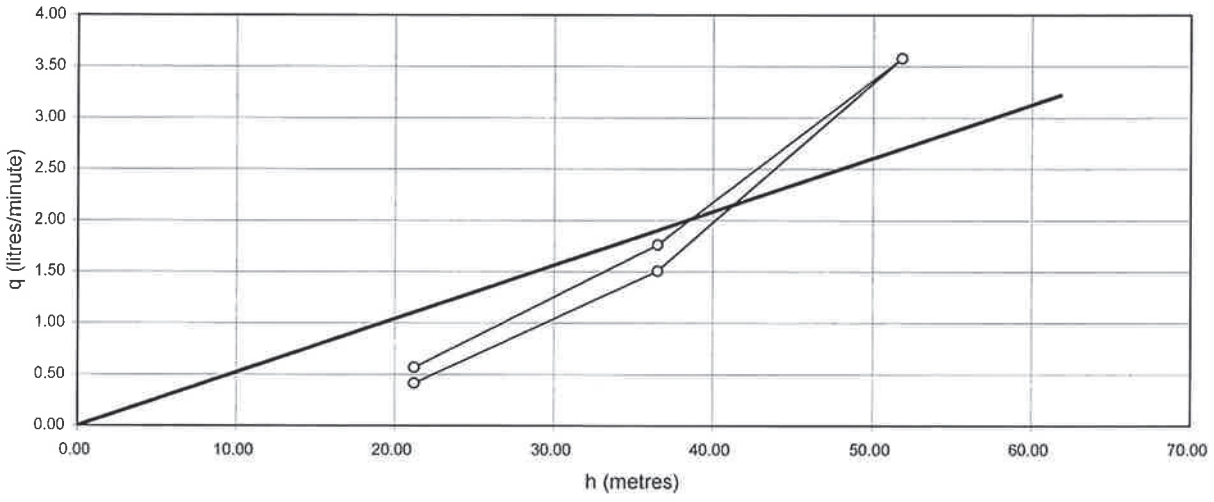
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH324P

Contract No. :	NEX/2209	**Test No. :**	2
Project No. :	J3251	**Test Date :**	28/04/2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	K M LO
Test Section :	23.08 **m** **to** 28.08 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	51.17 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	101 mm
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	05453	Rock type : Grade III/II	Casing Details : Hx 19.85m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD **h** (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
4.15 m (2)	0.57	160.00	16.31			21.21	0.53
	1.76	310.00	31.60			36.50	0.96
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	3.58	460.00	46.89			51.79	1.38
	1.51	310.00	31.60			36.50	0.83
0.75 m (3)	0.41	160.00	16.31			21.21	0.39



Type of Flow Dilation

$L = \frac{100}{lh} q =$ **1.04 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section



DRAWING NO SCL/Z/00/CIV/C05/206

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE

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LEGEND :

- MTR PROTECTION ZONE
- 2209/SCL/DH008 — DRILLHOLES
- 2209/SCL/DH010(P) — DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/IDH013 — INCLINED DRILLHOLES
- 2209/SCL/TT015 — TRIAL TRENCHES
- 2209/SCL/EDH001 — ENVIRONMENTAL DRILLHOLES
- 2209/SCL/EDH001(P) — ENVIRONMENTAL DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/CH001 — INCLINED COREHOLE
- 2209/SCL/SS001 — SLOPE SURFACE STRIPPING

AS-BUILT CO-ORDINATES FOR DRILLHOLES / TRIAL TRENCHES

No.	EASTING	NORTHING
2209/SCL/DH264	835316.53	815631.77
2209/SCL/DH265(P)	835253.29	815593.71
2209/SCL/DH266(P)	835240.76	815593.86
2209/SCL/DH267(P)	835182.95	815590.57
2209/SCL/DH323(P)	835240.96	815609.92
2209/SCL/DH324(P)	835205.68	815564.67
2209/SCL/DH330(P)	835201.40	815557.93
2209/SCL/DH331	835213.89	815501.55
2209/SCL/DH345	835288.52	815616.16
2209/SCL/DH384	835098.73	815492.77
2209/SCL/DH385	835142.13	815486.40
2209/SCL/EDH165(P)	835190.10	815560.00
2209/SCL/TT161	835312.91	815630.58
2209/SCL/TT185	835186.65	815598.58
2209/SCL/TT187	835238.52	815562.72
2209/SCL/TT188	835167.92	815549.24
2209/SCL/TT189	835192.39	815543.08
2209/SCL/TT190	835203.27	815520.33
2209/SCL/TT191	835159.17	815537.12

REVISION	DESCRIPTION	BY	DATE	APPROVED
A	AS-BUILT RECORD FOR BD SUBMISSION	YKYONG	FEB 10	AMG

Registered Geotechnical Engineer

HUI TUNG MAN

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR
MTR CORPORATION LIMITED PROJECTS DIVISION | CIVIL ENGINEERING DEPARTMENT

TITLE
CONTRACT NEX2209
AS-BUILT DRILLHOLES AND TRIAL TRENCHES LAYOUT PLAN (SCHEDULED AREA)

SHEET 7

SCALE	1 : 1000 (A1)	CAD REF	SCL_Z00_CIV_C05_206	AS BUILT APPROVED	
DATE	03 APR 2008	AS BUILT DWG NO			
DRAWN	CL WONG	DESIGNED	D CHOW	DRAWING NO	REV
CHECKED	TM HUI	APPROVED	AMG	SCL/Z/00/CIV/C05/206	A

CAD REF X:\EP\SCL\P\active\2009\34-08-0008\34issue\NEX2209_(As-built)\SCL_Z00_CIV_C05_206A.dgn

PLOTTING TIME 28/04/10 9:11am

D:\pdf_conversion_procedure\New-project_driver\pdf_kcrc_150dpi.plt

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號 :
OUR REF 本署檔號 : BD 3/7001/08
FAX 圖文傳真 : 2973 0561
TEL 電話 : 2626 1577
www.bd.gov.hk

22 October 2009

Mr. HUI Tung-man
MTR Corporation Limited
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Hung Hom, Kowloon.

Dear Sir,

South Island Line (East)

I acknowledge receipt of your Form BA 14 submitted on **30 September 2009** in respect of the ground investigation field works (Stage I) for the above together with Ground Investigation Field Works Report, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Civil Engineering Department, MTRCL
MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

AP **Mr. YEUNG Sze-wai, Wilfred**
Architect Department,
8/F Citylink Plaza, Shatin, N.T.

香港九龍旺角彌敦道 750 號先驅中心 12 樓至 18 樓 12/F-18/F Pioneer Centre, 750 Nathan Road, Mongkok, Kowloon, Hong Kong.

屋宇署
BUILDINGS DEPARTMENT

5

YOUR REF 來函檔號：
OUR REF 本署檔號： **BD 3/7004/08 (Pt.II)**
FAX 圖文傳真： **2718 1477**
TEL 電話： **3105 3216**
www.info.gov.hk/bd

Mr. Stephen CHIK
MTR Corporation Limited,
Project Division,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

27 May 2010

Dear Sir,

Shatin to Central Link (SCL)

I herewith acknowledge your letter dated 12 May 2010 and received on 17 May 2010 enclosing the Form BA14 to certify the completion of Stage I Ground Investigation Works in both scheduled area and non-scheduled area at the captioned, and RGE's letter dated 26 May 2010 regarding clarification on the above records, the content of which has been noted.

PE-CIVIL & PLANNING DEPT.
CIVIL ENGINEERING SECTION
File No. /
SP#
Rec'd - 1 JUN 2010 Encl.

Name	Info.	Action	Initial
G S Harris			
C K Ho			
Edward Ngai (C)			
Linda Yeung			
Evan Tsui			
[illegible]			
Edward Ngai (M)			

Yours sincerely,

(WONG Wing-keung)
Senior Structural Engineer
for Building Authority

c.c. **RGE- Mr. HUI Tung-man**
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

AP - Yeung Sze-wai Wilfred
Architects Department,
8/F, Citylink Plaza,
Shatin,
N.T.

S.L. 4 (1/92)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH330P**

SHEET **1** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835201.40 N 815557.93	PROJECT No. J3251
MACHINE & No. 17		DATE from 27/03/2009 to 16/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.96 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
27/03/2009	PX	08:00										5.96	0.00			
									A		0.45 0.50	5.46	0.50			Brown, silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (FILL)
									B		0.95 1.00	4.96	1.00			Brown, silty sandy subangular coarse GRAVEL sized rock fragments. (FILL)
									C		1.45 1.50					Firm, brown, sandy SILT with occasional subangular fine to medium gravel sized rock and quartz fragments. (ALLUVIUM)
									D		1.95 2.00					
									E		2.45 2.50					
									F		2.95 3.00	2.96	3.00			
				80					1							Yellowish brown, silty fine to medium SAND with much subangular fine to coarse gravel sized rock fragments. (ALLUVIUM)
									2		4.00 4.10	1.86	4.10			
								3,6 4,4,3,5 N=16	3							Medium dense, brown, silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments. (ALLUVIUM)
									4		4.50 4.55					
				90					5		5.00	0.96	5.00			Firm, reddish brown, mottled brown, sandy clayey SILT with much angular to subangular fine to medium gravel sized quartz fragments. (ALLUVIUM)
									6		6.00 6.10	-0.14	6.10			
								2,2 2,3,2,2 N=9	7							Firm, light pinkish brown, mottled dark brown, clayey SILT with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
									8		6.50 6.55					
				100					9		7.00	-1.04	7.00			Purplish red, clayey silty fine to coarse SAND with some subangular fine gravel sized quartz fragments. (ALLUVIUM)
		4.10m at 18:00														
27/03/2009									10		8.00 8.10	-2.14	8.10			
28/03/2009		4.50m at 08:00						1,2 2,2,2,4 N=10	11						V	Extremely weak, reddish brown, mottled white and dark brown, completely decomposed GRANITE. (SILT with occasional subangular fine gravel sized quartz fragments)
									12		8.50 8.55					
				100					13		9.00	-3.04	9.00			9.00 - 10.10m: Light pinkish brown, mottled white, brown and dark brown.
												-4.04	10.00			

INSPECTION PIT

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **17/04/2009**

CHECKED **P O POON**

DATE **18/04/2009**

REMARKS

1. Inspection pit was dug to 3.00m depth.
2. Eastman tests were carried out at 5.00m, 10.00m, 15.00m, 20.00m, 25.00m depths.
3. Constant head permeability test was carried out at 14.50m-16.00m depth.
4. Standpipe was installed at 15.70m depth.
5. Acoustic televiewer survey was carried out at 19.00m-29.00m depth.

(to be continued...)

t:\gintw\library\1july2009.glb\drillhole (1 feb 09) (ADM)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH330P**

SHEET **2** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835201.40 N 815557.93	PROJECT No. J3251
MACHINE & No. 17		DATE from 27/03/2009 to 16/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.96 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
											-4.04		10.00			
								1,1 1,2,2,4 N=9	14		10.00					As sheet 1 of 6.
									15		10.10	4.14	10.10		V	Extremely weak, orangish brown, completely decomposed GRANITE. (SILT with some subangular fine gravel sized quartz fragments)
									16		10.50 10.55					
												-5.04	11.00			
				85					17		11.00				V	Extremely weak, reddish brown, mottled pink, brown and white, completely decomposed GRANITE. (Stiff, sandy SILT with some angular to subangular fine gravel sized quartz fragments)
									18		12.00 12.10					
								2,4 5,7,7,7 N=26	19							
									20		12.50 12.55					
	PX 13.00 HX											-7.04	13.00			
				90					21		13.00				V	Extremely weak, purplish red, mottled white and dark brown, completely decomposed GRANITE. (Silty fine to coarse SAND with some angular fine gravel sized quartz fragments)
									22		14.00 14.10	-8.14	14.10			
								6,8 11,12,13,13 N=49	23						V	Extremely weak, orangish brown, mottled grey, completely decomposed GRANITE. (Stiff, sandy SILT with some subangular fine gravel sized quartz fragments)
		4.20m at 18:00							24		14.50 14.55					
28/03/2009												-9.04	15.00			
31/03/2009		4.70m at 08:00		90					25		15.00				V	Extremely weak, pink, completely decomposed fine grained GRANITE. (Silty fine to medium SAND)
		4.70m at 18:00							26		16.00 16.10	-10.14	16.10			
31/03/2009	HX 16.22							6,44/35mm 100/10mm 100bls/10mm	27		16.17 16.22	-10.26	16.22		V/IV	Very weak, pink, completely to highly decomposed fine grained GRANITE. (Silty fine to coarse SAND with some angular fine gravel sized rock fragments)
01/04/2009		4.70m at 08:00		100	99	99	4.7			T2IOI					III/II	
											17.24					Moderately strong to strong, pink, mottled light grey, spotted black and dark green, moderately to slightly decomposed medium grained GRANITE. Joints are medium spaced, rough undulating, extremely narrow, iron stained, dipping 50°-60°. 17.39 - 17.44m: PEGMATITE.
				100	99	91						-11.43	17.39			
												-11.48	17.44			
		4.70m at 18:00								T2IOI						
01/04/2009							1.3				18.67					
02/04/2009		4.70m at 08:00		100	98	83				T2IOI		-12.61	18.57		III/II	Moderately strong to strong, pink, spotted dark green, locally mottled dark brown, moderately to slightly decomposed fine grained GRANITE. Joints are widely to medium, locally closely spaced, rough undulating, extremely narrow, iron stained, chlorite coated, dipping 50°-60° and 60°-70°.
							11.1				19.92	-14.04	20.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **17/04/2009**

CHECKED **P O POON**

DATE **18/04/2009**

REMARKS

6. Packer (Water Absorption) tests were carried out at 23.00m-28.00m and 36.00m-41.00m depths.

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH330P**

SHEET 3 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835201.40 N 815557.93	PROJECT No. J3251
MACHINE & No. 17		DATE from 27/03/2009 to 16/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.96 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	87	2.2		T2101 21.15	-14.04	20.00		III/II	As sheet 2 of 6.
				100	100	100			T2101 21.70					
				100	100	98			T2101	-16.21	22.17			
										-16.32	22.28			22.17 - 22.28m: PEGMATITE.
		4.70m at 18:00							T2101 22.94	-16.73	22.69		II	Strong, pink, mottled light grey, spotted black, slightly decomposed medium grained GRANITE. Joints are medium spaced, rough undulating, tight to extremely narrow, iron stained, chlorite coated, dipping 50°-60°.
02/04/2009 03/04/2009		4.70m at 08:00		100	100	100			T2101 23.87					
				100	100	100			T2101	-18.42	24.38			
										-18.64	24.60			24.38 - 24.60m: Pink, mottled light grey and light green.
				100	100	100			T2101 24.88					
				100	100	100			T2101	-19.44	25.40			
										-19.62	25.58			25.40 - 25.58m: Pink, mottled light grey.
				100	100	100			T2101 25.58					
				100	100	100			T2101 26.08					
		4.70m at 18:00							T2101 26.60	-20.69	26.65		III/II	Moderately strong to strong, pink, spotted black, moderately to slightly decomposed fine grained GRANITE. Joints are medium spaced, smooth undulating, tight to extremely narrow, chlorite coated, dipping 50°-60°.
03/04/2009 06/04/2009		4.70m at 08:00		100	100	84			T2101 27.41					
				100	100	100			T2101 27.94					
		4.70m at 18:00							T2101	-22.66	28.62		III/II	Moderately strong to strong, pink, mottled light grey, spotted black, moderately to slightly decomposed medium grained GRANITE. Joints are medium spaced, smooth undulating, extremely narrow, chlorite coated, dipping 60°-70°.
06/04/2009 14/04/2009		4.70m at 08:00		98	94	94			T2101 29.20	-23.54	29.50		II	Strong, light pink, mottled light grey, spotted black, slightly decomposed medium grained
				100	100	100	0.3		T2101		30.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 17/04/2009

CHECKED P O POON

DATE 18/04/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH330P**

SHEET **4** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. 17	E 835201.40 N 815557.93	DATE from 27/03/2009 to 16/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.96 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			30.04	-24.04	30.00		II	GRANITE. Joints are very widely, locally medium spaced, rough undulating, tight, calcite and chlorite coated, dipping 50°-60° and 60°-70°.
				100	100	100			T2IOI 30.84					
				100	100	100			T2IOI 31.42					
				100	100	100			T2IOI 32.90					
				100	100	100			T2IOI 33.75					
				100	100	100			T2IOI 34.46					
				100	100	100			T2IOI					
		4.70m at 18:00					2.0		35.96					
14/04/2009 15/04/2009		4.70m at 08:00		100	97	97			T2IOI					
							0.5		37.49	-31.14 -31.27	37.10 37.23			37.10 - 37.23m: Pink, mottled light grey and dark green.
				100	100	100			T2IOI 38.95					
				100	100	100			T2IOI	-34.04	40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **17/04/2009**

CHECKED **P O POON**

DATE **18/04/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH330P**

SHEET **5** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. 17	E 835201.40 N 815557.93	DATE from 27/03/2009 to 16/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.96 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				-34.04	40.00		II	As sheet 3 of 6.
				100	100	100			T2IOI 40.51	-34.63	40.59			40.59 - 40.64m: PEGMATITE.
										-34.68	40.64			
									T2IOI 42.04	-36.03	41.99			41.99 - 42.04m: PEGMATITE.
				100	100	100				-36.08	42.04			
									T2IOI 42.65	-36.69	42.65		III	Moderately strong, pink, mottled light grey, spotted black and white, moderately decomposed medium grained GRANITE. Joints are widely to medium spaced, rough undulating, extremely narrow, iron stained, chlorite coated, dipping 50°-60° and 60°-70°.
				100	95	95	3.3							
				100	100	100			T2IOI 43.60	-37.68	43.64			43.64 - 43.85m: PEGMATITE.
										-37.89	43.85			
							0.6		T2IOI 45.14					
15/04/2009		4.70m at 18:00												
16/04/2009		4.70m at 08:00		100	99	99								
							5.8		T2IOI 46.61	-40.57	46.53			46.53 - 46.63m: PEGMATITE.
										-40.67	46.63			
				100	100	93				-40.82	46.78		III	Moderately strong, pink and light pink, spotted black, moderately decomposed fine grained GRANITE. Joints are medium, locally closely spaced, smooth undulating, tight to extremely narrow, chlorite coated, dipping 50°-60°.
							11.4							
							2.6		T2IOI 48.11					
				100	97	93								
							1.5		T2IOI 49.65	-43.25	49.21			49.21 - 49.35m: PEGMATITE.
										-43.39	49.35		II	Strong, pink, mottled light grey, spotted black, slightly decomposed medium grained GRANITE. Joints are medium spaced, rough planar, tight,
				99	99	99			T2IOI		50.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **17/04/2009**

CHECKED **P O POON**

DATE **18/04/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH330P**

SHEET **6** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. 17	E 835201.40 N 815557.93	DATE from 27/03/2009 to 16/04/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.96 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
										-44.04	50.00			
				99	99	99				-44.18	50.14		II	calcite coated, dipping 60°-70° and subvertical.
										-44.19	50.15			50.14 - 50.15m: PEGMATITE.
									T2101					50.14 - 50.80m: Incipient subvertical joints.
										-44.84	50.80			
16/04/2009		4.70m at 18:00							51.15	-45.19	51.15			End of hole at 51.15m depth.
											60.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 17/04/2009

CHECKED P O POON

DATE 18/04/2009

REMARKS

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MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH330(P)
Box No. : 1 of 11
Depth : 0.00 m. To (17.74) m.
Date of Photograph : 20/4/2009
Kodak Color Control Patches
0.00
16.22
17.24
(17.74)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH330(P)
Box No. : 2 of 11
Depth : (17.74) m. To (21.52) m.
Date of Photograph : 20/4/2009
Kodak Color Control Patches
(17.74)
18.67
19.92
21.15
(21.52)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH330(P)
Box No. : 3 of 11
Depth : (21.52) m. To 24.88 m.
Date of Photograph : 20/4/2009
Kodak Color Control Patches
(21.52)
21.70
22.94
23.87
24.88


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH330(P)
Box No. : 4 of 11
Depth : 24.88 m. To (28.37) m.
Date of Photograph : 20/4/2009
Kodak Color Control Patches
24.88
25.58
26.08
26.60
27.41
27.94
(28.37)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 330(P)
Box No. : 5 of 11
Depth : (28.37) m. To (31.80) m.
Date of Photograph : 20/4/2009
Kodak Color Control Patches
(28.37)
29.20
30.04
30.84
31.42
(31.80)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH330(P)
Box No. : 6 of 11
Depth : (31.80) m. To (35.35) m.
Date of Photograph : 20/4/2009
KODAK Color Control Patches
(31.80)
32.90
34.46
33.75
(35.35)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 330(P)
Box No. : 7 of 11
Depth : (35.35) m. To 38.95 m.
Date of Photograph : 20/4/2009
(35.35)
35.96
37.49
38.95


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 330(P)
Box No. : 8 of 11
Depth : 38.95 m. To 42.65 m.
Date of Photograph : 20/4/2009
38.95
40.51
42.04
42.65


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 330(P)
Box No. : 9 of 11
Depth : 42.65 m. To (46.21) m.
Date of Photograph : 20/4/2009
Kodak Color Control Patches
42.65
43.60
45.14
(46.21)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 330(P)
Box No. : 10 of 11
Depth : (46.21) m. To 49.65 m.
Date of Photograph : 20/4/2009
Kodak Color Control Patches
(46.21)
46.61
48.11
49.65


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH330(P)
Box No. : 11 of 11
Depth : 49.65 m. To 51.15 m.
Date of Photograph : 20/4/2009
49.65
51.15
END

Gammon

STANDPIPE DETAIL AND RESPONSE TEST RECORD

CONTRACT NO. NEX/2209

DRILLHOLE No.
2209/SCL/DH330P
S 1

Project : Ground Investigation (Land) for Shatin to Central Link

Date Installed :	20/04/2009	**Project No. :**	J3251
Date Tested :	22/04/2009	**Co-ordinates :**	
Initial Water Level :	3.77 **m below G.L.**	**E** 835201.40	**N** 815557.93
Tested / Supervised by :	Raymond Lau	**Ground Level :**	5.96 **mPD**
Checked by :	P O POON	**Standpipe tip level :**	-9.74 **mPD**

Time Elapsed (minutes)	Depth of Water from Top of Pipe (m)
0.00	0.00
0.25	2.00
0.50	2.00
0.75	2.02
1.00	2.35
2.00	3.25
3.00	3.37
4.00	3.50
5.00	3.62
6.00	3.72

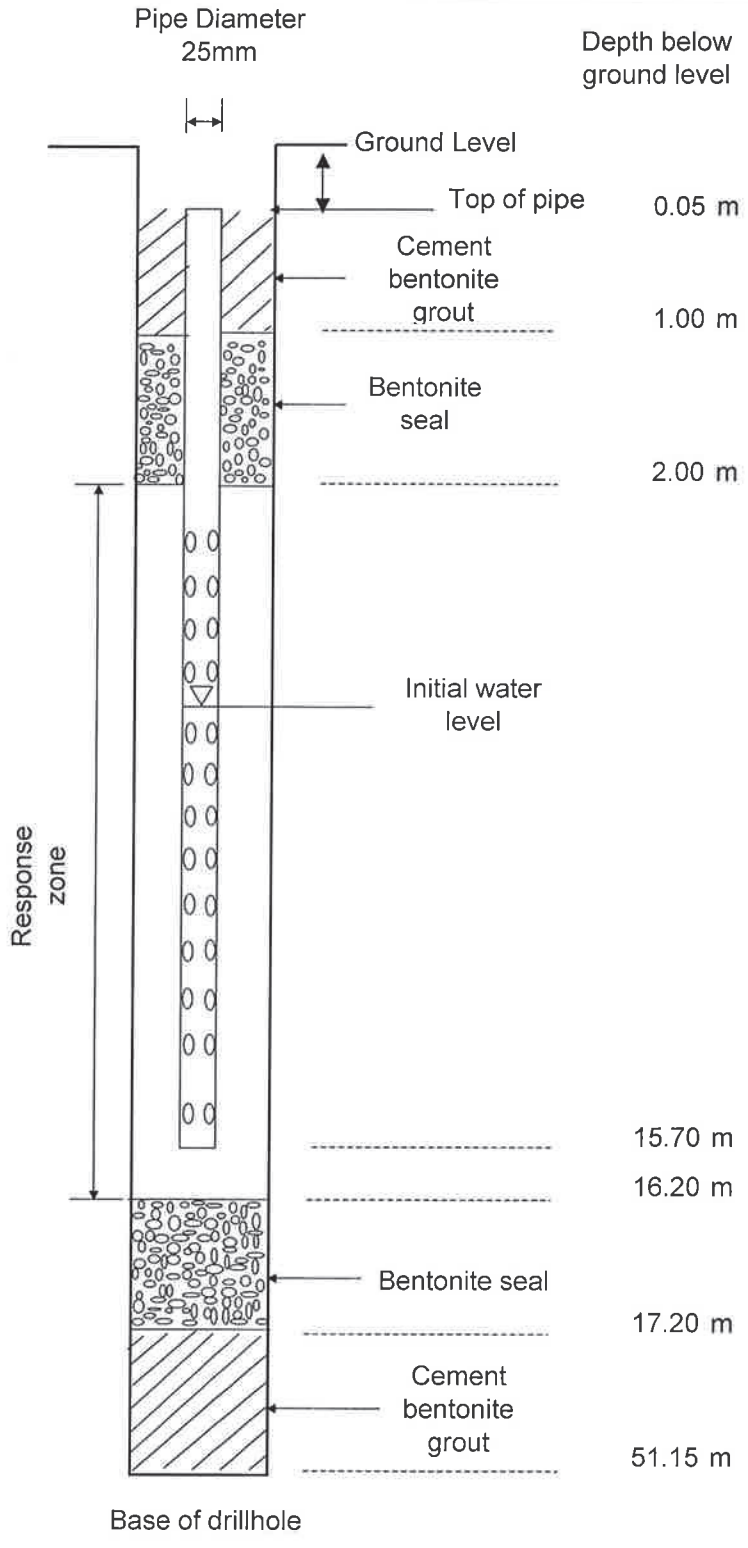
Filter material :

10-16mm Aggregates

Material surrounding response zone :

2.00-8.10: ALLUVIUM
8.10-16.10: Completely Decomposed GRANITE (SILT/ SAND with gravel
16.10-16.20 Completely to Highly Decomposed GRANITE (Silty SAND with gravel)

Remarks :



Gammon

STANDPIPE AND PIEZOMETER MONITORING RESULTS

Contract No. NEX/2209

Job No. J3251

Project : Ground Investigation (Land) for Shatin to Central Link

DATE	Recorded by	Drillhole No. / Pipe No.		
		2209/SCL/DH330P-S (15.70m) below G.L.		
22/04/2009	W F LI	3.72		
23/04/2009	W F LI	3.79		
24/04/2009	W F LI	3.80		
25/04/2009	W F LI	3.80		
27/04/2009	W F LI	3.79		
28/04/2009	W F LI	3.72		
29/04/2009	W F LI	3.70		

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Depths are from pipe top

Checked by: P O POON

Date: 30/04/2009

Gammon

CONSTANT HEAD PERMEABILITY TEST RECORD SHEET

DRILLHOLE No. **2209/SCL/DH330P**

Contract No. :	NEX/2209	**Job No.:**	J3251
Project :	Ground Investigation (Land) for Shatin to Central Link		
Standpipe Tip Level :	15.85	**m below G.L.**	
Initial Water Level before test :	4.23	**m below G.L.**	
Depth of Base of Reponse Zone :	16.00	**m below G.L.**	
Flowmeter I.D. :	FM370		

Test Date : 01/04/2009

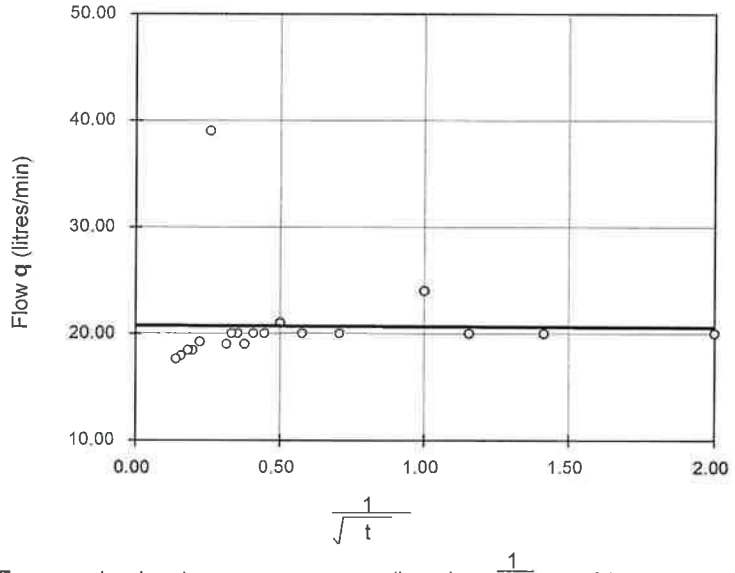
Co-ordinates : E 835201.40 N 815557.93

Ground Level : 5.96 **mPD**

Tested / Supervised by : Raymond Lau

Checked by : P O POON

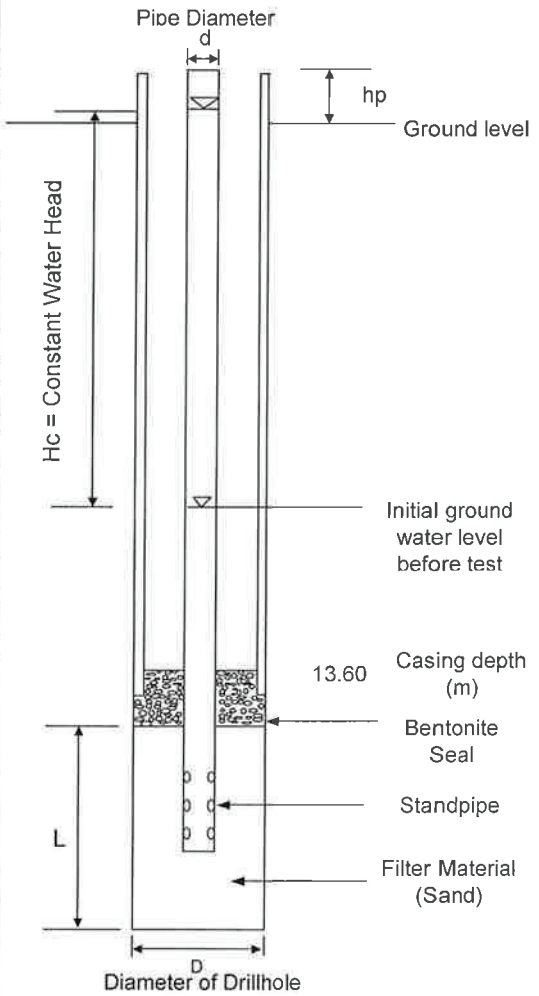
Elapsed Time t (minutes)	$\frac{1}{\sqrt{t}}$	Intake Flow Q (litres)	Flow q $\frac{\Delta Q}{\Delta t}$ (litres / min.)
0.00	∞	1136.00	0.00
0.25	2.00	1141.00	20.00
0.50	1.41	1146.00	20.00
0.75	1.15	1151.00	20.00
1.00	1.00	1157.00	24.00
2.00	0.71	1177.00	20.00
3.00	0.58	1197.00	20.00
4.00	0.50	1218.00	21.00
5.00	0.45	1238.00	20.00
6.00	0.41	1258.00	20.00
7.00	0.38	1277.00	19.00
8.00	0.35	1297.00	20.00
9.00	0.33	1317.00	20.00
10.00	0.32	1336.00	19.00
15.00	0.26	1531.00	39.00
20.00	0.22	1627.00	19.20
25.00	0.20	1719.00	18.40
30.00	0.18	1811.00	18.40
40.00	0.16	1990.00	17.90
50.00	0.14	2166.00	17.60



From graph, when t → ∞ (i.e. when $\frac{1}{\sqrt{t}}$ → 0)

q = 20.76 litres/min.

3.460E-04 m^3 / sec.



d = 0.025 m

D = 0.140 m

L = 1.50 m

hp = 0.47 m

Hc = 4.70 m

Where :

Shape Factor = F (in metres)

$$F = \frac{2.4\,\pi\,L}{\ln\left[1.2(L/D) + \sqrt{(1 + (1.2L/D)^2)}\right]} = 3.4815$$

Permeability: $k = \frac{q}{F\,Hc}$

k = 2.11E-05 m/sec

Material Surrounding Response Zone :

14.5-15.0m: Completely Decomposed GRANITE (sandy SILT with gravels)

15.0-16.0m: Completely Decomposed GRANITE (silty SAND)

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH330P

Contract No. : NEX/2209	**Test No. :** 1
Project No. : J3251	**Date of test :** 18/04/2009
Project : Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :** W M LAU
Test Section : 23.00 **m** **to** 28.00 **m**	**Checked by :** P O POON

Packer type :	Double	Depth of hole at time of test :	51.15 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	25901	Rock type : Grade II & III/II GRANITE	Casing Details : Hx 16.22m

Pressure gauge height above ground level :	0.56 m
Depth to centre of test section (measured down line of drillhole) :	25.50 m
Depth to groundwater level (measured down line of drillhole) :	5.10 m

FIRST PERIOD Gauge Pressure 153.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	355.0	368.2	381.4	395.6		
Water take	(litres/min)		2.64	2.64	2.84		2.71

SECOND PERIOD Gauge Pressure 306.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	401.0	419.0	438.5	458.7		
Water take	(litres/min)		3.60	3.90	4.04		3.85

THIRD PERIOD Gauge Pressure 459.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	461.0	483.4	505.7	528.1		
Water take	(litres/min)		4.48	4.46	4.48		4.47

FOURTH PERIOD Gauge Pressure 306.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	534.0	550.2	566.0	581.8		
Water take	(litres/min)		3.24	3.16	3.16		3.19

FIFTH PERIOD Gauge Pressure 153.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	587.0	600.1	613.1	626.1		
Water take	(litres/min)		2.62	2.60	2.60		2.61

Gammon

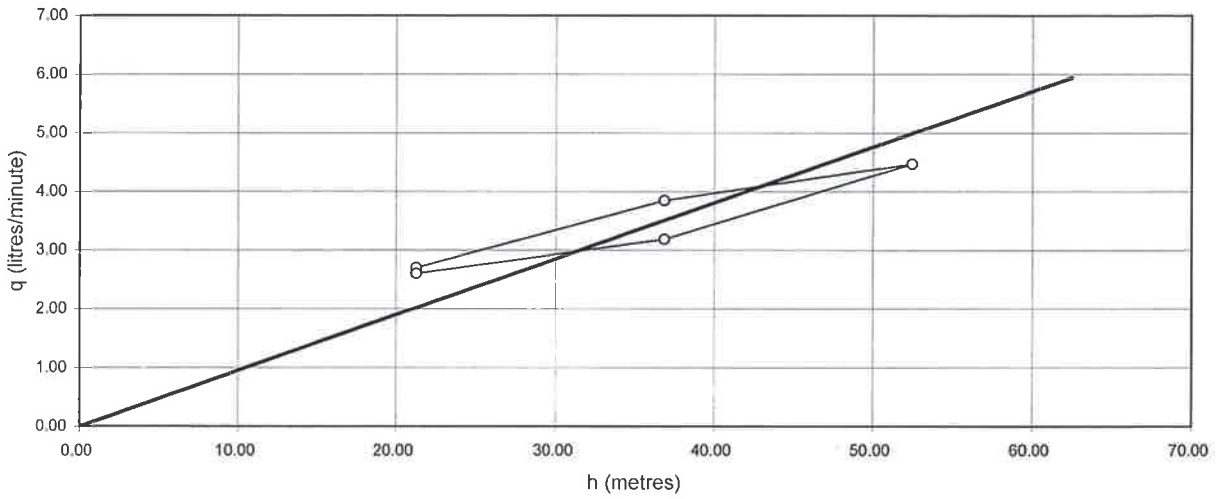
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH330P

Contract No. :	NEX/2209	**Test No. :**	1
Project No. :	J3251	**Test Date :**	18/04/2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	23.00 **m** **to** 28.00 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	51.15 m
Packer Pressure :	2000 **kPa**	Diameter of hole in test area :	101 mm
Presure gauge No. :	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	25901.00	Rock type : Grade II & III/II GRANI	Casing Details : Hx 16.22m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD **h** (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
5.10 m (2)	2.71	153.00	15.60			21.26	2.55
	3.85	306.00	31.19			36.85	2.09
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	4.47	459.00	46.79			52.45	1.71
	3.19	306.00	31.19			36.85	1.73
0.56 m (3)	2.61	153.00	15.60			21.26	2.45



Type of Flow Turbulent

$L = \frac{100}{lh}$ q = **1.90** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH330P

Contract No. : NEX/2209	**Test No. :** 2
Project No. : J3251	**Date of test :** 18/04/2009
Project : Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :** W M LAU
Test Section : 36.00 **m** **to** 41.00 **m**	**Checked by :** P O POON

Packer type :	Double	Depth of hole at time of test :	51.15 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	25901	Rock type : Grade II GRANITE	Casing Details : Hx 16.22m

Pressure gauge height above ground level :	0.56 m
Depth to centre of test section (measured down line of drillhole) :	38.50 m
Depth to groundwater level (measured down line of drillhole) :	5.10 m

FIRST PERIOD Gauge Pressure 231.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	360.0	463.4	558.0	646.6		
Water take	(litres/min)		20.68	18.92	17.72		19.11

SECOND PERIOD Gauge Pressure 462.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	680.0	808.7	928.5	1045.9		
Water take	(litres/min)		25.74	23.96	23.48		24.39

THIRD PERIOD Gauge Pressure 693.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	170.0	332.8	485.0	637.4		
Water take	(litres/min)		32.56	30.44	30.48		31.16

FOURTH PERIOD Gauge Pressure 462.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	723.0	832.9	941.1	1052.1		
Water take	(litres/min)		21.98	21.64	22.20		21.94

FIFTH PERIOD Gauge Pressure 231.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	70.0	131.3	195.5	261.6		
Water take	(litres/min)		12.26	12.84	13.22		12.77

Gammon

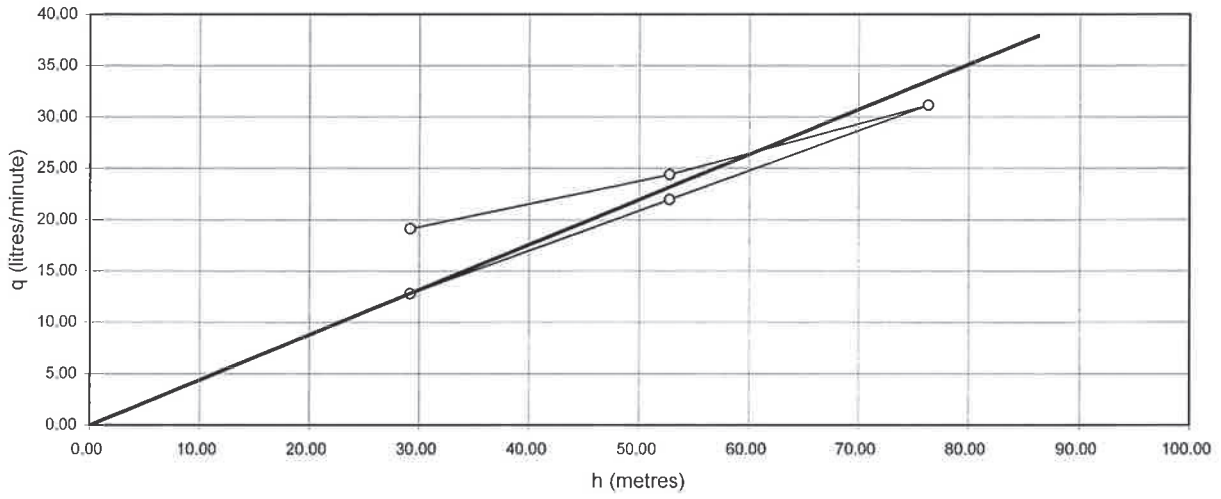
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH330P

Contract No. :	NEX/2209	**Test No. :**	2
Project No. :	J3251	**Test Date :**	18/04/2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	36.00 **m** **to** 41.00 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	51.15 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	101 mm
Presure gauge No. :	PG-002	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	25901.00	Rock type : Grade II GRANITE	Casing Details : Hx 16.22m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD **h** (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
5.10 m (2)	19.11	231.00	23.55			29.21	13.08
	24.39	462.00	47.09			52.75	9.25
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	31.16	693.00	70.64			76.30	8.17
0.56 m (3)	21.94	462.00	47.09			52.75	8.32
	12.77	231.00	23.55			29.21	8.75



Type of Flow Laminar

$L = \frac{100}{lh}$ q = **8.79** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section



DRAWING NO SCL/Z/00/CIV/C05/206

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE

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LEGEND :

- MTR PROTECTION ZONE
- 2209/SCL/DH008 — DRILLHOLES
- 2209/SCL/DH010(P) — DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/IDH013 — INCLINED DRILLHOLES
- 2209/SCL/TT015 — TRIAL TRENCHES
- 2209/SCL/EDH001 — ENVIRONMENTAL DRILLHOLES
- 2209/SCL/EDH001(P) — ENVIRONMENTAL DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/CH001 — INCLINED COREHOLE
- 2209/SCL/SS001 — SLOPE SURFACE STRIPPING

AS-BUILT CO-ORDINATES FOR DRILLHOLES / TRIAL TRENCHES

No.	EASTING	NORTHING
2209/SCL/DH264	835316.53	815631.77
2209/SCL/DH265(P)	835253.29	815593.71
2209/SCL/DH266(P)	835240.76	815593.86
2209/SCL/DH267(P)	835182.95	815590.57
2209/SCL/DH323(P)	835240.96	815609.92
2209/SCL/DH324(P)	835205.68	815564.67
2209/SCL/DH330(P)	835201.40	815557.93
2209/SCL/DH331	835213.89	815501.55
2209/SCL/DH345	835288.52	815616.16
2209/SCL/DH384	835098.73	815492.77
2209/SCL/DH385	835142.13	815486.40
2209/SCL/EDH165(P)	835190.10	815560.00
2209/SCL/TT161	835312.91	815630.58
2209/SCL/TT185	835186.65	815598.58
2209/SCL/TT187	835238.52	815562.72
2209/SCL/TT188	835167.92	815549.24
2209/SCL/TT189	835192.39	815543.08
2209/SCL/TT190	835203.27	815520.33
2209/SCL/TT191	835159.17	815537.12

REVISION	DESCRIPTION	BY	DATE	APPROVED
A	AS-BUILT RECORD FOR BD SUBMISSION	YKYONG	FEB 10	AMG

Registered Geotechnical Engineer

HUI TUNG MAN

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR
MTR CORPORATION LIMITED PROJECTS DIVISION | CIVIL ENGINEERING DEPARTMENT

TITLE
CONTRACT NEX2209
AS-BUILT DRILLHOLES AND TRIAL TRENCHES LAYOUT PLAN (SCHEDULED AREA)

SHEET 7

SCALE	1 : 1000 (A1)	CAD REF	SCL_Z00_CIV_C05_206	AS BUILT APPROVED	
DATE	03 APR 2008	AS BUILT DWG NO			
DRAWN	CL WONG	DESIGNED	D CHOW	DRAWING NO	REV
CHECKED	TM HUI	APPROVED	AMG	SCL/Z/00/CIV/C05/206	A

CAD REF X:\EP\SCL\P\active\2009\34-08-0008\34base\NEX2209_(As-built)\SCL_Z00_CIV_C05_206A.dgn

PLOTTING TIME 28/04/10 9:11am

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屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號 :
OUR REF 本署檔號 : BD 3/7001/08
FAX 圖文傳真 : 2973 0561
TEL 電話 : 2626 1577
www.bd.gov.hk

22 October 2009

Mr. HUI Tung-man
MTR Corporation Limited
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Hung Hom, Kowloon.

Dear Sir,

South Island Line (East)

I acknowledge receipt of your Form BA 14 submitted on **30 September 2009** in respect of the ground investigation field works (Stage I) for the above together with Ground Investigation Field Works Report, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Civil Engineering Department, MTRCL
MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

AP **Mr. YEUNG Sze-wai, Wilfred**
Architect Department,
8/F Citylink Plaza, Shatin, N.T.

香港九龍旺角彌敦道 750 號先驅中心 12 樓至 18 樓 12/F-18/F Pioneer Centre, 750 Nathan Road, Mongkok, Kowloon, Hong Kong.

屋宇署
BUILDINGS DEPARTMENT

5

YOUR REF 來函檔號：
OUR REF 本署檔號： **BD 3/7004/08 (Pt.II)**
FAX 圖文傳真： **2718 1477**
TEL 電話： **3105 3216**
www.info.gov.hk/bd

Mr. Stephen CHIK
MTR Corporation Limited,
Project Division,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

27 May 2010

Dear Sir,

Shatin to Central Link (SCL)

I herewith acknowledge your letter dated 12 May 2010 and received on 17 May 2010 enclosing the Form BA14 to certify the completion of Stage I Ground Investigation Works in both scheduled area and non-scheduled area at the captioned, and RGE's letter dated 26 May 2010 regarding clarification on the above records, the content of which has been noted.

PE-CIVIL & PLANNING DEPT.
CIVIL ENGINEERING SECTION
File No. /
SP#
Rec'd - 1 JUN 2010 Encl.

Name	Info.	Action	Initial
G S Harris			
C K Ho			
Edward Ngai (C)			
Linda Yeung			
Evan Tsui			
[illegible]			
Edward Ngai (M)			

Yours sincerely,

(WONG Wing-keung)
Senior Structural Engineer
for Building Authority

c.c. **RGE- Mr. HUI Tung-man**
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

AP - Yeung Sze-wai Wilfred
Architects Department,
8/F, Citylink Plaza,
Shatin,
N.T.

S.L. 4 (1/92)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/EDH165P**

SHEET 1 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835190.10 N 815560.00	PROJECT No. J3251
MACHINE & No. 17		DATE from 13/03/2009 to 23/03/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.95 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
13/03/2009	SX	08:00								5.95	0.00			
									A 0.45 0.50	5.45	0.50			Light brown, silty fine to medium SAND with much subangular fine to coarse gravel sized rock fragments. (FILL)
									B 0.95 1.00	4.95	1.00			Light grey, subangular coarse GRAVEL sized rock fragments. (FILL)
									C 1.45 1.50	4.45	1.50			Brown and light grey, sandy subangular coarse GRAVEL sized concrete fragments. (FILL)
									INSPECTION PIT D 1.95 2.00					Firm, orangish brown and brown, sandy SILT with some subangular fine gravel sized quartz fragments. (FILL)
									E 2.45 2.50					
13/03/2009	SX 3.00	18:00							F 2.95 3.00	2.95	3.00			
14/03/2009	PX	08:00		80					1					Brown and reddish brown, silty sandy subangular fine to coarse GRAVEL sized rock fragments. (FILL)
									2 4.00 4.10	1.85	4.10			
								2,5 10,6,4,4 N=24	3 4.50 4.55					Firm, brown, sandy SILT with some subangular fine to coarse gravel sized rock fragments. (FILL)
				88					5 5.00	0.95	5.00			Firm, orangish brown and white, sandy clayey SILT with much angular fine to medium gravel sized quartz fragments. (FILL)
								1,1 1,1,1,1 N=4	6 6.00 6.10					
									7 8 6.50 6.55					
				0					7.00	-1.05	7.00			Brown, subangular coarse GRAVEL sized rock fragments with silty matrix. (FILL)
									9 8.00 8.10	-2.15	8.10			
				90					10				V	Extremely weak, pink, mottled light grey and white, completely decomposed GRANITE. (Firm, slightly sandy clayey SILT with some angular fine to medium gravel sized quartz fragments)
									11 9.10 9.20	-3.25	9.20		V	Extremely weak, brown, spotted red and white, completely decomposed GRANITE. (Firm, slightly sandy SILT)
14/03/2009 17/03/2009		18:00 08:00						1,1 1,1,1,5 N=8	12 13 9.60 9.65	-3.70	9.65		V	Extremely weak, reddish brown, mottled white,
											10.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 24/03/2009

CHECKED P O POON

DATE 25/03/2009

REMARKS

1. Inspection pit was dug to 3.00m depth.
2. Constant head permeability test was carried out at 8.00m-9.50m depth.
3. Standpipe was installed at 7.50m depth.
4. Piezometer was installed at 11.80m depth.
5. Packer (Water Absorption) tests were carried out at 23.00m-28.00m and 36.00m-41.00m depths.

(to be continued...)

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/EDH165P**

SHEET 2 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835190.10 N 815560.00	PROJECT No. J3251
MACHINE & No. 17		DATE from 13/03/2009 to 23/03/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.95 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
												-4.05	10.00			
									14		10.20	-4.35	10.30		V	completely decomposed GRANITE. (Firm, sandy SILT with some angular fine to medium gravel sized quartz fragments)
				60					15		10.30				V	Extremely weak, brown, mottled white, completely decomposed GRANITE. (Firm, sandy SILT with some angular fine to medium gravel sized rock fragments)
									16		11.30	-5.45	11.40			
				100					17		11.40				V	Extremely weak, pink and white, completely decomposed GRANITE. (Slightly silty fine to coarse SAND with some subangular fine to coarse gravel sized rock fragments)
									18		12.40	-6.55	12.50			
								7,43/55mm 100/50mm 100bls/50mm	19		12.50 12.63				V	Extremely weak, brown and white, completely decomposed GRANITE. (Silty fine to coarse SAND with some angular fine to coarse gravel sized rock fragments)
									20		12.68 12.78	-6.83	12.78		III/II	Moderately strong to strong, pink, spotted black and light grey, moderately to slightly decomposed medium grained GRANITE. Joints are medium to closely spaced, rough planar and undulating, tight to extremely narrow, iron and manganese stained, chlorite coated, dipping 20°-30° and 60°-70°. 14.10 - 14.89m: Moderately strong, moderately decomposed.
				100	98	94	5.7			T2IO1						
											14.20	-8.15	14.10		III	
				99	96	80				T2IO1		-8.94	14.89		III/II	
							2.3					-9.24	15.19		III/II	Moderately strong to strong, light grey, spotted dark green, moderately to slightly decomposed fine grained GRANITE. Joints are medium spaced, rough planar, tight to extremely narrow, iron stained, chlorite coated, dipping subhorizontal and 50°-60°.
17/03/2009		18:00														
18/03/2009		08:00		96	92	92				T2IO1	15.67					
							5.0									
										T2IO1	17.05	-11.10	17.05			17.05 - 18.62m: Pink, spotted light grey and black.
				96	92	92				T2IO1	17.58	-11.63	17.58		II	17.58 - 19.45m: Strong, slightly decomposed.
				100	96	96	3.3									
							4.1			T2IO1	19.04	-12.67	18.62			
				96	91	88						-13.50	19.45		II	Strong, pink, spotted black and light grey, slightly decomposed medium grained GRANITE. Joints are widely to medium spaced, rough
							0.8			T2IO1			20.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 24/03/2009

CHECKED P O POON

DATE 25/03/2009

REMARKS

6. Acoustic televiewer survey was carried out at 12.55m-22.50m and 27.00m-42.00m depths.
7. Pressuremeter test was carried out at 9.84m-10.17m depth.

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/EDH165P**

SHEET 3 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835190.10 N 815560.00	PROJECT No. J3251
MACHINE & No. 17		DATE from 13/03/2009 to 23/03/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.95 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
										-14.05	20.00			
				96	91	88			T2101 20.54	-14.40	20.35		II	planar, smooth undulating, tight to extremely narrow, iron and manganese stained, chlorite coated, dipping 20°-30° and 60°-70°. 20.35 - 22.60m: Slightly chloritized granite.
				100	100	100								
									T2101 21.95					
				99	99	88	3.3							
							1.0		T2101 23.28	-16.65	22.60			
18/03/2009		18:00												
19/03/2009		08:00		100	100	100								
									T2101 24.47					
				98	98	98								
									T2101 25.77					
				100	99	99								
							5.6		T2101 27.20	-20.85	26.80		III/II	Moderately strong to strong, pink, spotted dark green, moderately to slightly decomposed fine grained GRANITE. Joints are closely spaced, rough undulating, tight, chlorite coated, dipping 60°-70°.
				98	94	84				-21.75	27.70			
							0.9		T2101 28.68	-21.93	27.88		III	Moderately strong, pink, mottled light grey and dark green, moderately decomposed slightly chloritized medium grained GRANITE. Joints are widely spaced, rough and slickensided planar, extremely narrow, chlorite coated, dipping 70°-80°. 27.88 - 29.40m: Subvertical joint.
				100	100	100								
									T2101	-23.45	29.40			
										-24.05	30.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 24/03/2009

CHECKED P O POON

DATE 25/03/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/EDH165P**

SHEET 4 of 6

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835190.10 N 815560.00	PROJECT No. J3251
MACHINE & No. 17		DATE from 13/03/2009 to 23/03/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.95 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
										-24.05	30.00			
				98	98	98			30.02				III	30.00 - 30.70m: Subvertical joint.
									T2IOI	-24.75	30.70			
19/03/2009	PX 31.45	18:00							31.45					
20/03/2009	HX	08:00		100	100	100				-25.98	31.93		III	Moderately strong, pink, mottled light grey, spotted dark green, moderately decomposed fine grained GRANITE. Joints are widely spaced, smooth undulating, tight, chlorite coated, dipping 60°-70°.
									T2IOI					
				100	100	99			32.81					
							≥20		T2IOI	-27.37	33.32			
							1.6		33.63				II	Strong, pink, mottled light grey, spotted dark green, slightly decomposed medium grained GRANITE. Joints are medium spaced, rough planar and undulating, tight, calcite and chlorite coated, dipping 60°-70°.
				100	100	100			T2IOI					
									34.86					
				100	100	95			T2IOI	-29.72	35.67			
							8.2		35.90				III	Moderately strong, dark grey, streaked white, moderately decomposed MAFIC DYKE. Joints are medium to closely spaced, rough planar, smooth undulating, tight, calcite and chlorite coated, dipping 50°-60° and 60°-70°.
				97	97	0			T2IOI					
				100	100	100			36.20					
							3.4		T2IOI					
									37.67					
20/03/2009		18:00							T2IOI					
21/03/2009		08:00		100	94	94			39.14					
									T2IOI					
				100	95	95				-34.05	40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 24/03/2009

CHECKED P O POON

DATE 25/03/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/EDH165P**

SHEET **5** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835190.10 N 815560.00	PROJECT No. J3251
MACHINE & No. 17		DATE from 13/03/2009 to 23/03/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.95 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	95	95			T2IO1 40.63	-34.05	40.00		III	As sheet 4 of 6.
				100	100	100								
									T2IO1 42.10	-35.55	41.50			41.50 - 41.70m: Calcite vein (2cm), dipping 70°-80°.
				100	94	94				-35.75	41.70		II	Strong, greyish pink and pink, spotted black, moderately decomposed slightly chloritized fine grained GRANITE. Joints are medium spaced, rough planar, extremely narrow, kaolin and chlorite coated, dipping 40°-50° and 50°-60°.
							1.4			-36.90	42.85		III	Moderately strong, pink, mottled light grey and light green, spotted black, moderately decomposed slightly chloritized medium grained GRANITE. Joints are medium, locally closely spaced, rough planar, tight, kaolin and chlorite coated, dipping 30°-40°.
				100	100	100			T2IO1 43.65					
	HX 45.17													
				100	100	100			T2IO1 45.17					
21/03/2009		18:00												
23/03/2009		08:00		100	100	100			T2IO1 46.44					
							3.9			-41.09	47.04			
										-41.25	47.20			47.04 - 47.20m: MAFIC DYKE, dipping 70°-80°.
				98	98	92			T2IO1 47.96					
									T2IO1 48.84					
				100	100	99	1.9		T2IO1	-44.05	50.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 24/03/2009

CHECKED P O POON

DATE 25/03/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/EDH165P**

SHEET **6** of **6**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 835190.10 N 815560.00	PROJECT No. J3251
MACHINE & No. 17		DATE from 13/03/2009 to 23/03/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 5.95 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	99			T2101 50.29	-44.05	50.00		III	As sheet 5 of 6.
				100	100	82	9.7		T2101 51.59					
23/03/2009		18:00								-45.64	51.59			End of hole at 51.59m depth.
											60.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 24/03/2009

CHECKED P O POON

DATE 25/03/2009

REMARKS

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MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 1 of 12
Depth : 0.0 0 m. To (15.09) m.
Date of Photograph : 30/3/2009
Kodak Color Control Patches
0.00
12.18
14.20
(15.09)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 2 of 12
Depth : (15.09) m. To (18.48) m.
Date of Photograph : 30/3/2009
(15.09)
15.67
17.05
17.58
17.58
(18.48)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 3 of 12
Depth : (18.48) m. To 21.95 m.
Date of Photograph : 30/3/2009
Kodak Color Control Patches
(18.48)
19.04
20.54
21.95


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 4 of 12
Depth : 21.95 m. To (25.30) m.
Date of Photograph : 30/3/2009
Kodak Color Control Patches
21.95
23.28
24.47
(25.30)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 5 of 12
Depth : (25.30) m. To 28.68 m.
Date of Photograph : 30/3/2009
Kodak Color Control Patches
(25.30)
25.77
27.20
28.68


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 6 of 12
Depth : 28.68 m. To (31.93) m.
Date of Photograph : 30/3/2009
28.68
30.02
31.45
(31.93)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 7 of 12
Depth : (31.93) m. To (35.22) m.
Date of Photograph : 30/3/2009
Kodak Color Control Patches
(31.93)
32.81
33.63
34.86
(35.22)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 8 of 12
Depth : (35.22) m. To (38.57) m.
Date of Photograph : 30/3/2009
Kodak Color Control Patches
(35.22)
35.90
36.20
37.67
37.67
(38.57)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 9 of 12
Depth : (38.57) m. To (41.58) m.
Date of Photograph : 30/3/2009
Kodak Color Control Patches
(38.57)
39.14
40.63
(41.58)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 10 of 12
Depth : (41.58) m. To (45.02) m.
Date of Photograph : 30/3/2009
Kodak Color Control Patches
(41.58)
42.10
43.65
(45.02)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 11 of 12
Depth : (45.02) m. To (48.70) m.
Date of Photograph : 30/3/2009
(45.02)
45.17
46.44
47.96
(48.70)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/EDH 165(P)
Box No. : 12 of 12
Depth : (48.70) m. To 51.59 m.
Date of Photograph : 30/3/2009
Kodak Color Control Patches
(48.70)
48.84
50.29
51.59
END

Gammon	PIEZOMETER DETAIL AND RESPONSE TEST RECORD CONTRACT NO. NEX/2209	DRILLHOLE No. 2209/SCL/EDH165P P 1

Project : Ground Investigation (Land) for Shatin to Central Link

Date Installed :	26/03/2009	**Project No. :**	J3251
Date Tested :	28/03/2009	**Co-ordinates :**	
Initial Water Level :	3.30 **m below G.L.**	**E** 835190.10	**N** 815560.00
Tested / Supervised by :	Raymond Lau	**Ground Level :**	5.95 **mPD**
Checked by :	P O POON	**Piezometer tip level :**	-5.85 **mPD**

Time Elapsed (minutes)	Depth of Water from Top of Pipe (m)
0.00	0.00
0.25	1.20
0.50	1.90
0.75	2.60
1.00	2.70
2.00	2.80
3.00	2.85
4.00	2.87
5.00	2.95
6.00	3.04
7.00	3.12
8.00	3.13
9.00	3.15
10.00	3.20
15.00	3.25

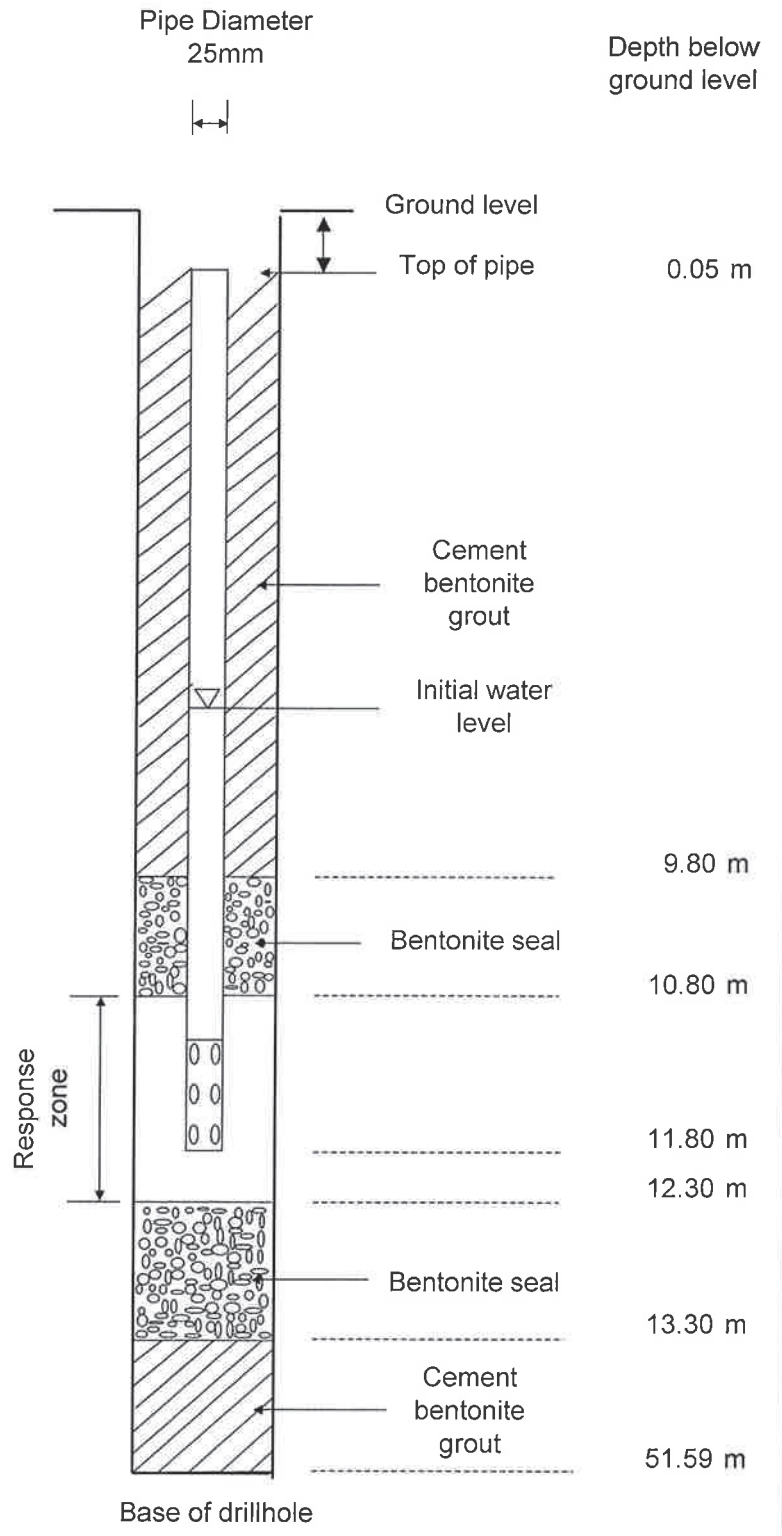
Filter material : SAND

Material surrounding response zone :

10.80-11.40: Completely Decomposed GRANITE. (Sandy SILT with gravel)
11.40-12.30: Completely Decomposed GRANITE. (Silty SAND with gravel)

Remarks :

One standpipe was installed at 7.50m.



Gammon	STANDPIPE AND PIEZOMETER MONITORING RESULTS Contract No. NEX/2209	Job No. J3251

Project : Ground Investigation (Land) for Shatin to Central Link

DATE	Recorded by	Drillhole No. / Pipe No.		
		2209/SCL/EDH165P-P (11.80m) below G.L.	2209/SCL/EDH165P-S (7.50m) below G.L.	
28/03/2009	W F LI	3.25	3.95	
30/03/2009	W F LI	3.35	4.05	
31/03/2009	W F LI	3.31	4.01	
01/04/2009	W F LI	3.26	3.94	
02/04/2009	W F LI	3.25	3.94	
03/04/2009	W F LI	3.26	3.93	
06/04/2009	W F LI	3.27	3.94	

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Depths are from pipe top

Checked by: P O POON

Date: 07/04/2009

Gammon

CONSTANT HEAD PERMEABILITY TEST RECORD SHEET

DRILLHOLE No. **2209/SCL/EDH165P**

Contract No. :	NEX/2209	**Job No.:**	J3251
Project :	Ground Investigation (Land) for Shatin to Central Link		
Standpipe Tip Level :	9.35	m below G.L.	
Initial Water Level before test :	4.66	m below G.L.	
Depth of Base of Reponse Zone :	9.50	m below G.L.	
Flowmeter I.D. :	FM370		

Test Date : 16/03/2009

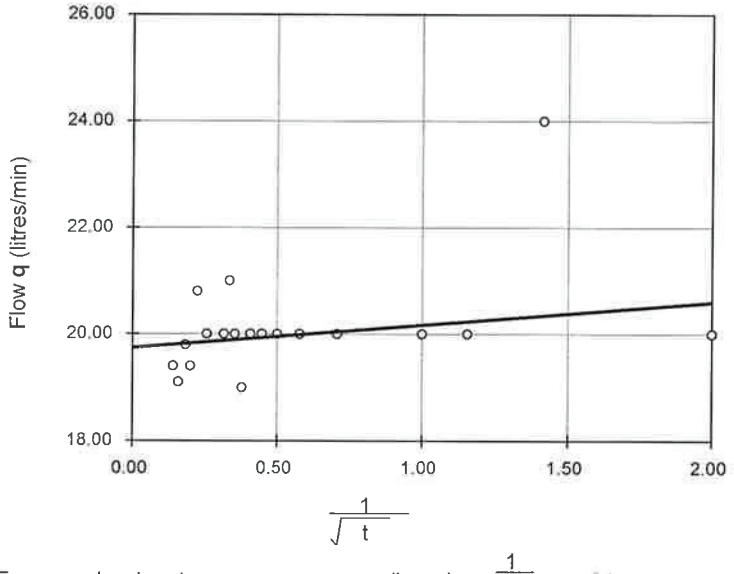
Co-ordinates : E 835190.10 N 815560.00

Ground Level : 5.95 mPD

Tested / Supervised by : Raymond Lau

Checked by : P O POON

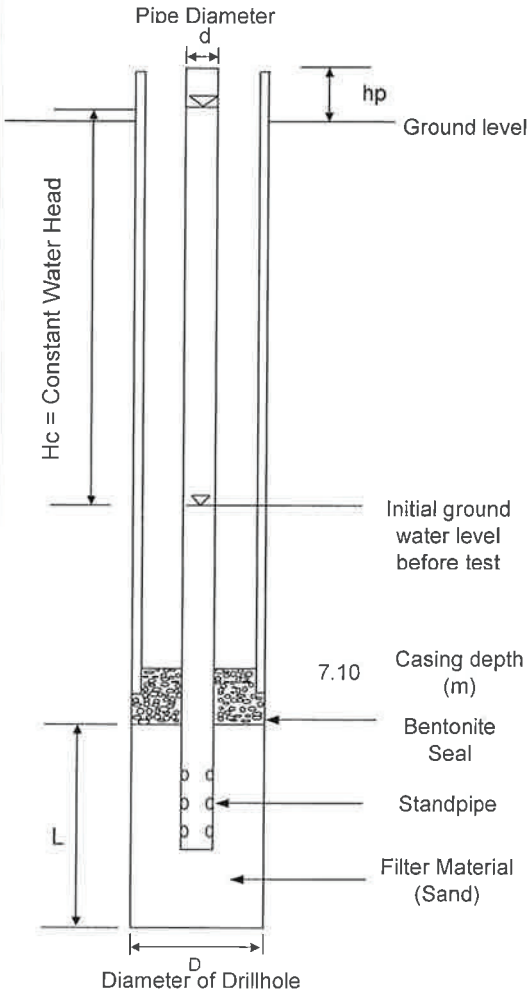
Elapsed Time t (minutes)	$\frac{1}{\sqrt{t}}$	Intake Flow Q (litres)	Flow q $\frac{\Delta Q}{\Delta t}$ (litres / min.)
0.00	∞	1000.00	0.00
0.25	2.00	1005.00	20.00
0.50	1.41	1011.00	24.00
0.75	1.15	1016.00	20.00
1.00	1.00	1021.00	20.00
2.00	0.71	1041.00	20.00
3.00	0.58	1061.00	20.00
4.00	0.50	1081.00	20.00
5.00	0.45	1101.00	20.00
6.00	0.41	1121.00	20.00
7.00	0.38	1140.00	19.00
8.00	0.35	1160.00	20.00
9.00	0.33	1181.00	21.00
10.00	0.32	1201.00	20.00
15.00	0.26	1301.00	20.00
20.00	0.22	1405.00	20.80
25.00	0.20	1502.00	19.40
30.00	0.18	1601.00	19.80
40.00	0.16	1792.00	19.10
50.00	0.14	1986.00	19.40



From graph, when t → ∞ (i.e. when $\frac{1}{\sqrt{t}}$ → 0)

q = 19.74 litres/min.

3.290E-04 m^3 / sec.



d = 0.038 m

D = 0.140 m

L = 1.50 m

hp = 0.62 m

Hc = 5.28 m

Where :

Shape Factor = F (in metres)

$$F = \frac{2.4\,\pi\,L}{\ln\left[1.2(L/D) + \sqrt{(1 + (1.2L/D)^2)}\right]} = 3.4815$$

Permeability: $k = \frac{q}{F\,Hc}$

k = 1.79E-05 m/sec

Material Surrounding Response Zone :

8.0-8.1m: Silty GRAVEL (FILL)

8.1-9.2m: Completely Decomposed GRANITE (Sandy, clayey SILT with gravels)

9.2-9.5m: Completely Decomposed GRANITE (sandy SILT)

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/EDH165P

Contract No. : NEX/2209	**Test No. :** 1
Project No. : J3251	**Date of test :** 24-03-2009
Project : Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :** W M LAU
Test Section : 23.00 **m** **to** 28.00 **m**	**Checked by :** P O POON

Packer type :	Double	Depth of hole at time of test :	51.59 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	05453	Rock type : Grade II GRANITE Casing Details :	Hx 45.17m

Pressure gauge height above ground level : 0.53 m

Depth to centre of test section (measured down line of drillhole) : 25.50 m

Depth to groundwater level (measured down line of drillhole) : 5.60 m

FIRST PERIOD Gauge Pressure 153.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	734.0	884.6	1033.3	1180.7		
Water take	(litres/min)		30.12	29.74	29.48		29.78

SECOND PERIOD Gauge Pressure 306.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	221.0	413.2	600.2	787.1		
Water take	(litres/min)		38.44	37.40	37.38		37.74

THIRD PERIOD Gauge Pressure 459.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	860.0	1062.0	1262.6	1460.8		
Water take	(litres/min)		40.40	40.12	39.64		40.05

FOURTH PERIOD Gauge Pressure 306.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	511.0	685.6	857.7	1027.9		
Water take	(litres/min)		34.92	34.42	34.04		34.46

FIFTH PERIOD Gauge Pressure 153.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	31.4	182.4	334.7	483.6		
Water take	(litres/min)		30.20	30.46	29.78		30.15

Gammon

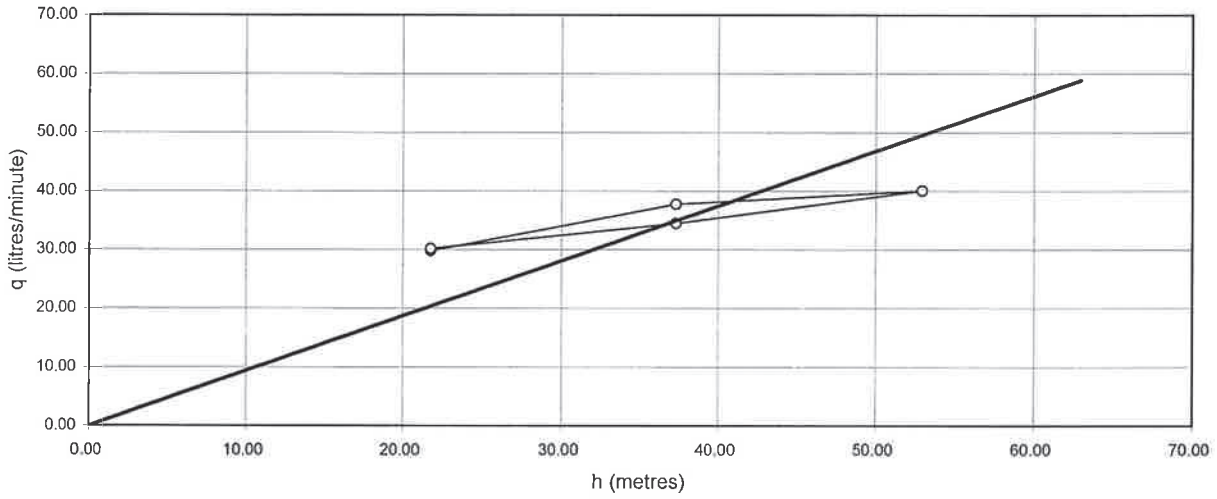
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/EDH165P

Contract No. :	NEX/2209	**Test No. :**	1
Project No. :	J3251	**Test Date :**	24-03-2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	23.00 **m** **to** 28.00 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	51.59 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	101 mm
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	05453	Rock type : Grade II GRANITE	Casing Details : Hx 45.17m

LENGTH OF TEST SECTION 5.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	h (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
5.60 m (2)	29.78	153.00	15.60			21.73	27.41
	37.74	306.00	31.19			37.32	20.22
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	40.05	459.00	46.79			52.92	15.14
	34.46	306.00	31.19			37.32	18.47
0.53 m (3)	30.15	153.00	15.60			21.73	27.75



Type of Flow Turbulent

$L = \frac{100}{lh} q =$ **18.73** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/EDH165P

Contract No. :	NEX/2209	**Test No. :**	2
Project No. :	J3251	**Date of test :**	24-03-2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	36.00 **m** **to** 41.00 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	51.59 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	05453	Rock type : Grade III GRANITE	Casing Details : Hx 45.17m

Pressure gauge height above ground level : 0.53 m

Depth to centre of test section (measured down line of drillhole) : 38.50 m

Depth to groundwater level (measured down line of drillhole) : 5.60 m

FIRST PERIOD Gauge Pressure 231.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	991.0	1026.0	1062.2	1096.1		
Water take	(litres/min)		7.00	7.24	6.78		7.01

SECOND PERIOD Gauge Pressure 462.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	120.0	158.1	194.8	231.1		
Water take	(litres/min)		7.62	7.34	7.26		7.41

THIRD PERIOD Gauge Pressure 693.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	244.0	290.1	335.8	380.3		
Water take	(litres/min)		9.22	9.14	8.90		9.09

FOURTH PERIOD Gauge Pressure 462.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	391.0	426.7	462.2	499.1		
Water take	(litres/min)		7.14	7.10	7.38		7.21

FIFTH PERIOD Gauge Pressure 231.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	509.0	539.0	568.6	599.5		
Water take	(litres/min)		6.00	5.92	6.18		6.03

Gammon

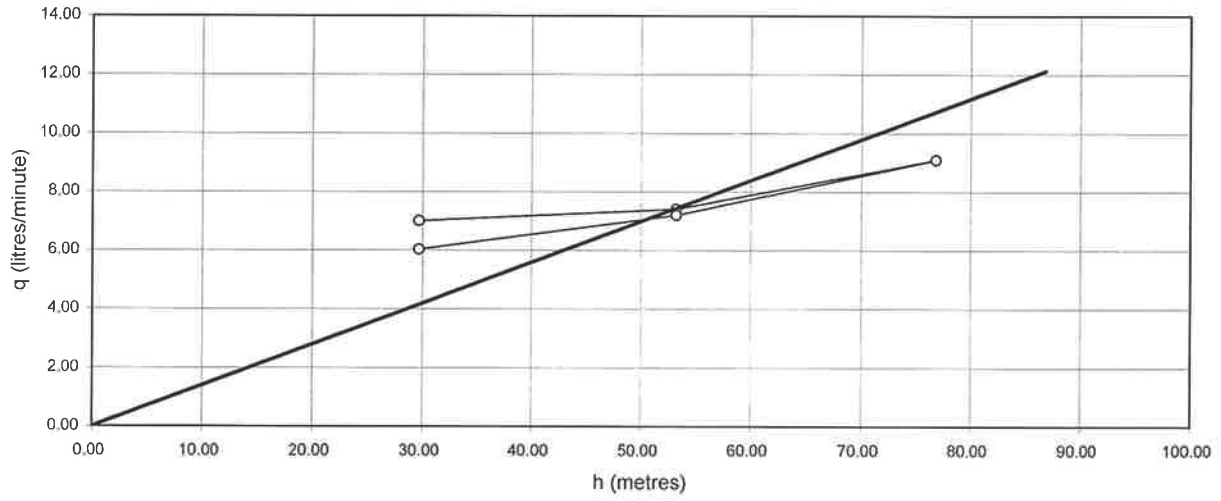
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/EDH165P

Contract No. :	NEX/2209	**Test No. :**	2
Project No. :	J3251	**Test Date :**	24-03-2009
Project :	Ground Investigation (Land) for Shatin to Central Link	**Tested / Supervised by :**	W M LAU
Test Section :	36.00 **m** **to** 41.00 **m**	**Checked by :**	P O POON

Packer type :	Double	Depth of hole at time of test :	51.59 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	101 mm
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	05453	Rock type : Grade III GRANITE Casing Details :	Hx 45.17m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD **h** (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 5.60 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	7.01	231.00	23.55			29.68	4.72
	7.41	462.00	47.09			53.22	2.78
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.53 m (3)	9.09	693.00	70.64			76.77	2.37
	7.21	462.00	47.09			53.22	2.71
	6.03	231.00	23.55			29.68	4.07



Type of Flow Turbulent

$L = \frac{100}{lh} q =$ **2.80 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section



DRAWING NO SCL/Z/00/CIV/C05/206

DO NOT SCALE DRAWINGS. VERIFY ALL DIMENSIONS ON SITE

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LEGEND :

- MTR PROTECTION ZONE
- 2209/SCL/DH008 — DRILLHOLES
- 2209/SCL/DH010(P) — DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/IDH013 — INCLINED DRILLHOLES
- 2209/SCL/TT015 — TRIAL TRENCHES
- 2209/SCL/EDH001 — ENVIRONMENTAL DRILLHOLES
- 2209/SCL/EDH001(P) — ENVIRONMENTAL DRILLHOLES WITH STANDPIPE/PIEZOMETER
- 2209/SCL/CH001 — INCLINED COREHOLE
- 2209/SCL/SS001 — SLOPE SURFACE STRIPPING

AS-BUILT CO-ORDINATES FOR DRILLHOLES / TRIAL TRENCHES

No.	EASTING	NORTHING
2209/SCL/DH264	835316.53	815631.77
2209/SCL/DH265(P)	835253.29	815593.71
2209/SCL/DH266(P)	835240.76	815593.86
2209/SCL/DH267(P)	835182.95	815590.57
2209/SCL/DH323(P)	835240.96	815609.92
2209/SCL/DH324(P)	835205.68	815564.67
2209/SCL/DH330(P)	835201.40	815557.93
2209/SCL/DH331	835213.89	815501.55
2209/SCL/DH345	835288.52	815616.16
2209/SCL/DH384	835098.73	815492.77
2209/SCL/DH385	835142.13	815486.40
2209/SCL/EDH165(P)	835190.10	815560.00
2209/SCL/TT161	835312.91	815630.58
2209/SCL/TT185	835186.65	815598.58
2209/SCL/TT187	835238.52	815562.72
2209/SCL/TT188	835167.92	815549.24
2209/SCL/TT189	835192.39	815543.08
2209/SCL/TT190	835203.27	815520.33
2209/SCL/TT191	835159.17	815537.12

REVISION	DESCRIPTION	BY	DATE	APPROVED
A	AS-BUILT RECORD FOR BD SUBMISSION	YKYONG	FEB 10	AMG

Registered Geotechnical Engineer

HUI TUNG MAN

MTR

SHATIN TO CENTRAL LINK

ORIGINATOR
MTR CORPORATION LIMITED PROJECTS DIVISION | CIVIL ENGINEERING DEPARTMENT

TITLE
CONTRACT NEX2209
AS-BUILT DRILLHOLES AND TRIAL TRENCHES LAYOUT PLAN (SCHEDULED AREA)

SHEET 7

SCALE	1 : 1000 (A1)	CAD REF	SCL_Z00_CIV_C05_206	AS BUILT APPROVED	
DATE	03 APR 2008	AS BUILT DWG NO			
DRAWN	CL WONG	DESIGNED	D CHOW	DRAWING NO	REV
CHECKED	TM HUI	APPROVED	AMG	SCL/Z/00/CIV/C05/206	A

CAD REF X:\EP\SCL\P\active\2009\34-08-0008\34base\NEX2209_(As-built)\SCL_Z00_CIV_C05_206A.dgn

PLOTTING TIME 28/04/10 9:11am

D:\pdf_conversion_procedure\New-project_driver\pdf_kcrc_150dpi.plt

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號 :
OUR REF 本署檔號 : BD 3/7001/08
FAX 圖文傳真 : 2973 0561
TEL 電話 : 2626 1577
www.bd.gov.hk

22 October 2009

Mr. HUI Tung-man
MTR Corporation Limited
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Hung Hom, Kowloon.

Dear Sir,

South Island Line (East)

I acknowledge receipt of your Form BA 14 submitted on **30 September 2009** in respect of the ground investigation field works (Stage I) for the above together with Ground Investigation Field Works Report, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Civil Engineering Department, MTRCL
MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

AP **Mr. YEUNG Sze-wai, Wilfred**
Architect Department,
8/F Citylink Plaza, Shatin, N.T.

香港九龍旺角彌敦道 750 號先驅中心 12 樓至 18 樓 12/F-18/F Pioneer Centre, 750 Nathan Road, Mongkok, Kowloon, Hong Kong.

屋宇署
BUILDINGS DEPARTMENT

5

YOUR REF 來函檔號：
OUR REF 本署檔號： **BD 3/7004/08 (Pt.II)**
FAX 圖文傳真： **2718 1477**
TEL 電話： **3105 3216**
www.info.gov.hk/bd

Mr. Stephen CHIK
MTR Corporation Limited,
Project Division,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

27 May 2010

Dear Sir,

Shatin to Central Link (SCL)

I herewith acknowledge your letter dated 12 May 2010 and received on 17 May 2010 enclosing the Form BA14 to certify the completion of Stage I Ground Investigation Works in both scheduled area and non-scheduled area at the captioned, and RGE's letter dated 26 May 2010 regarding clarification on the above records, the content of which has been noted.

PE-CIVIL & PLANNING DEPT.
CIVIL ENGINEERING SECTION
File No. /
SP#
Rec'd - 1 JUN 2010 Encl.

Name	Info.	Action	Initial
G S Harris			
C K Ho			
Edward Ngai (C)			
Linda Yeung			
Evan Tsui			
[illegible]			
Edward Ngai (M)			

Yours sincerely,

(WONG Wing-keung)
Senior Structural Engineer
for Building Authority

c.c. **RGE- Mr. HUI Tung-man**
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

AP - Yeung Sze-wai Wilfred
Architects Department,
8/F, Citylink Plaza,
Shatin,
N.T.

S.L. 4 (1/92)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET 1 of 10

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 834932.39 N 815290.11	PROJECT No. J3251
MACHINE & No. 20-114		DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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
23/07/2009	PX	08:00								39.36	0.00			brown, mottled yellowish brown, sandy SILT with occasional subangular fine to coarse gravel sized rock fragments. (FILL)
	PX 3.00								A 0.45 0.50 B 0.95 1.00 C 1.45 1.50 D 1.95 2.00 E 2.45 2.50 F 2.95 3.00	36.36	3.00			
	HX			100					1					Reddish brown, sandy SILT with some subangular fine gravel sized rock fragments. (FILL)
									2 4.00 4.10	34.86	4.50			
								1,1 1,2,2,2 N=7	3 4.50					Greyish brown, sandy clayey SILT with some subangular fine gravel sized rock fragments. (FILL)
	HX 5.00			63	9	0			4 4.90 4.95 5.00	34.36	5.00			
									T2IOI	33.99	5.37			Light grey and reddish brown, angular to subangular coarse GRAVEL and COBBLES sized rock, brick and concrete fragments. (FILL)
				99	65	34	13.6		5.43				III	Moderately strong, yellowish brown, dappled light grey, moderately decomposed fine ash TUFF. Joints are medium to closely spaced, smooth planar and undulating, iron and manganese stained, dipping 20°-30°, 40°-50° and 70°-80°.
									T2IOI					
				94	77	74			6.85	32.30	7.06			7.06 - 7.95m: Medium grained GRANITE.
							5.5		T2IOI					
									8.10	31.41	7.95		II	Strong, dark grey, spotted white, slightly decomposed fine ash TUFF. Joints are closely to medium spaced, smooth planar and undulating, clean, dipping 10°-20°, 40°-50°, 60°-70° and 70°-80°.
									T2IOI					
		5.60m at 18:00								30.30	9.06			9.06 - 9.86m: Medium grained GRANITE.
23/07/2009									9.55					
24/07/2009		5.95m at 08:00		100	98	89			T2IOI	29.50	9.86			
										29.36	10.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 05/08/2009

CHECKED P O POON

DATE 06/08/2009

REMARKS

1. Inspection pit was dug to 3.00m depth.
2. Acoustic televiewer survey was carried out at 5.60m-89.55m depth.
3. Packer (Water Absorption) tests were carried out at 6.00m-9.50m, 9.50m-12.50m, 12.50m-17.50m, 17.50m-22.00m, 22.00m-27.00m, 27.00m-31.00m, 31.00m-36.00m, 36.00m-41.00m, 41.00m-45.00m, 45.00m-50.00m, 50.00m-55.00m, 55.00m-60.00m, 60.00m-65.00m, 65.00m-68.00m, 68.00m-71.00m, 71.00m-74.50m, 74.00m-79.00m, 79.00m-84.00m and 84.00m-89.00m depths. (to be continued...)

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET **2** of **10**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. 20-114	E 834932.39 N 815290.11	DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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
										29.36	10.00			
				100	98	89			T2101	29.32	10.04		II	As sheet 1 of 10. 10.04 - 10.22m: 25mm thick fine grained granite intruded, dipping 70°-80°.
										29.14	10.22			
									11.03	28.46	10.90			10.90 - 11.30m: 10-40mm granite intruded dipping 70°-80°.
				100	99	70			T2101	28.06	11.30			
									11.74					
				100	90	66			T2101					
									12.71	26.65	12.71			
				100	95	86	>20		T2101	26.53	12.83			12.71 - 12.83m: Very closely spaced joints.
							5.6		13.55					
				100	90	90			T2101					
							9.5		14.48					
				100	43	26			T2101					
									15.36					
				100	60	54			T2101	23.46	15.90			15.90 - 16.18m: Very closely spaced joints.
							>20		16.18	23.18	16.18			
				100	85	49	6.4		T2101	22.59	16.77			16.77 - 17.02m: Medium grained GRANITE intruded.
										22.34	17.02			
		7.05m at 18:00												
24/07/2009 25/07/2009		5.90m at 08:00		100	99	63			17.68					
									T2101					
									18.98					
				100	84	68	3.3		T2101	19.36	20.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 05/08/2009

CHECKED P O POON

DATE 06/08/2009

REMARKS

4. Standpipe was installed at 5.50m depth.

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET **3** of **10**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 834932.39 N 815290.11	PROJECT No. J3251
MACHINE & No. 20-114		DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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
										19.36	20.00			
				100	84	68			T2101 20.50				II	As sheet 1 of 10.
				100	97	97			T2101 22.07	17.33	22.03			
				100	100	100			T2101 23.57	16.56	22.80		II	Strong, pink, mottled light grey and green, slightly decomposed fine to medium grained GRANITE. Joints are medium spaced, smooth planar, extremely narrow, clean dipping 10°-20°.
										16.08	23.28			22.80 - 23.28m: 150mm thick pegmatite dipping 60°.
				100	93	85			T2101 25.10	14.86	24.50			
				100	81	77			T2101 26.52	12.84	26.52		II	Strong, dark grey, streaked and spotted white, slightly decomposed fine ash TUFF. Joints are medium to closely spaced, smooth and slickensided, planar and undulating, clean, chlorite and kaolin coated dipping 10°-20°, 40°-50°, 60°-70° and 70°-80°.
				100	69	63	>20			12.40	26.96			26.52 - 26.96m: Very closely spaced joints.
							2.8		T2101 27.65					
25/07/2009		7.10m at 18:00												
27/07/2009		6.10m at 08:00		100	95	91			T2101 29.13					
				100	49	36	9.4		T2101 29.96	9.36	30.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **05/08/2009**

CHECKED **P O POON**

DATE **06/08/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET **4** of **10**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 834932.39 N 815290.11	PROJECT No. J3251
MACHINE & No. 20-114		DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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
										9.36	30.00			
				100	84	76			T2IOI 30.92	8.76	30.60		II	As sheet 3 of 10.
										8.76	30.60		III/II	30.60 - 30.82m: 10-20mm calcite veins dipping 70°-80°.
										8.54	30.82			
				100	100	93	4.7			8.31	31.05		II	30.60 - 31.05m: Moderately strong to strong, moderately to slightly decomposed and with extremely closely spaced micro-fracture.
				100	98	80			T2IOI 32.12					
				100	99	99			T2IOI 33.65					
				100	85	81			T2IOI 35.07					
				100	60	37	8.8		T2IOI 36.50					
		7.10m at 18:00 27/07/2009							T2IOI 37.98	1.38	37.98			37.98 - 38.45m: Very closely spaced joints.
		6.50m at 08:00 28/07/2009		100	53	53	>20			0.91	38.45			
							9.4		T2IOI 38.95					
				100	67	29			T2IOI 39.95	-0.64	40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 05/08/2009

CHECKED P O POON

DATE 06/08/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET **5** of **10**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES	PROJECT No. J3251
MACHINE & No. 20-114	E 834932.39 N 815290.11	DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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
										-0.64	40.00			
				100	73	65			T2IOI 41.03				II	As sheet 3 of 10.
				100	75	46			T2IOI 41.83					
				100	98	90	3.5		T2IOI 43.41					
				100	78	51	11.7		T2IOI 44.93					
		7.20m at 18:00		100	74	35	5.3		T2IOI 46.01					
28/07/2009 29/07/2009		6.50m at 08:00		100	89	56			T2IOI 47.51					
				100	91	87			T2IOI 49.10					
				100	96	96			T2IOI	-10.64	50.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **05/08/2009**

CHECKED **P O POON**

DATE **06/08/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET **6** of **10**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 834932.39 N 815290.11	PROJECT No. J3251
MACHINE & No. 20-114		DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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	96	96			T2IOI 50.68	-10.64	50.00		II	As sheet 3 of 10.
				100	94	94	3.2							
				100	99	94			T2IOI 52.24					
				100	100	95			T2IOI 53.74					
				100	97	72	7.2		T2IOI 55.26					
29/07/2009		7.10m at 18:00							T2IOI 56.75					
30/07/2009		6.50m at 08:00		100	70	63			T2IOI 58.10	-18.39 -18.49	57.75 57.85			57.75 - 57.85m: 3-10mm calcite veins dipping 60°.
				100	79	74			T2IOI 58.95					
				100	90	82	4.6		T2IOI 60.00	-20.64	60.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 05/08/2009

CHECKED P O POON

DATE 06/08/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET **7** of **10**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 834932.39 N 815290.11	PROJECT No. J3251
MACHINE & No. 20-114		DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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	86	82			60.00	-20.64	60.00		II	As sheet 3 of 10.
										-21.34	60.70			60.70 - 61.66m: Extremely closely spaced micro-fracture, dipping 70°-80° and 20mm-50mm sub-vertical granite intrusion.
				100	83	63			T2IO1 61.56	-22.30	61.66			
							9.6		T2IO1 63.11					
				100	59	53								
				100	81	52			T2IO1 64.02					
							>20		T2IO1	-25.56	64.92			
							14.3			-25.72	65.08			64.92 - 65.08m: Very closely spaced joints.
		7.30m at 18:00					>20			-26.07	65.43			
30/07/2009														65.43 - 65.67m: Very closely spaced joints.
31/07/2009		6.50m at 08:00		100	73	68	10.8		65.56	-26.31	65.67			
				100	93	68			T2IO1 66.40					
									T2IO1 67.80	-28.59	67.95			67.95 - 68.50m: Extremely closely spaced micro-fracture, dipping 70°-80°.
										-29.14	68.50			
				100	94	56			T2IO1 69.22					
				100	56	26				-30.21	69.57			69.57 - 70.13m: Very closely spaced joints.
							>20		T2IO1	-30.64	70.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 05/08/2009

CHECKED P O POON

DATE 06/08/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET **8** of **10**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 834932.39 N 815290.11	PROJECT No. J3251
MACHINE & No. 20-114		DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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
										-30.64	70.00			
				100	96	74	8.7		70.13	-30.77	70.13		II	As sheet 3 of 10.
									T2IOI					
				100	78	60			71.73					
									T2IOI					
		7.10m at 18:00					13.7		72.73					
31/07/2009 01/08/2009		6.50m at 08:00		100	60	49			T2IOI					
									73.55	-34.19	73.55			
				100	23	0	>20		T2IOI 73.85	-34.49	73.85			73.55 - 73.85m: Very closely spaced joints.
				100	98	83	5.0		T2IOI					
									75.31					
				100	83	77			T2IOI					
									76.76					
				100	97	97			T2IOI					
		7.10m at 18:00							78.26					
01/08/2009 03/08/2009		6.50m at 08:00		100	99	87			T2IOI					
									79.78 T2IOI					
				100	84	66				-40.64	80.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **05/08/2009**

CHECKED **P O POON**

DATE **06/08/2009**

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET **9** of **10**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 834932.39 N 815290.11	PROJECT No. J3251
MACHINE & No. 20-114		DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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	84	66	18.0			-40.64	80.00		II	As sheet 3 of 10.
							8.3		T2IOI					
				100	90	65			81.26					
									T2IOI					
				100	100	77			82.76					
									T2IOI					
				100	74	66			83.91					
									T2IOI					
				100	60	34			84.96					
		7.10m at 18:00							T2IOI					
03/08/2009									85.81	-46.45	85.81			
04/08/2009		6.50m at 08:00		100	63	63	N.I.			-46.54	85.90			85.81 - 85.90m: Non intact.
							5.3		T2IOI	-46.92	86.28			
							N.I.		86.40	-47.04	86.40			86.28 - 86.40m: Non intact.
				100	85	61	17.5							
							6.2		T2IOI					
									87.90					
				100	93	56								
									T2IOI					
							15.7		89.00					
				100	96	66								
							7.7		T2IOI					
		7.20m								-50.64	90.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED W K SIU

DATE 05/08/2009

CHECKED P O POON

DATE 06/08/2009

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

HOLE No. **2209/SCL/DH168P**

SHEET **10** of **10**

CONTRACT NO. NEX/2209

Project Title Ground Investigation (Land) for Shatin to Central Link

METHOD Rotary	CO-ORDINATES E 834932.39 N 815290.11	PROJECT No. J3251
MACHINE & No. 20-114		DATE from 23/07/2009 to 04/08/2009
FLUSHING MEDIUM WATER	ORIENTATION **Vertical**	GROUND LEVEL + 39.36 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
										-50.64	90.00			
04/08/2009		at 18:00		100	96	66			90.16	-50.80	90.16			As sheet 3 of 10. End of hole at 90.16m depth.
											100.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED **W K SIU**

DATE **05/08/2009**

CHECKED **P O POON**

DATE **06/08/2009**

REMARKS

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MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 1 of 24
Depth : 0.00 m. To 8.10 m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
0.00
5.43
5.00
6.85
8.10


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 2 of 24
Depth : 8.10 m. To 11.74 m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
8.10
9.55
11.03
11.74


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 3 of 24
Depth : 11.74 m. To 15.36 m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
11.74
12.71
13.55
14.48
15.36

MTR

Gammon

Project Title : Ground Investigation (Land) For Shatin to Central Link

Contract No. : NEX/2209

Hole No. : 2209/SCL/DH168P

Box No. : 4 of 24

Depth : 15.36 m. To 18.98 m.

Date of Photograph : 17/8/2009




MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 5 of 24
Depth : 18.98 m. To (22.72) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
18.98
20.50
22.07
(22.72)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 6 of 24
Depth : (22.72) m. To 26.52 m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(22.72)
23.57
25.10
26.52
26.52M


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 7 of 24
Depth : 26.52 m. To (30.09) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
26.52
27.65
29.13
29.96
(30.09)

MTR

Gammon

Project Title : Ground Investigation (Land) For Shatin to Central Link

Contract No. : NEX/2209

Hole No. : 2209/SCL/DH168P

Box No. : 8 of 24

Depth : (30.09) m. To 33.65 m.

Date of Photograph : 17/8/2009




MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 9 of 24
Depth : 33.65 m. To (37.32) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
33.65
35.07
36.50
(37.32)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 10 of 24
Depth : (37.32) m. To (40.72) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(37.32)
37.98
38.95
39.95
(40.72)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 11 of 24
Depth : (40.72) m. To (44.18) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(40.72)
41.03
41.83
43.41
(44.18)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 12 of 24
Depth : (44.18) m. To 47.51 m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(44.18)
44.93
46.01
47.51

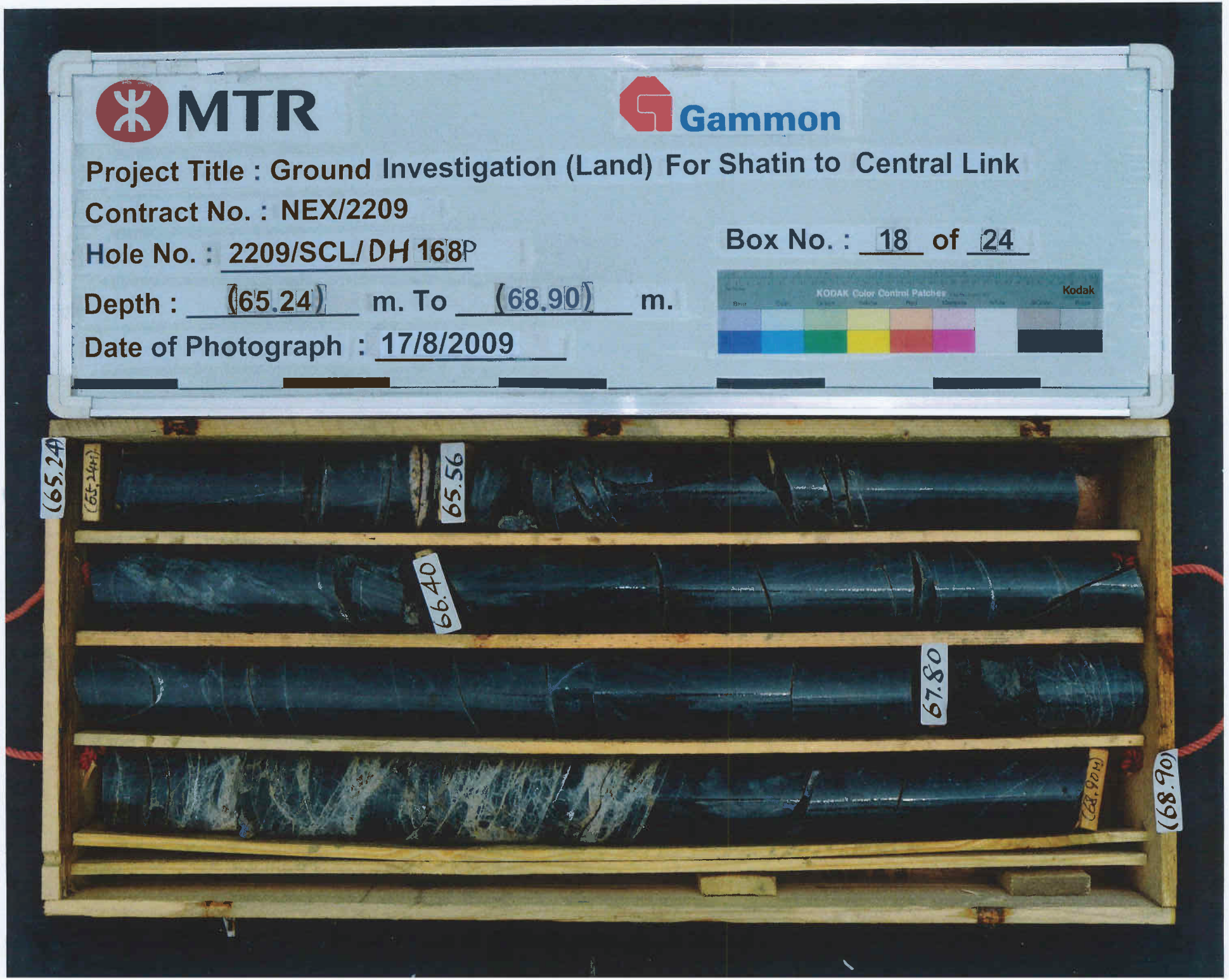

MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 13 of 24
Depth : 47.51 m. To (51.06) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
47.51
49.10
50.68
(51.06)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 14 of 24
Depth : (51.06) m. To (54.65) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(51.06)
52.24
53.74
(54.65)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 15 of 24
Depth : (54.65) m. To 58.10 m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(54.65)
(54.65m)
55.26
56.75
58.10


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 16 of 24
Depth : 58.10 m. To 61.56 m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
58.10
58.95
60.00
61.56


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 17 of 24
Depth : 61.56 m. To (65.24) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
61.56
63.11
64.02
(65.24)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 18 of 24
Depth : (65.24) m. To (68.90) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(65.24)
(65.24)
65.56
66.40
67.80
(68.90)
(68.90)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 19 of 24
Depth : (68.90) m. To (72.53) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(68.90)
69.22
70.13
71.73
(72.53)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 20 of 24
Depth : (72.53) m. To (76.16) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(72.53)
72.73
73.55
73.85
75.31
(76.16)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH168P
Box No. : 21 of 24
Depth : (76.16) m. To 79.78 m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(76.16)
76.76
78.26
79.78


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 22 of 24
Depth : 79.78 m. To (83.38) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
79.78
81.26
82.76
(83.38)


MTR
Gammon
Project Title : Ground Investigation (Land) For Shatin to Central Link
Contract No. : NEX/2209
Hole No. : 2209/SCL/DH 168P
Box No. : 23 of 24
Depth : (83.38) m. To (86.80) m.
Date of Photograph : 17/8/2009
KODAK Color Control Patches
Kodak
(83.38)
83.91
84.96
84.96
85.81
86.40
(86.80)

MTR

Gammon

Project Title : Ground Investigation (Land) For Shatin to Central Link

Contract No. : NEX/2209

Hole No. : 2209/SCL/DH168P

Box No. : 24 of 24

Depth : (86.80) m. To 90.16 m.

Date of Photograph : 17/8/2009



Gammon

STANDPIPE DETAIL AND RESPONSE TEST RECORD

CONTRACT NO. NEX/2209

DRILLHOLE No.
2209/SCL/DH168P
S 1

Project : Ground Investigation (Land) for Shatin to Central Link

Date Installed :	13/08/2009	**Project No. :**	J3251
Date Tested :	14/08/2009	**Co-ordinates :**	
Initial Water Level :	Dry **m below G.L.**	**E** 834932.39	**N** 815290.11
Tested / Supervised by :	K M Lo	**Ground Level :**	39.36 **mPD**
Checked by :	P O POON	**Standpipe tip level :**	33.86 **mPD**

Time Elapsed (minutes)	Depth of Water from Top of Pipe (m)
0.00	0.00
0.25	1.65
0.50	2.45
0.75	3.00
1.00	3.45
1.50	4.25
2.00	5.00
3.00	5.40

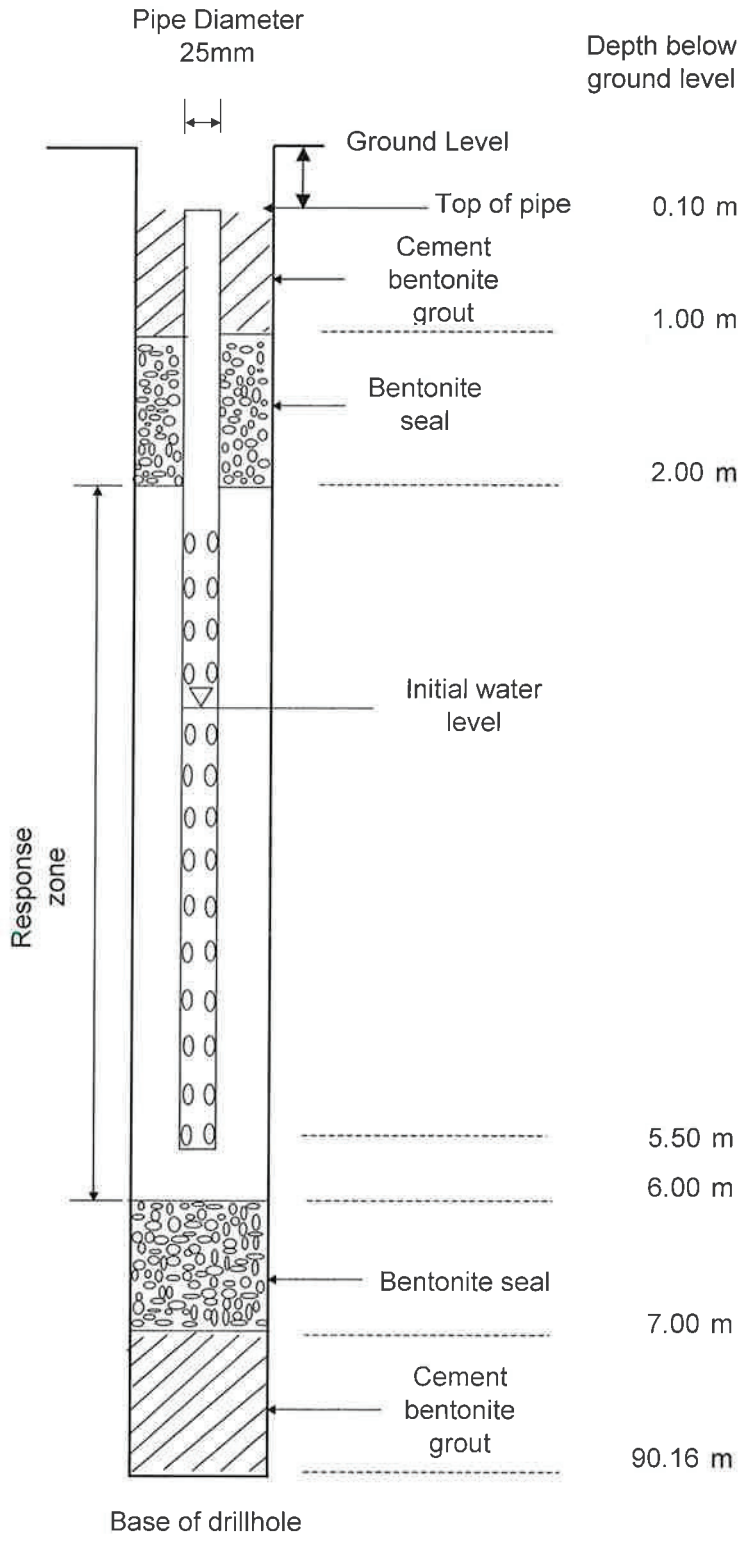
Filter material :

10-16mm Aggregates

Material surrounding response zone :

2.00-5.37: FILL ;
5.37-6.00: MARINE DEPOSIT

Remarks :



Gammon	STANDPIPE AND PIEZOMETER MONITORING RESULTS Contract No. NEX/2209	Job No. J3251

Project : Ground Investigation (Land) for Shatin to Central Link

DATE	Recorded by	Drillhole No. / Pipe No.		
		2209/SCL/DH168P-S (5.50m) below G.L.		
15/08/2009	W F LI	Dry		
17/08/2009	W F LI	Dry		
18/08/2009	W F LI	Dry		
19/08/2009	W F LI	Dry		
20/08/2009	W F LI	Dry		
21/08/2009	W F LI	Dry		
22/08/2009	W F LI	Dry		

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Depths are from pipe top

Checked by: P O POON

Date: 23/8/2009

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	1
Project No. :	J3251	**Date of test :**	06/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	79.00 **m** **to** 84.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	81.50 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 489.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	3034.0	3136.4	3239.9	3341.3		
Water take	(litres/min)		20.48	20.70	20.28		20.49

SECOND PERIOD — Gauge Pressure 978.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	3450.0	3663.0	3883.1	4101.6		
Water take	(litres/min)		42.60	44.02	43.70		43.44

THIRD PERIOD — Gauge Pressure 1467.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	4284.0	4571.5	4855.8	5147.3		
Water take	(litres/min)		57.50	56.86	58.30		57.55

FOURTH PERIOD — Gauge Pressure 978.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	5339.0	5570.3	5802.4	6025.6		
Water take	(litres/min)		46.26	46.42	44.64		45.77

FIFTH PERIOD — Gauge Pressure 489.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	6160.0	6283.2	6399.5	6517.9		
Water take	(litres/min)		24.64	23.26	23.68		23.86

Gammon

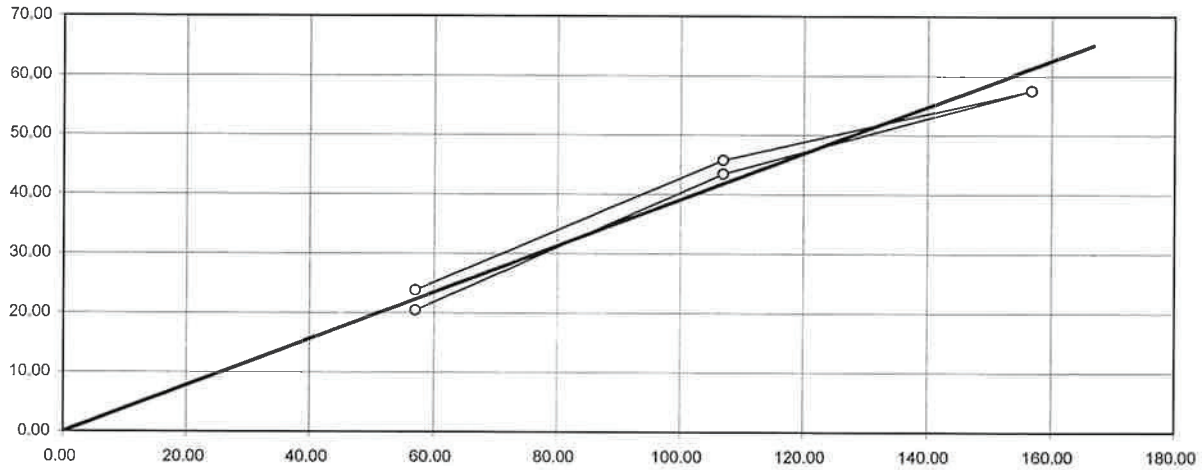
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/ DH168P

Contract No. : NEX2209	**Test No. :** 1
Project No. : J3251	**Test Date :** 06/08/2009
Project : Ground Investigation for Shatin to Central Link	**Tested / Supervised by :** K M Lo
Test Section : 79.00 **m** **to** 84.00 **m**	**Checked by :** Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	20.49	489.00	49.85			57.05	7.18
	43.44	978.00	99.69			106.89	8.13
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	57.55	1467.00	149.54			156.74	7.34
	45.77	978.00	99.69			106.89	8.56
	23.86	489.00	49.85			57.05	8.37



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **7.8203** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	2
Project No. :	J3251	**Date of test :**	07/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	84.00 **m** **to** 89.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	86.50 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 519.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	6624.0	6679.0	6735.0	6792.0		
Water take	(litres/min)		11.00	11.20	11.40		11.20

SECOND PERIOD — Gauge Pressure 1038.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	6936.0	7109.0	7281.4	7457.0		
Water take	(litres/min)		34.60	34.48	35.12		34.73

THIRD PERIOD — Gauge Pressure 1557.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	7675.0	7884.0	8090.0	8294.0		
Water take	(litres/min)		41.80	41.20	40.80		41.27

FOURTH PERIOD — Gauge Pressure 1038.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	8435.0	8630.7	8830.0	9031.0		
Water take	(litres/min)		39.14	39.86	40.20		39.73

FIFTH PERIOD — Gauge Pressure 519.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	9100.0	9183.0	9266.0	9346.6		
Water take	(litres/min)		16.60	16.60	16.12		16.44

Gammon

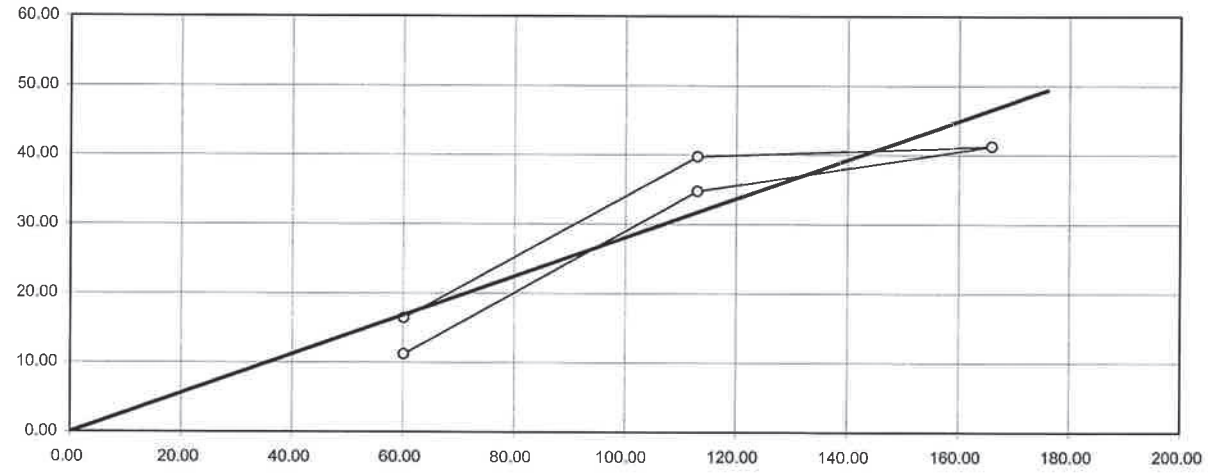
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. : NEX2209	**Test No. :** 2
Project No. : J3251	**Test Date :** 07/08/2009
Project : Ground Investigation for Shatin to Central Link	**Tested / Supervised by :** K M Lo
Test Section : 84.00 **m** **to** 89.00 **m**	**Checked by :** Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	11.20	519.00	52.91			60.11	3.73
	34.73	1038.00	105.81			113.01	6.15
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	41.27	1557.00	158.72			165.92	4.97
	39.73	1038.00	105.81			113.01	7.03
	16.44	519.00	52.91			60.11	5.47



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **5.6135 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. : NEX2209	**Test No. :** 3
Project No. : J3251	**Date of test :** 07/08/2009
Project : Ground Investigation for Shatin to Central Link	**Tested / Supervised by :** K M Lo
Test Section : 74.00 **m** **to** 79.00 **m**	**Checked by :** Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	76.50 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 459.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	9519.0	9547.0	9573.5	9600.2		
Water take	(litres/min)		5.60	5.30	5.34		5.41

SECOND PERIOD — Gauge Pressure 918.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	9652.0	9764.2	9873.7	9978.5		
Water take	(litres/min)		22.44	21.90	20.96		21.77

THIRD PERIOD — Gauge Pressure 1377.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	10195.0	10467.0	10742.3	11012.4		
Water take	(litres/min)		54.40	55.06	54.02		54.49

FOURTH PERIOD — Gauge Pressure 918.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	11032.0	11084.8	11140.0	11196.3		
Water take	(litres/min)		10.56	11.04	11.26		10.95

FIFTH PERIOD — Gauge Pressure 459.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	11224.0	11255.4	11286.1	11317.3		
Water take	(litres/min)		6.28	6.14	6.24		6.22

Gammon

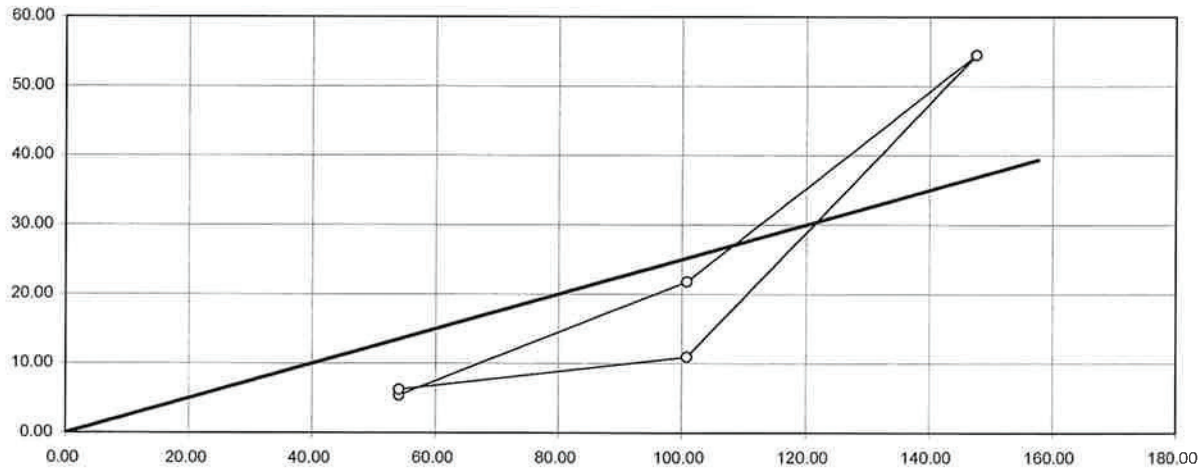
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	3
Project No. :	J3251	**Test Date :**	07/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	74.00 **m** **to** 79.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
6.70 m (2)	5.41	459.00	46.79			53.99	2.01
	21.77	918.00	93.58			100.78	4.32
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	54.49	1377.00	140.37			147.57	7.39
	10.95	918.00	93.58			100.78	2.17
0.50 m (3)	6.22	459.00	46.79			53.99	2.30



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **4.9948 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	4
Project No. :	J3251	**Date of test :**	07/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	71.00 **m** **to** 74.50 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	72.75 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 436.50 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	11320.0	11341.4	11363.2	11384.2		
Water take	(litres/min)		4.28	4.36	4.20		4.28

SECOND PERIOD — Gauge Pressure 873.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	11410.0	11506.0	11606.0	11701.3		
Water take	(litres/min)		19.20	20.00	19.06		19.42

THIRD PERIOD — Gauge Pressure 1309.50 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	11960.0	12210.0	12467.0	12716.5		
Water take	(litres/min)		50.00	51.40	49.90		50.43

FOURTH PERIOD — Gauge Pressure 873.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	12850.0	13005.0	13151.5	13302.0		
Water take	(litres/min)		31.00	29.30	30.10		30.13

FIFTH PERIOD — Gauge Pressure 436.50 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	13329.0	13357.4	13384.0	13411.5		
Water take	(litres/min)		5.68	5.32	5.50		5.50

Gammon

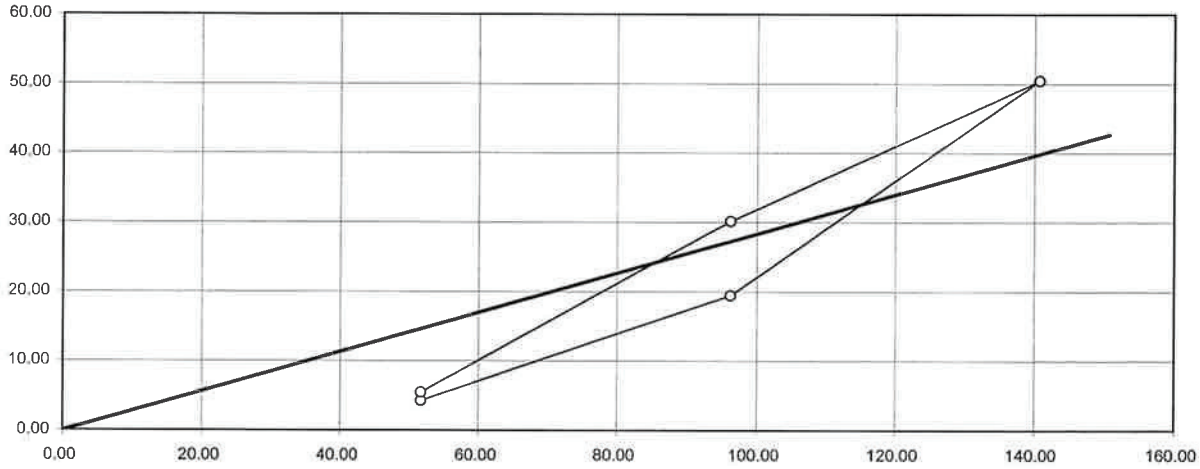
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	4
Project No. :	J3251	**Test Date :**	07/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	71.00 **m** **to** 74.50 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 **m**
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 3.50 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	h (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	4.28	436.50	44.50			51.70	2.37
	19.42	873.00	88.99			96.19	5.77
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	50.43	1309.50	133.49			140.69	10.24
	30.13	873.00	88.99			96.19	8.95
	5.50	436.50	44.50			51.70	3.04



Type of Flow Dilation

$L = \frac{100}{lh} q =$ **8.0965** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. : NEX2209	**Test No. :** 5
Project No. : J3251	**Date of test :** 8/8/2009
Project : Ground Investigation for Shatin to Central Link	**Tested / Supervised by :** K M Lo
Test Section : 60.00 **m** **to** 65.00 **m**	**Checked by :** Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	62.50 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 375.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	13431.6	13471.6	13512.4	13553.4		
Water take	(litres/min)		8.00	8.16	8.20		8.12

SECOND PERIOD — Gauge Pressure 750.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	13615.4	13696.4	13778.4	13860.0		
Water take	(litres/min)		16.20	16.40	16.32		16.31

THIRD PERIOD — Gauge Pressure 1125.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	14042.0	14218.0	14398.0	14573.0		
Water take	(litres/min)		35.20	36.00	35.00		35.40

FOURTH PERIOD — Gauge Pressure 750.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	15000.0	15100.6	15200.7	15300.5		
Water take	(litres/min)		20.12	20.02	19.96		20.03

FIFTH PERIOD — Gauge Pressure 375.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	15621.5	15672.1	15722.4	15772.1		
Water take	(litres/min)		10.12	10.06	9.94		10.04

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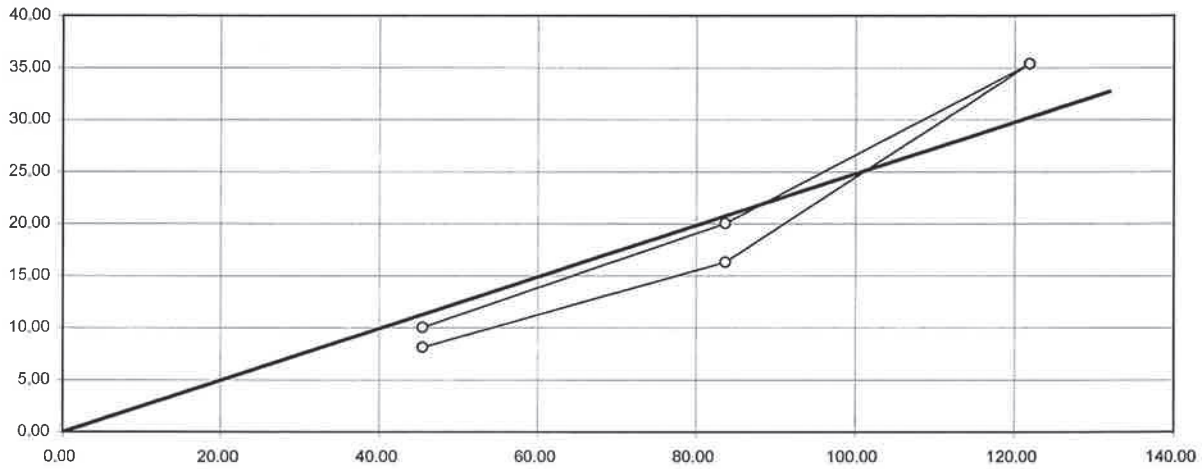
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	5
Project No. :	J3251	**Test Date :**	8/8/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	60.00 **m** **to** 65.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	8.12	375.00	38.23			45.43	3.58
	16.31	750.00	76.45			83.65	3.90
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	35.40	1125.00	114.68			121.88	5.81
	20.03	750.00	76.45			83.65	4.79
	10.04	375.00	38.23			45.43	4.42



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **4.9607** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

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PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	6
Project No. :	J3251	**Date of test :**	8/8/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	55.00 **m** **to** 60.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16	
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101	m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90	Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details :	Hx 5.00m

Pressure gauge height above ground level :	0.50	m
Depth to centre of test section (measured down line of drillhole) :	57.50	m
Depth to groundwater level (measured down line of drillhole) :	6.70	m

FIRST PERIOD — Gauge Pressure 345.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	15806.2	15826.4	15847.2	15868.4		
Water take	(litres/min)		4.04	4.16	4.24		4.15

SECOND PERIOD — Gauge Pressure 690.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	15871.3	15912.7	15954.5	15996.7		
Water take	(litres/min)		8.28	8.36	8.44		8.36

THIRD PERIOD — Gauge Pressure 1035.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	16007.5	16073.8	16141.2	16209.5		
Water take	(litres/min)		13.26	13.48	13.66		13.47

FOURTH PERIOD — Gauge Pressure 690.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	16213.4	16251.2	16289.6	16326.7		
Water take	(litres/min)		7.56	7.68	7.42		7.55

FIFTH PERIOD — Gauge Pressure 345.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	16330.4	16350.3	16369.3	16387.9		
Water take	(litres/min)		3.98	3.80	3.72		3.83

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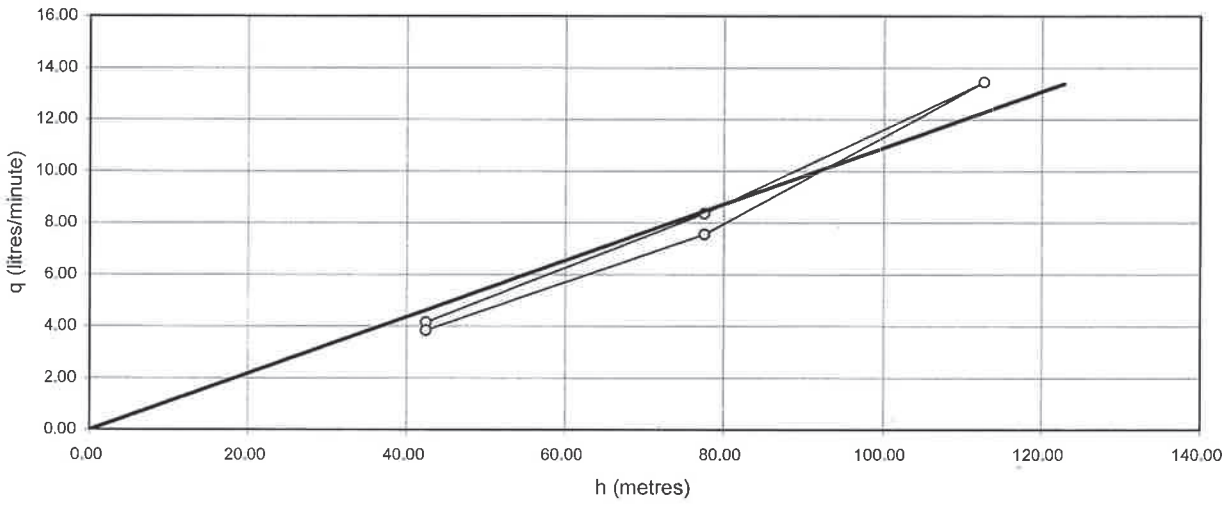
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	6
Project No. :	J3251	**Test Date :**	8/8/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	55.00 **m** **to** 60.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
6.70 m (2)	4.15	345.00	35.17			42.37	1.96
	8.36	690.00	70.34			77.54	2.16
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	13.47	1035.00	105.50			112.70	2.39
	7.55	690.00	70.34			77.54	1.95
0.50 m (3)	3.83	345.00	35.17			42.37	1.81



Type of Flow Dilation

$L = \frac{100}{lh} q =$ **2.1823 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	7
Project No. :	J3251	**Date of test :**	8/8/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	50.00 **m** **to** 55.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	52.50 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 315.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	16400.2	16430.8	16462.3	16494.4		
Water take	(litres/min)		6.12	6.30	6.42		6.28

SECOND PERIOD — Gauge Pressure 630.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	16505.2	16563.9	16623.3	16683.2		
Water take	(litres/min)		11.74	11.88	11.98		11.87

THIRD PERIOD — Gauge Pressure 945.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	16699.4	16764.8	16830.5	16897.0		
Water take	(litres/min)		13.08	13.14	13.30		13.17

FOURTH PERIOD — Gauge Pressure 630.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	16901.0	16946.8	16993.3	17039.5		
Water take	(litres/min)		9.16	9.30	9.24		9.23

FIFTH PERIOD — Gauge Pressure 315.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17087.1	17118.3	17149.8	17180.8		
Water take	(litres/min)		6.24	6.30	6.20		6.25

Gammon

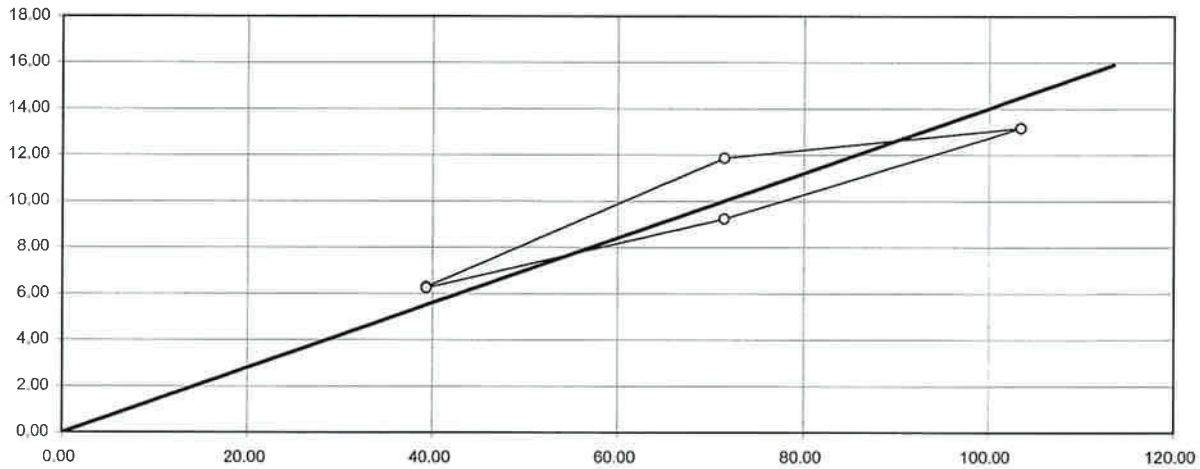
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	7
Project No. :	J3251	**Test Date :**	8/8/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	50.00 **m** **to** 55.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	6.28	315.00	32.11			39.31	3.20
	11.87	630.00	64.22			71.42	3.32
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	13.17	945.00	96.33			103.53	2.54
	9.23	630.00	64.22			71.42	2.59
	6.25	315.00	32.11			39.31	3.18



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **2.8014 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	8
Project No. :	J3251	**Date of test :**	8/8/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	45.00 **m** **to** 50.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	47.50 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD Gauge Pressure 285.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17199.7	17232.2	17265.8	17298.9		
Water take	(litres/min)		6.50	6.72	6.62		6.61

SECOND PERIOD Gauge Pressure 570.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17305.8	17354.3	17402.5	17451.3		
Water take	(litres/min)		9.70	9.64	9.76		9.70

THIRD PERIOD Gauge Pressure 855.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17500.8	17558.1	17615.8	17673.6		
Water take	(litres/min)		11.46	11.54	11.56		11.52

FOURTH PERIOD Gauge Pressure 570.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17702.6	17741.1	17779.2	17817.1		
Water take	(litres/min)		7.70	7.62	7.58		7.63

FIFTH PERIOD Gauge Pressure 285.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17825.8	17846.5	17867.6	17888.5		
Water take	(litres/min)		4.14	4.22	4.18		4.18

Gammon

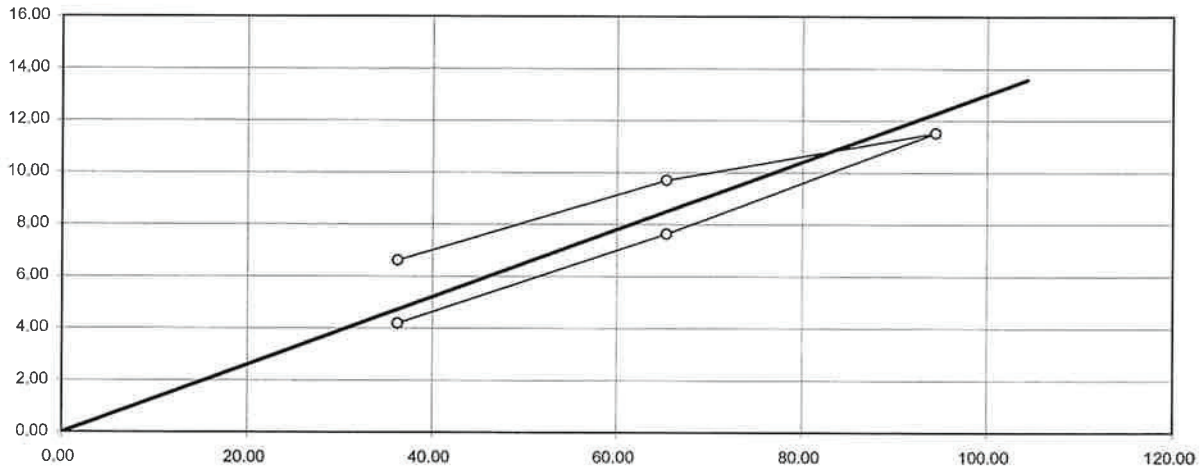
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/ DH168P

Contract No. :	NEX2209	**Test No. :**	8
Project No. :	J3251	**Test Date :**	8/8/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	45.00 **m** **to** 50.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m.
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
6.70 m (2)	6.61	285.00	29.05			36.25	3.65
	9.70	570.00	58.10			65.30	2.97
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	11.52	855.00	87.16			94.36	2.44
	7.63	570.00	58.10			65.30	2.34
0.50 m (3)	4.18	285.00	29.05			36.25	2.31



Type of Flow Void Filling

$L = \frac{100}{lh} q =$ **2.6023 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	9
Project No. :	J3251	**Date of test :**	10/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	36.00 **m** **to** 41.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	38.50 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD Gauge Pressure 231.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17900.6	17916.1	17932.2	17948.4		
Water take	(litres/min)		3.10	3.22	3.24		3.19

SECOND PERIOD Gauge Pressure 462.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	17958.3	17980.2	18002.3	18024.6		
Water take	(litres/min)		4.38	4.42	4.46		4.42

THIRD PERIOD Gauge Pressure 693.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18040.3	18069.6	18099.1	18128.6		
Water take	(litres/min)		5.86	5.90	5.90		5.89

FOURTH PERIOD Gauge Pressure 462.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18131.4	18144.9	18158.9	18173.0		
Water take	(litres/min)		2.70	2.80	2.82		2.77

FIFTH PERIOD Gauge Pressure 231.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18179.4	18186.2	18193.3	18200.5		
Water take	(litres/min)		1.36	1.42	1.44		1.41

Gammon

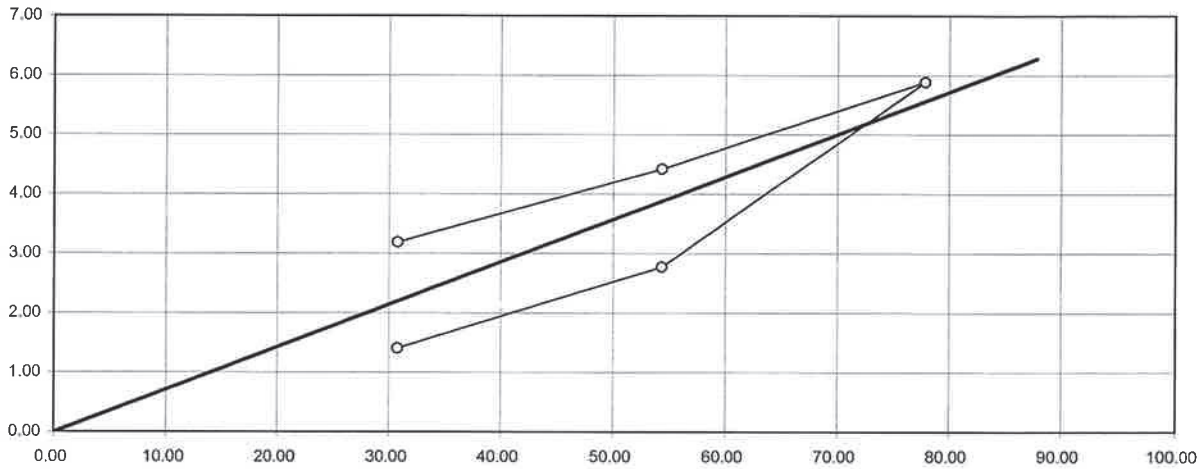
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	9
Project No. :	J3251	**Test Date :**	10/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	36.00 **m** **to** 41.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	3.19	231.00	23.55			30.75	2.07
	4.42	462.00	47.09			54.29	1.63
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	5.89	693.00	70.64			77.84	1.51
	2.77	462.00	47.09			54.29	1.02
	1.41	231.00	23.55			30.75	0.91



Type of Flow Void Filling

$L = \frac{100}{lh} q =$ **1.4300 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	10
Project No. :	J3251	**Date of test :**	10/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	31.00 **m** **to** 36.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	33.50 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 201.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18250.3	18266.2	18282.3	18298.6		
Water take	(litres/min)		3.18	3.22	3.26		3.22

SECOND PERIOD — Gauge Pressure 402.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18309.4	18337.1	18365.1	18393.2		
Water take	(litres/min)		5.54	5.60	5.62		5.59

THIRD PERIOD — Gauge Pressure 603.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18405.3	18445.0	18484.5	18524.1		
Water take	(litres/min)		7.94	7.90	7.92		7.92

FOURTH PERIOD — Gauge Pressure 402.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18562.3	18591.6	18621.1	18650.8		
Water take	(litres/min)		5.86	5.90	5.94		5.90

FIFTH PERIOD — Gauge Pressure 201.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18693.2	18710.7	18728.4	18746.1		
Water take	(litres/min)		3.50	3.54	3.54		3.53

Gammon

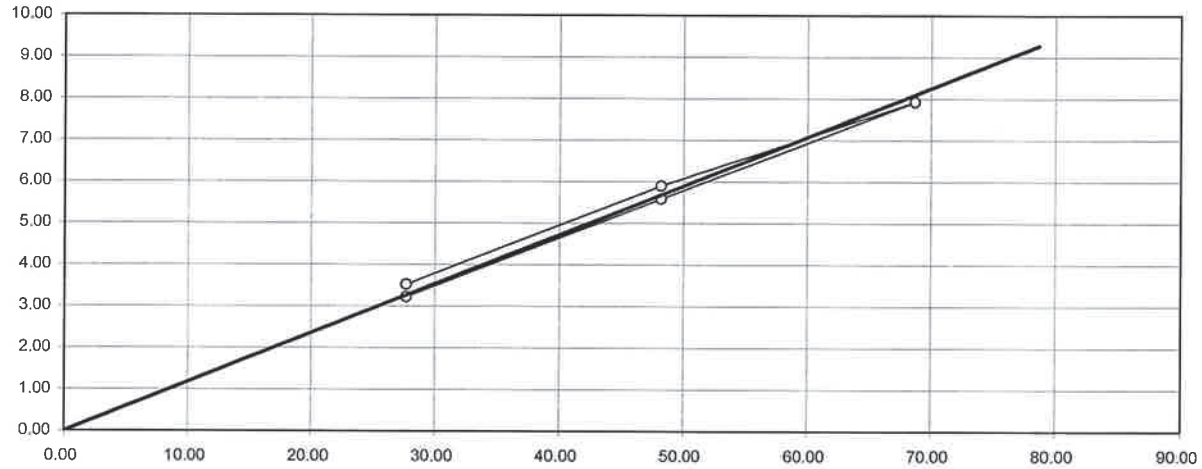
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	10
Project No. :	J3251	**Test Date :**	10/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	31.00 **m** **to** 36.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	3.22	201.00	20.49			27.69	2.33
	5.59	402.00	40.98			48.18	2.32
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	7.92	603.00	61.47			68.67	2.31
	5.90	402.00	40.98			48.18	2.45
	3.53	201.00	20.49			27.69	2.55



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **2.3580 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	11
Project No. :	J3251	**Date of test :**	10/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	22.00 **m** **to** 27.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	24.50 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 147.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18803.2	18824.4	18846.2	18868.2		
Water take	(litres/min)		4.24	4.36	4.40		4.33

SECOND PERIOD — Gauge Pressure 294.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	18881.3	18928.2	18975.6	19023.1		
Water take	(litres/min)		9.38	9.48	9.50		9.45

THIRD PERIOD — Gauge Pressure 441.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	19084.5	19149.4	19214.7	19280.3		
Water take	(litres/min)		12.98	13.06	13.12		13.05

FOURTH PERIOD — Gauge Pressure 294.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	19301.6	19353.3	19404.6	19455.6		
Water take	(litres/min)		10.34	10.26	10.20		10.27

FIFTH PERIOD — Gauge Pressure 147.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	19493.7	19530.0	19566.5	19602.5		
Water take	(litres/min)		7.26	7.30	7.20		7.25

Gammon

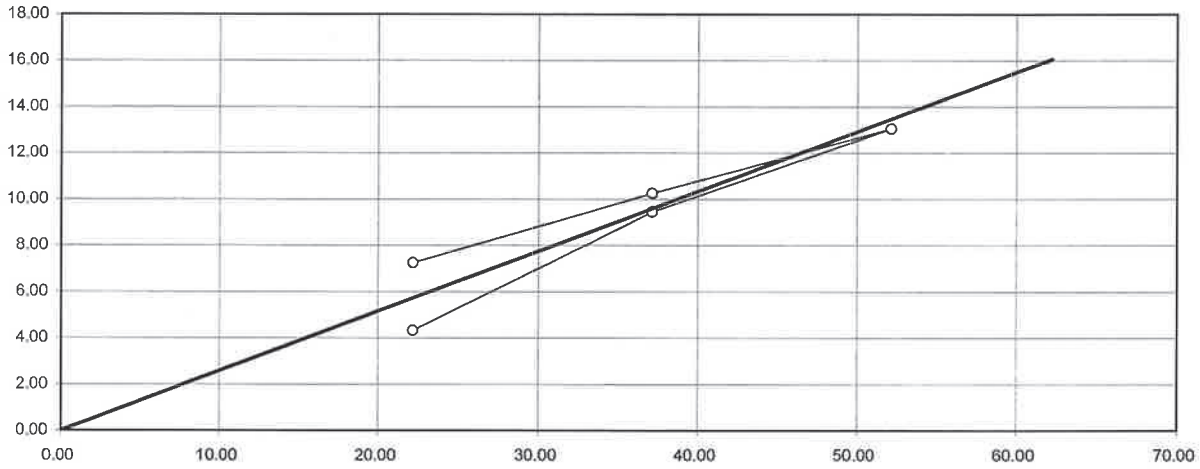
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	11
Project No. :	J3251	**Test Date :**	10/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	22.00 **m** **to** 27.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	h (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
6.70 m (2)	4.33	147.00	14.98			22.18	3.91
	9.45	294.00	29.97			37.17	5.09
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	13.05	441.00	44.95			52.15	5.01
	10.27	294.00	29.97			37.17	5.52
0.50 m (3)	7.25	147.00	14.98			22.18	6.54



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **5.1668 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	12
Project No. :	J3251	**Date of test :**	10/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	12.50 **m** **to** 17.50 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	15.00 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 90.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	19671.4	19692.2	19713.3	19734.3		
Water take	(litres/min)		4.16	4.22	4.20		4.19

SECOND PERIOD — Gauge Pressure 180.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	19781.4	19813.2	19845.1	19877.2		
Water take	(litres/min)		6.36	6.38	6.42		6.39

THIRD PERIOD — Gauge Pressure 270.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	19903.4	19952.1	20001.2	20050.2		
Water take	(litres/min)		9.74	9.82	9.80		9.79

FOURTH PERIOD — Gauge Pressure 180.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	20093.6	20114.9	20136.8	20158.6		
Water take	(litres/min)		4.26	4.38	4.36		4.33

FIFTH PERIOD — Gauge Pressure 90.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	20189.4	20209.2	20228.9	20248.9		
Water take	(litres/min)		3.96	3.94	4.00		3.97

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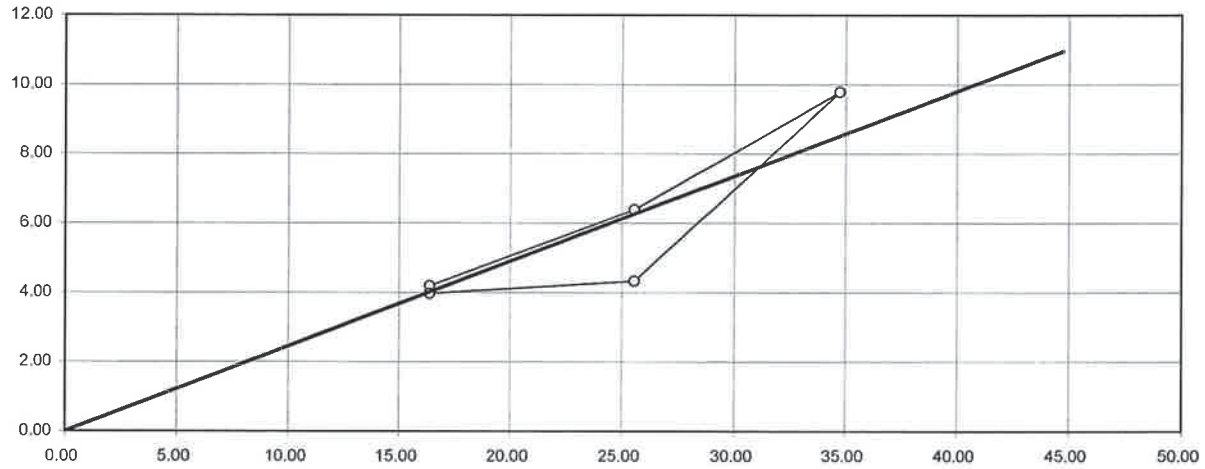
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	12
Project No. :	J3251	**Test Date :**	10/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	12.50 **m** **to** 17.50 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 5.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	4.19	90.00	9.17			16.37	5.12
	6.39	180.00	18.35			25.55	5.00
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	9.79	270.00	27.52			34.72	5.64
	4.33	180.00	18.35			25.55	3.39
	3.97	90.00	9.17			16.37	4.84



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **4.9047 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	13
Project No. :	J3251	**Date of test :**	11/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	68.00 **m** **to** 71.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16	
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101	m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90	Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details :	Hx 5.00m

Pressure gauge height above ground level :	0.50	m
Depth to centre of test section (measured down line of drillhole) :	69.50	m
Depth to groundwater level (measured down line of drillhole) :	6.70	m

FIRST PERIOD — Gauge Pressure 417.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	20304.7	20350.4	20396.9	20444.3		
Water take	(litres/min)		9.14	9.30	9.48		9.31

SECOND PERIOD — Gauge Pressure 834.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	20509.1	20602.2	20696.3	20790.8		
Water take	(litres/min)		18.62	18.82	18.90		18.78

THIRD PERIOD — Gauge Pressure 1251.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	20821.4	20970.4	21121.6	21272.4		
Water take	(litres/min)		29.80	30.24	30.16		30.07

FOURTH PERIOD — Gauge Pressure 834.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21296.3	21372.8	21451.6	21530.8		
Water take	(litres/min)		15.30	15.76	15.84		15.63

FIFTH PERIOD — Gauge Pressure 417.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21584.4	21619.8	21655.4	21691.8		
Water take	(litres/min)		7.08	7.12	7.28		7.16

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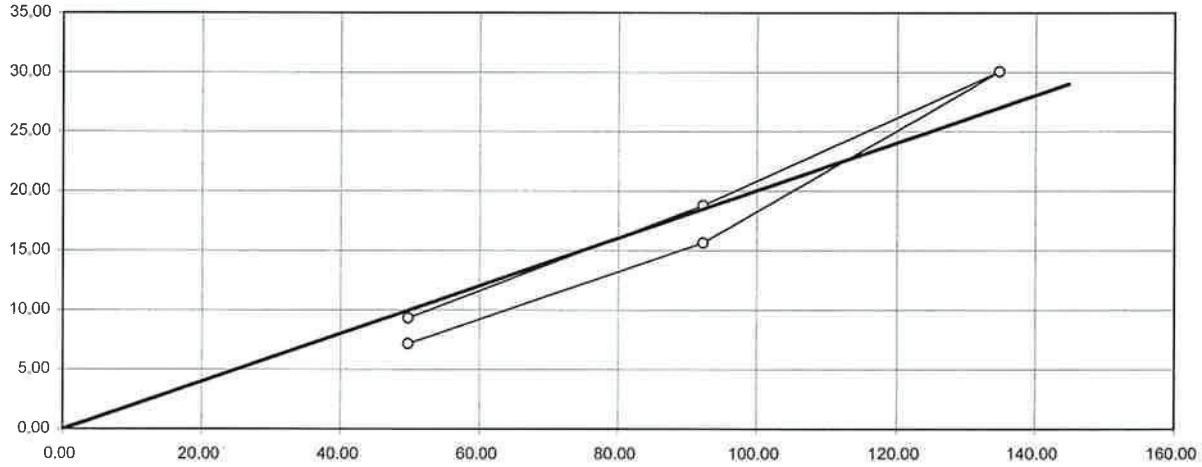
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	13
Project No. :	J3251	**Test Date :**	11/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	68.00 **m** **to** 71.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 3.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	h (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
6.70 m (2)	9.31	417.00	42.51			49.71	6.24
	18.78	834.00	85.02			92.22	6.79
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	30.07	1251.00	127.52			134.72	7.44
0.50 m (3)	15.63	834.00	85.02			92.22	5.65
	7.16	417.00	42.51			49.71	4.80



Type of Flow Laminar

$L = \frac{100}{lh}\ q =$ **6.6856 lugeon units**

Where l = length of test section in metres

Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	14
Project No. :	J3251	**Date of test :**	11/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	65.00 **m** **to** 68.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16	
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101	m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90	Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details :	Hx 5.00m

Pressure gauge height above ground level :	0.50	m
Depth to centre of test section (measured down line of drillhole) :	66.50	m
Depth to groundwater level (measured down line of drillhole) :	6.70	m

FIRST PERIOD — Gauge Pressure 399.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21708.4	21723.6	21739.2	21755.1		
Water take	(litres/min)		3.04	3.12	3.18		3.11

SECOND PERIOD — Gauge Pressure 798.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21774.3	21794.9	21815.8	21836.9		
Water take	(litres/min)		4.12	4.18	4.22		4.17

THIRD PERIOD — Gauge Pressure 1197.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21888.3	21919.9	21951.7	21983.7		
Water take	(litres/min)		6.32	6.36	6.40		6.36

FOURTH PERIOD — Gauge Pressure 798.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21996.9	22012.2	22027.9	22043.3		
Water take	(litres/min)		3.06	3.14	3.08		3.09

FIFTH PERIOD — Gauge Pressure 399.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	22081.4	22092.6	22104.1	22115.8		
Water take	(litres/min)		2.24	2.30	2.34		2.29

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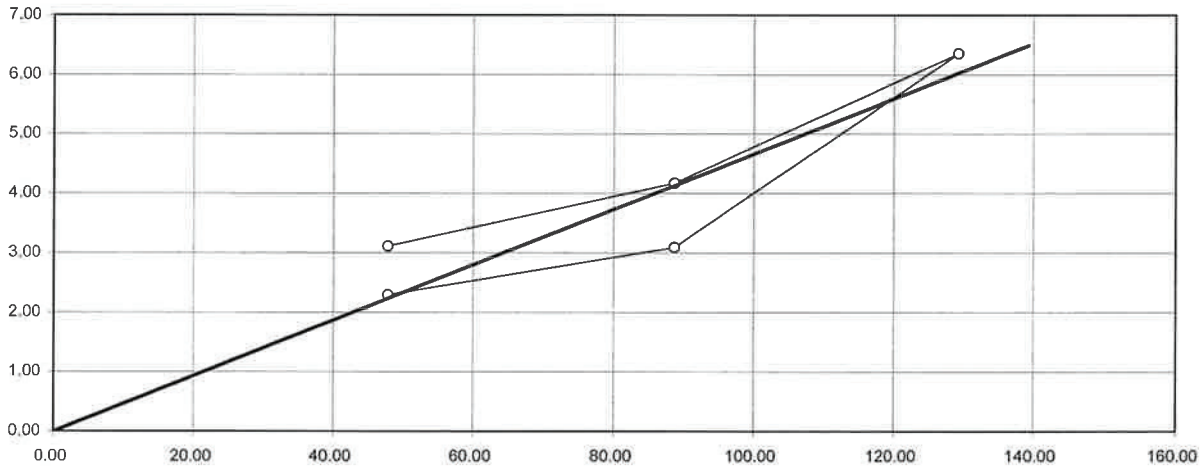
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/ DH168P

Contract No. :	NEX2209	**Test No. :**	14
Project No. :	J3251	**Test Date :**	11/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	65.00 **m** **to** 68.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 3.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
6.70 m (2)	3.11	399.00	40.67			47.87	2.17
	4.17	798.00	81.35			88.55	1.57
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	6.36	1197.00	122.02			129.22	1.64
0.50 m (3)	3.09	798.00	81.35			88.55	1.16
	2.29	399.00	40.67			47.87	1.60



Type of Flow Dilation

$L = \frac{100}{lh}\ q =$ **1.5548 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	15
Project No. :	J3251	**Date of test :**	11/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	9.50 **m** **to** 12.50 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16	
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101	m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90	Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details :	Hx 5.00m

Pressure gauge height above ground level :	0.50	m
Depth to centre of test section (measured down line of drillhole) :	11.00	m
Depth to groundwater level (measured down line of drillhole) :	6.70	m

FIRST PERIOD — Gauge Pressure 66.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21146.7	21195.3	21244.5	21293.5		
Water take	(litres/min)		9.72	9.84	9.80		9.79

SECOND PERIOD — Gauge Pressure 132.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21324.6	21383.4	21442.5	21501.9		
Water take	(litres/min)		11.76	11.82	11.88		11.82

THIRD PERIOD — Gauge Pressure 198.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21571.4	21646.4	21722.5	21798.4		
Water take	(litres/min)		15.00	15.22	15.18		15.13

FOURTH PERIOD — Gauge Pressure 132.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21810.1	21862.1	21914.4	21967.1		
Water take	(litres/min)		10.40	10.46	10.54		10.47

FIFTH PERIOD — Gauge Pressure 66.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	21996.1	22042.0	22088.2	22134.7		
Water take	(litres/min)		9.18	9.24	9.30		9.24

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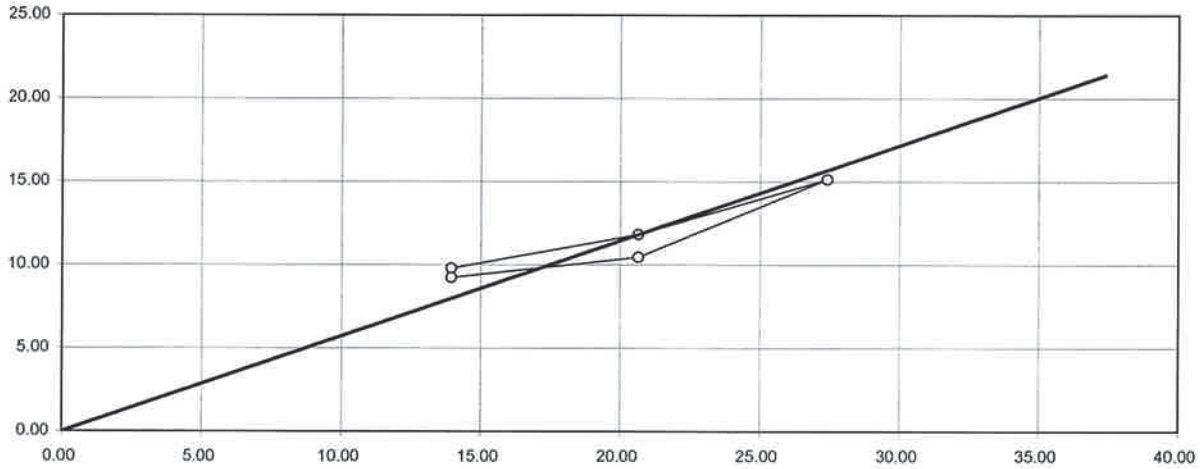
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/ DH168P

Contract No. :	NEX2209	**Test No. :**	15
Project No. :	J3251	**Test Date :**	11/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	9.50 **m** **to** 12.50 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 3.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	9.79	66.00	6.73			13.93	23.42
	11.82	132.00	13.46			20.66	19.07
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	15.13	198.00	20.18			27.38	18.42
	10.47	132.00	13.46			20.66	16.89
	9.24	66.00	6.73			13.93	22.11



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **19.0804 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	16
Project No. :	J3251	**Date of test :**	11/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	41.00 **m** **to** 45.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	43.00 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD Gauge Pressure 258.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	22203.5	22233.0	22262.4	22292.0		
Water take	(litres/min)		5.90	5.88	5.92		5.90

SECOND PERIOD Gauge Pressure 516.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	22307.2	22340.8	22374.8	22408.7		
Water take	(litres/min)		6.72	6.80	6.78		6.77

THIRD PERIOD Gauge Pressure 774.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	22430.9	22479.9	22529.7	22580.9		
Water take	(litres/min)		9.80	9.96	10.24		10.00

FOURTH PERIOD Gauge Pressure 516.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	22593.4	22623.5	22654.1	22684.5		
Water take	(litres/min)		6.02	6.12	6.08		6.07

FIFTH PERIOD Gauge Pressure 258.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	22696.9	22716.2	22735.8	22755.3		
Water take	(litres/min)		3.86	3.92	3.90		3.89

Gammon

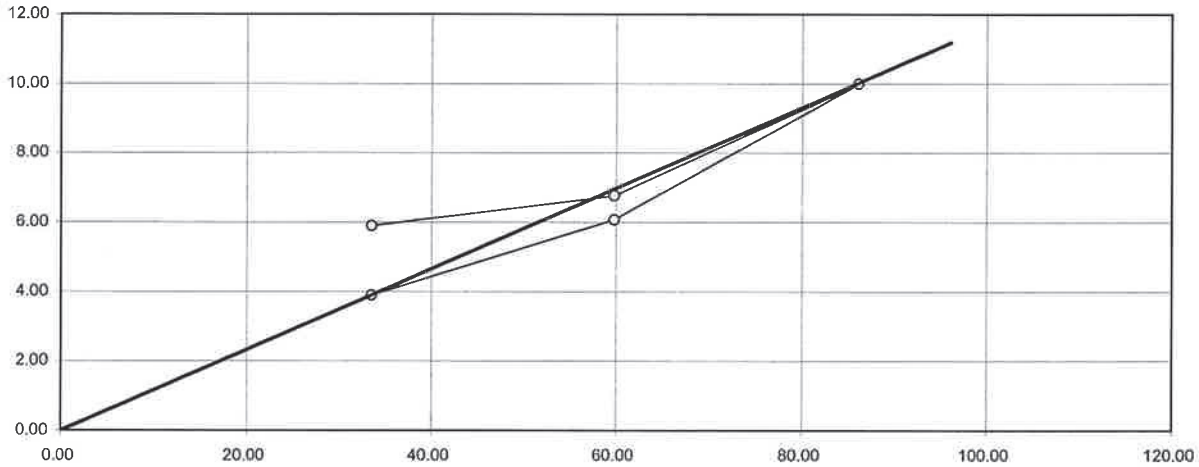
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/ DH168P

Contract No. :	NEX2209	**Test No. :**	16
Project No. :	J3251	**Test Date :**	11/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	41.00 **m** **to** 45.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 4.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	5.90	258.00	26.30			33.50	4.40
	6.77	516.00	52.60			59.80	2.83
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	10.00	774.00	78.90			86.10	2.90
	6.07	516.00	52.60			59.80	2.54
	3.89	258.00	26.30			33.50	2.91



Type of Flow Laminar

$L = \frac{100}{lh} q =$ **2.9104** **lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	17
Project No. :	J3251	**Date of test :**	12/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	27.00 **m** **to** 31.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	29.00 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 174.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	22790.4	22814.6	22839.1	22863.7		
Water take	(litres/min)		4.84	4.90	4.92		4.89

SECOND PERIOD — Gauge Pressure 348.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	22882.6	22917.9	22953.4	22989.0		
Water take	(litres/min)		7.06	7.10	7.12		7.09

THIRD PERIOD — Gauge Pressure 522.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	23008.6	23057.0	23105.3	23153.9		
Water take	(litres/min)		9.68	9.66	9.72		9.69

FOURTH PERIOD — Gauge Pressure 348.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	23173.4	23216.0	23258.6	23301.4		
Water take	(litres/min)		8.52	8.52	8.56		8.53

FIFTH PERIOD — Gauge Pressure 174.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	23352.7	23381.9	23411.2	23440.4		
Water take	(litres/min)		5.84	5.86	5.84		5.85

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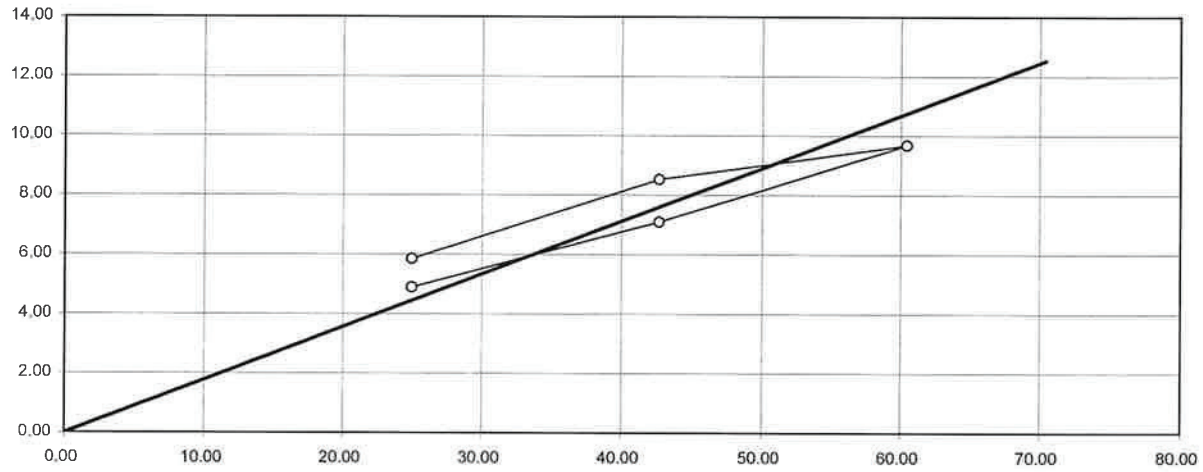
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	17
Project No. :	J3251	**Test Date :**	12/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	27.00 **m** **to** 31.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 4.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L. 6.70 m (2)	(4)	(5)	(6)	(7)	(8)	(9)	
	4.89	174.00	17.74			24.94	4.90
	7.09	348.00	35.47			42.67	4.16
HEIGHT OF PRESSURE GAUGE ABOVE G.L. 0.50 m (3)	9.69	522.00	53.21			60.41	4.01
	8.53	348.00	35.47			42.67	5.00
	5.85	174.00	17.74			24.94	5.86



Type of Flow Turbulent

$L = \frac{100}{lh} q =$ **4.4512 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	18
Project No. :	J3251	**Date of test :**	12/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	17.50 **m** **to** 22.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : SD GRANITE	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	19.75 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD Gauge Pressure 118.50 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	23479.1	23504.5	23530.0	23555.6		
Water take	(litres/min)		5.08	5.10	5.12		5.10

SECOND PERIOD Gauge Pressure 237.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	23578.4	23615.7	23653.3	23690.8		
Water take	(litres/min)		7.46	7.52	7.50		7.49

THIRD PERIOD Gauge Pressure 355.50 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	23710.4	23786.0	23862.1	23937.9		
Water take	(litres/min)		15.12	15.22	15.16		15.17

FOURTH PERIOD Gauge Pressure 237.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	23988.4	24022.8	24057.5	24092.6		
Water take	(litres/min)		6.88	6.94	7.02		6.95

FIFTH PERIOD Gauge Pressure 118.50 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	24108.7	24135.3	24162.3	24189.1		
Water take	(litres/min)		5.32	5.40	5.36		5.36

Gammon

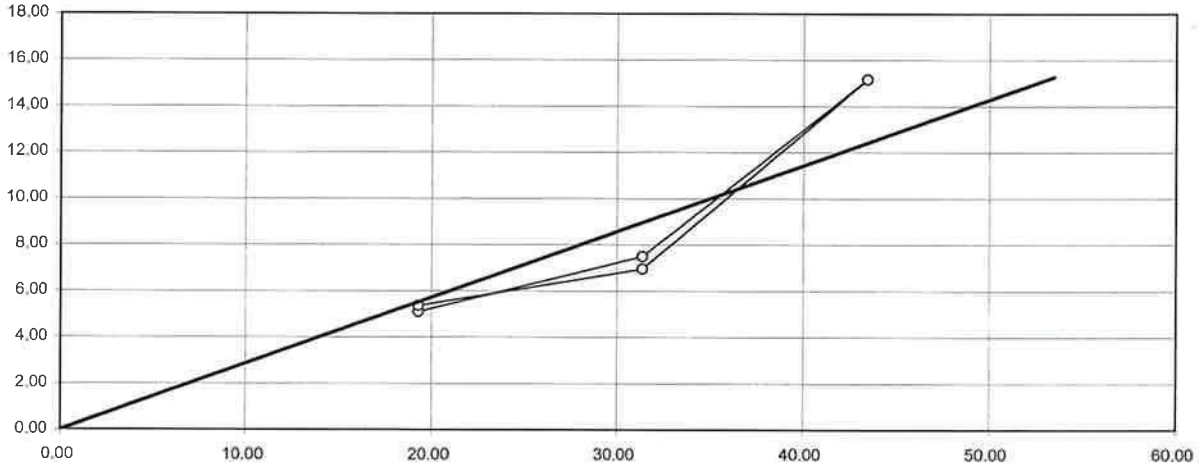
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/ DH168P

Contract No. :	NEX2209	**Test No. :**	18
Project No. :	J3251	**Test Date :**	12/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	17.50 **m** **to** 22.00 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : SD GRANITE	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 4.50 m	FLOW q litres/min	GAUGE PRESSURE units kPa	GAUGE PRESSURE head of water m	FRICTION HEAD LOSS in basic equipment m	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD **h** (2+3+6-7-8) m	LUGEON VALUE
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
6.70 m (2)	5.10	118.50	12.08			19.28	5.88
	7.49	237.00	24.16			31.36	5.31
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	15.17	355.50	36.24			43.44	7.76
0.50 m (3)	6.95	237.00	24.16			31.36	4.92
	5.36	118.50	12.08			19.28	6.18



Type of Flow Laminar

$L = \frac{100}{lh} \quad q =$ **6.3485 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 2209/SCL/DH168P

Contract No. : NEX2209	**Test No. :** 19
Project No. : J3251	**Date of test :** 12/08/2009
Project : Ground Investigation for Shatin to Central Link	**Tested / Supervised by :** K M Lo
Test Section : 6.00 m to 9.50 m	**Checked by :** Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	19-C52909	Drilling inclination from horizontal :	90 Degrees
Flowmeter No.:	FM371	Rock type : M / SD TUFF	Casing Details : Hx 5.00m

Pressure gauge height above ground level :	0.50 m
Depth to centre of test section (measured down line of drillhole) :	7.75 m
Depth to groundwater level (measured down line of drillhole) :	6.70 m

FIRST PERIOD — Gauge Pressure 46.50 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	24223.4	24376.5	24530.7	24686.9		
Water take	(litres/min)		30.62	30.84	31.24		30.90

SECOND PERIOD — Gauge Pressure 93.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	24731.4	24959.4	25188.6	25418.5		
Water take	(litres/min)		45.60	45.84	45.98		45.81

THIRD PERIOD — Gauge Pressure 139.50 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	25508.7	25815.0	26121.2	26430.6		
Water take	(litres/min)		61.26	61.24	61.88		61.46

FOURTH PERIOD — Gauge Pressure 93.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	26510.3	26730.6	26953.2	27174.8		
Water take	(litres/min)		44.06	44.52	44.32		44.30

FIFTH PERIOD — Gauge Pressure 46.50 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	27231.4	27380.6	27523.7	27664.1		
Water take	(litres/min)		29.84	28.62	28.08		28.85

Gammon

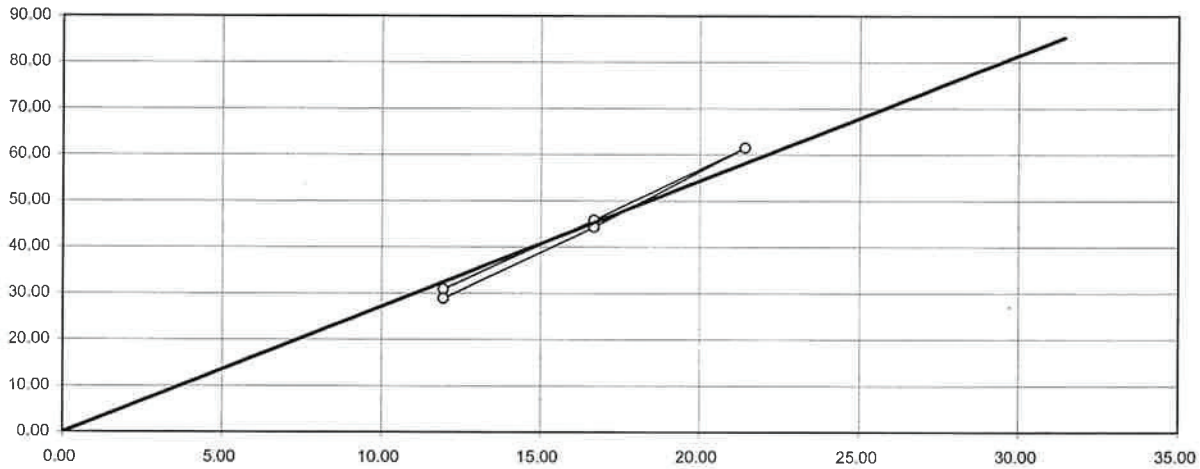
PACKER TEST RECORD SHEET

DRILLHOLE No. 2209/SCL/DH168P

Contract No. :	NEX2209	**Test No. :**	19
Project No. :	J3251	**Test Date :**	12/08/2009
Project :	Ground Investigation for Shatin to Central Link	**Tested / Supervised by :**	K M Lo
Test Section :	6.00 **m** **to** 9.50 **m**	**Checked by :**	Tony Poon

Packer type :	Pneumatic - Double	Depth of hole at time of test :	90.16 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Presure gauge No. :	19-C52909	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	FM371	Rock type : M / SD TUFF	Casing Details : Hx 5.00m

LENGTH OF TEST SECTION 3.50 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
6.70 m (2)	30.90	46.50	4.74			11.94	73.94
	45.81	93.00	9.48			16.68	78.46
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	61.46	139.50	14.22			21.42	81.98
	44.30	93.00	9.48			16.68	75.88
0.50 m (3)	28.85	46.50	4.74			11.94	69.03



Type of Flow Dilation

$L = \frac{100}{lh} q =$ **77.6208 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section


FOR CONTINUATION SEE DRAWING
SCL/Z/00/CIV/C05/123 & 135
834 600 E
834 700 E
834 800 E
834 900 E
835 000 E
835 100 E
815 300 N
815 200 N
815 100 N
815 000 N
814 900 N
2209/SCL/DH168(P)
2209/SCL/IDH169
99/282
2209/SCL/IDH170
65/237
2209/SCL/DH378
2209/SCL/IDH214
10/043
Hong Kong Park
Island Shangri-La Hotel
Edward Youde Aviary
Conservatory
Education Centre
Tennis Court
Playground
Basketball Court
Island School
Block 1
Block 2
Island Squash Rackets Club
Hong Villa
Bowen Road Garden
Magazine Gap Towers
Magazine Heights
Bowen Mansion
Borrett Mansions
Fortuna Tower
Kam Tai Mansion
Kai Fai Mansion
Best View Court
Extain Court
Birchwood Place
Grosvenor House
Caroline Mansion
Harrison Mansion
Wealthy Court
Jo Jo Court
Hongkong Electric Centre
Kennedy Road Zone Substation
British Consulate General
The British Council
Regent On The Park
Non Departmental Quarters
Government Offices
Police Married Quarters
Police Station
Fire Station
Ambulance Depot
Queen Elizabeth Stadium
Wan Chai Sports Ground
Wan Chai Swimming Pool
Wan Chai Public Library
Arts Centre
Convention Centre
Exhibition Centre
Harbour Road Sports Centre
Hong Kong Convention and Exhibition Centre
Hong Kong Police Museum
Police Officers' Club
Police Headquarters
Police Training School
Police Tactical Unit Headquarters
Police Married Quarters
Police Recruit Training Centre
Police Sports Ground
Police Pistol Range
Police Dog Unit
Police Driving School
Police Mounted Unit
Police Traffic Unit
Police Tactical Unit
Police Training School

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號 :
OUR REF 本署檔號 : BD 3/7001/08
FAX 圖文傳真 : 2973 0561
TEL 電話 : 2626 1577
www.bd.gov.hk

22 October 2009

Mr. HUI Tung-man
MTR Corporation Limited
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Hung Hom, Kowloon.

Dear Sir,

South Island Line (East)

I acknowledge receipt of your Form BA 14 submitted on **30 September 2009** in respect of the ground investigation field works (Stage I) for the above together with Ground Investigation Field Works Report, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Civil Engineering Department, MTRCL
MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

AP **Mr. YEUNG Sze-wai, Wilfred**
Architect Department,
8/F Citylink Plaza, Shatin, N.T.

香港九龍旺角彌敦道 750 號先驅中心 12 樓至 18 樓 12/F-18/F Pioneer Centre, 750 Nathan Road, Mongkok, Kowloon, Hong Kong.

屋宇署
BUILDINGS DEPARTMENT

5

YOUR REF 來函檔號：
OUR REF 本署檔號： **BD 3/7004/08 (Pt.II)**
FAX 圖文傳真： **2718 1477**
TEL 電話： **3105 3216**
www.info.gov.hk/bd

Mr. Stephen CHIK
MTR Corporation Limited,
Project Division,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

27 May 2010

Dear Sir,

Shatin to Central Link (SCL)

I herewith acknowledge your letter dated 12 May 2010 and received on 17 May 2010 enclosing the Form BA14 to certify the completion of Stage I Ground Investigation Works in both scheduled area and non-scheduled area at the captioned, and RGE's letter dated 26 May 2010 regarding clarification on the above records, the content of which has been noted.

PE-CIVIL & PLANNING DEPT.
CIVIL ENGINEERING SECTION
File No. /
SP#
Rec'd - 1 JUN 2010 Encl.

Name	Info.	Action	Initial
G S Harris			
C K Ho			
Edward Ngai (C)			
Linda Yeung			
Evan Tsui			
[illegible]			
Edward Ngai (M)			

Yours sincerely,

(WONG Wing-keung)
Senior Structural Engineer
for Building Authority

c.c. **RGE- Mr. HUI Tung-man**
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

AP - Yeung Sze-wai Wilfred
Architects Department,
8/F, Citylink Plaza,
Shatin,
N.T.

S.L. 4 (1/92)

Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

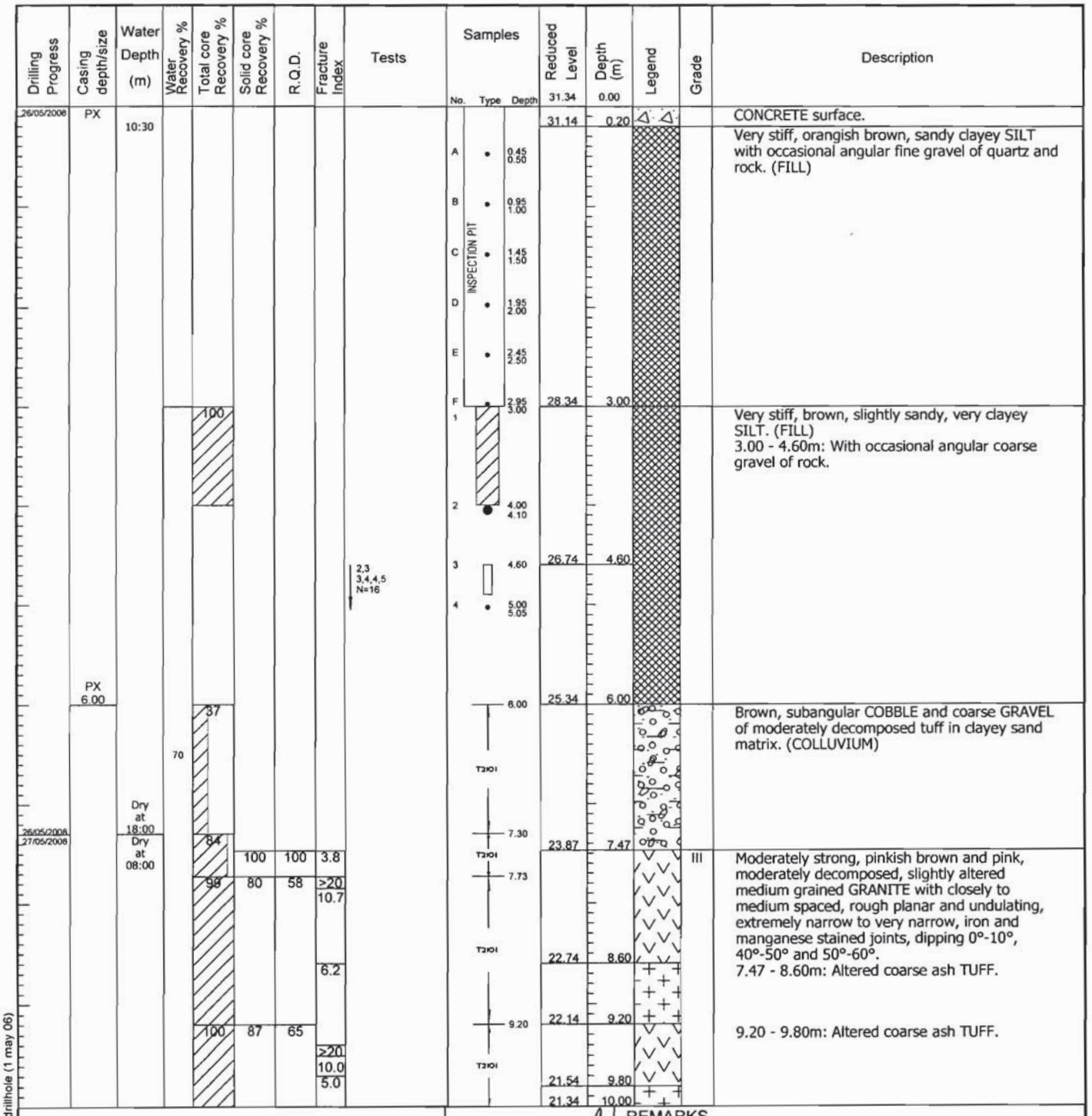
DRILLHOLE No. **1024/SIL/D008**

SHEET 1 of 8

CONTRACT NO. NEX/1024

Project Title Ground Investigation For South Island Line

METHOD Rotary	CO-ORDINATES E 834942.58 N 815337.98	PROJECT No. J3086
MACHINE & No. DR56		DATE from 26/05/2008 to 16/06/2008
FLUSHING MEDIUM WATER	ORIENTATION Vertical	GROUND LEVEL + 31.34 mPD



- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED T T FUNG

DATE 17/06/2008

CHECKED KEN MA

DATE 18/06/2008

REMARKS

1. Inspection pit was dug to 3.00m depth.
2. Impression packer tests were carried out at 47.19m-48.69m, 49.76m-51.26m and 51.47m-52.97m depths.
3. Packer (Water Absorption) test was carried out at 49.76m-51.26m depth.
4. Standpipe was installed at 70.40m depth.

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

DRILLHOLE No. **1024/SIL/D008**

SHEET 2 of 8

CONTRACT NO. NEX/1024

Project Title Ground Investigation For South Island Line

METHOD Rotary	CO-ORDINATES	PROJECT No. J3086
MACHINE & No. DR56	E 834942.58 N 815337.98	DATE from 26/05/2008 to 16/06/2008
FLUSHING MEDIUM WATER	ORIENTATION Vertical	GROUND LEVEL + 31.34 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
										21.34	10.00			
				100	91	91			10.13	21.21	10.13		III	As sheet 1 of 8. 10.13 - 10.63m: Granite fused with tuff.
									T2101	20.71	10.63		II	Strong, dark grey, slightly decomposed coarse ash TUFF with closely to medium, locally very closely spaced, rough planar and undulating, tight to extremely narrow, slightly iron and slightly chlorite stained joints, dipping 20°-30°, 30°-40°, 40°-50°, 60°-70° and subvertical.
				100	100	75			11.12					
							10.1		T2101					
				100	100	91			12.15					
		Dry at 18:00							T2101					
27/05/2008									12.69					
28/05/2008		Dry at 08:00		100	100	61	8.8		T2101					
							17.7		13.88					
				100	100	85								
							4.8		T2101					
			70							16.21	15.13			
				98	98	91			15.38	16.04	15.30			15.13 - 15.30m: Pink, fine to medium grained GRANITE.
									T2101	15.44	15.90			15.90 - 16.31m: Tuff fused with granite.
				100	77	23	>20		16.31	15.03	16.31			
									T2101					
				100	74	66	3.1		16.88					
							>20		T2101					
		15.13m at 18:00					1.7							
28/05/2008									17.99					
29/05/2008		17.50m at 09:30		98	99	81			T2101					
							16.0							
				100	98	93	7.9		19.30					
									T2101	11.39	19.95 20.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED T T FUNG

DATE 17/06/2008

CHECKED KEN MA

DATE 18/06/2008

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

DRILLHOLE No. **1024/SIL/D008**

SHEET 3 of 8

CONTRACT NO. NEX/1024

Project Title Ground Investigation For South Island Line

METHOD Rotary	CO-ORDINATES	PROJECT No. J3086
MACHINE & No. DR56	E 834942.58 N 815337.98	DATE from 26/05/2008 to 16/06/2008
FLUSHING MEDIUM WATER	ORIENTATION Vertical	GROUND LEVEL + 31.34 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
										11.34	20.00			
				100	98	93			T2101 20.40				II	Strong, greyish pink, slightly decomposed slightly altered medium grained GRANITE with medium to widely, locally closely spaced, rough and smooth, planar and undulating, tight to extremely narrow, chlorite stained joints, dipping 10°-20°, 40°-50°, 60°-70° and 70°-80°.
				100	100	96	2.0			10.74	20.60			19.95 - 20.60m: Fine grained GRANITE.
				100	100	100			T2101 21.70					
				100	100	91	8.5		T2101 22.67					
				100	100	100	3.5		T2101 23.14					
				100	100	85			T2101 24.58					
29/05/2008		22.02m at 18:00	70						T2101 25.40					
30/05/2008		21.90m at 08:00		100	100	100	1.0		T2101 26.14					
				100	100	80				4.94	26.40			
							12.0		T2101 26.79				II	Strong, dark grey, dappled pink, slightly decomposed slightly foliated coarse ash TUFF with medium to widely, locally closely spaced, rough and smooth, planar and undulating, tight, clean joints, dipping 0°-10°, 30°-40°, 40°-50° and 70°-80°.
				98	98	83	3.5			3.69	27.65			27.65 - 28.34m: Dappled pale pink, with fine grained GRANITE intrusion.
30/05/2008		21.86m at 18:00							T2101 27.86					
02/06/2008		21.98m at 08:00		100	100	100				3.00	28.34			
									T2101 29.00	2.64	28.70			28.70 - 29.80m: Dappled pale pink, with fine grained GRANITE intrusion.
				100	100	90			T2101 29.50					
				100	100	90	7.6			1.54	29.80			
										1.34	30.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
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- Piston sample
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- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED T T FUNG

DATE 17/06/2008

CHECKED KEN MA

DATE 18/06/2008

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

DRILLHOLE No. **1024/SIL/D008**

SHEET 4 of 8

CONTRACT NO. NEX/1024

Project Title Ground Investigation For South Island Line

METHOD Rotary	CO-ORDINATES	PROJECT No. J3086
MACHINE & No. DR56	E 834942.58 N 815337.98	DATE from 26/05/2008 to 16/06/2008
FLUSHING MEDIUM WATER	ORIENTATION Vertical	GROUND LEVEL + 31.34 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 1.34	Depth (m) 30.00	Legend	Grade	Description
				100	100	90			T2IO1	1.12	30.22		II	As sheet 3 of 8.
				100	100	97	1.6		30.38					30.22 - 31.57m: Pale pink, fine grained GRANITE.
									T2IO1					
										-0.23	31.57			
				100	95	73			31.82	-0.61	31.95			31.95 - 32.80m: Dappled pale pink, with fine grained GRANITE intrusion.
							11.4		T2IO1					
										-1.46	32.80			
				100	97	65	8.3		33.16					
							17.3							
							6.0		T2IO1					
				100	100	87			34.58					
			70						T2IO1	-3.66	35.00		II	Strong, reddish pink, locally mottled dark grey, slightly decomposed altered fine grained GRANITE with medium to widely, locally closely spaced, rough planar, undulating and stepped, tight to extremely narrow, chlorite stained and slightly kaolin coated joints, dipping 0°-10°, 30°-40° and 65°-75°.
										-4.22	35.56			35.00 - 35.56m: Fine to medium grained GRANITE.
										-4.31	35.65			35.56 - 35.65m: Reddish pink, PEGMATITE.
										-4.36	35.70			35.70 - 35.80m: Reddish pink, PEGMATITE.
										-4.46	35.80			35.80 - 36.70m: Fine to medium grained GRANITE.
				100	100	100	1.3		36.08					36.70 - 36.82m: Porphyritic.
									T2IO1	-5.36	36.70			37.00 - 37.76m: Porphyritic.
										-5.48	36.82			
				100	100	100	2.1		36.87	-5.66	37.00			
		21.82m at 18:00							T2IO1					
02/06/2008									37.35					
03/06/2008		22.05m at 08:00		100	100	91								
										-6.42	37.76			
									T2IO1	-6.83	38.17			38.17 - 38.37m: Reddish pink, PEGMATITE.
										-7.03	38.37			
							11.1			-7.31	38.65			38.65 - 38.90m: Reddish pink, PEGMATITE.
				100	100	96	5.2		38.87	-7.56	38.90			
									T2IO1					
										-8.66	40.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED T T FUNG

DATE 17/06/2008

CHECKED KEN MA

DATE 18/06/2008

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

DRILLHOLE No. **1024/SIL/D008**

SHEET 5 of 8

CONTRACT NO. NEX/1024

Project Title Ground Investigation For South Island Line

METHOD Rotary	CO-ORDINATES E 834942.58 N 815337.98	PROJECT No. J3086
MACHINE & No. DR56		DATE from 26/05/2008 to 16/06/2008
FLUSHING MEDIUM WATER	ORIENTATION Vertical	GROUND LEVEL + 31.34 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
										-8.66	40.00			
				100	100	96			T2IOI	-8.86	40.20		II	As sheet 4 of 8.
									40.41				III/II	Moderately strong to strong, dark grey and pink, moderately to slightly decomposed coarse ash crystal TUFF fused with fine grained granite. Joints are closely, locally medium spaced, rough planar, tight to extremely narrow, chlorite stained and clean, dipping 10°-20°, 40°-50°, 60°-70° and subvertical.
				100	84	63	10.6		T2IOI					
									41.60					
				100	77	14			T2IOI	-10.66	42.00			
									42.41				II	Strong, dark grey, slightly decomposed coarse ash crystal TUFF with closely, locally medium spaced, rough and smooth, planar and undulating, tight to extremely narrow, chlorite stained, slightly calcite coated and clean joints, dipping 0°-10°, 30°-40°, 50°-60°, 60°-70° and 70°-80°.
				100	82	53			T2IOI					
		21.86m at 18:00							43.43					
03/06/2008									T2IOI					
04/06/2008		21.92m at 08:00		100	96	65			44.23					
							>20		T2IOI					
				100	85	49	18.9		45.31					
							2.8		T2IOI					
		21.88m at 18:00	70											
04/06/2008										-14.06	45.40			
05/06/2008		21.90m at 08:00		98	98	80	>20		T2IOI				II	Strong, grey to dark grey, slightly decomposed slightly foliated clast bearing coarse ash crystal TUFF with closely to medium spaced, rough planar and undulating, locally stepped, tight to extremely narrow, chlorite stained, locally slightly calcite coated and clean joints, dipping 0°-10°, 20°-30°, 40°-50°, 60°-70° and 70°-80°.
							6.6		45.87					
				100	98	76			T2IOI					
									46.77					
				100	88	62	1.0		T2IOI					
									47.19					
				100	100	82			T2IOI					
							17.8							
		21.80m at 18:00							48.53					
05/06/2008									T2IOI					
06/06/2008		22.06m at 08:00		100	100	94	3.5							
		21.88m at 18:00							49.96	-18.66	50.00			
06/06/2008														

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

REMARKS

LOGGED T T FUNG

DATE 17/06/2008

CHECKED KEN MA

DATE 18/06/2008

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

DRILLHOLE No. **1024/SIL/D008**

SHEET 6 of 8

CONTRACT NO. NEX/1024

Project Title Ground Investigation For South Island Line

METHOD Rotary	CO-ORDINATES E 834942.58 N 815337.98	PROJECT No. J3086
MACHINE & No. DR56		DATE from 26/05/2008 to 16/06/2008
FLUSHING MEDIUM WATER	ORIENTATION Vertical	GROUND LEVEL + 31.34 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
10/06/2008		22.21m at 08:00		100	97	87	11.2		T2101	-18.66	50.00		II	As sheet 5 of 8.
				100	92	87	4.4		51.42 T2101					
				100	100	100			52.88 T2101	-21.46	52.80		II	Strong, dark greyish red, slightly decomposed altered coarse ash TUFF fused with fine grained granite. Joints are closely to medium spaced, rough and locally smooth, planar and undulating, tight to extremely narrow, chlorite stained, slightly kaolin coated joints, dipping 0°-10°, 20°-30°, 40°-50°, 50°-60° and subvertical.
				98	98	84	5.3		53.38 T2101					
				96	88	67			54.19 T2101					
				100	93	79			54.70 T2101					
10/06/2008		22.02m at 18:00	70							-23.84	55.18			
11/06/2008		22.16m at 08:00		100	82	69			55.27	-23.94	55.28			55.18 - 55.28m: Brownish pink, fine grained GRANITE.
							N.I.			-24.49	55.83		III/II	55.83 - 56.55m: Moderately strong to strong, moderately to slightly decomposed, with some microfractures.
							12.2			-25.21	56.55		III/II	56.55 - 56.90m: Moderately strong to strong, reddish pink, moderately to slightly decomposed, PEGMATITE.
							3.2			-25.56	56.90		II	
				98	87	61	6.8		56.80 T2101	-25.96	57.30		III/II	Strong, dark grey, slightly decomposed coarse ash crystal TUFF with closely to medium, locally very closely spaced, rough and smooth planar, tight to extremely narrow, chlorite stained, slightly calcite coated joints, dipping 0°-10°, 30°-40°, 50°-60°, 60°-70° and 70°-80°. 57.30 - 57.70m: Moderately strong to strong, moderately to slightly decomposed, slightly altered.
				96	96	66			58.19 T2101	-26.36	57.70		II	
				100	86	55			58.75 T2101					
		21.90m at					12.3			-28.66	60.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED T T FUNG

DATE 17/06/2008

CHECKED KEN MA

DATE 18/06/2008

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

DRILLHOLE No. **1024/SIL/D008**

SHEET 7 of 8

CONTRACT NO. NEX/1024

Project Title Ground Investigation For South Island Line

METHOD Rotary	CO-ORDINATES E 834942.58 N 815337.98	PROJECT No. J3086
MACHINE & No. DR56		DATE from 26/05/2008 to 16/06/2008
FLUSHING MEDIUM WATER	ORIENTATION Vertical	GROUND LEVEL + 31.34 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
11/06/2008 12/06/2008		18:00 22.08m at 08:00		93	62	25			60.05 T2IO1	-28.66	60.00		III/II	60.00 - 60.60m: Moderately strong to strong, moderately to slightly decomposed.
				100	94	51	>20		60.60	-29.26	60.60		II	
							7.8		T2IO1					
				100	100	100	4.8		61.60 T2IO1					
				100	100	94			63.29 T2IO1					
				98	88	81	9.2		64.11 T2IO1					
			70											
				100	100	65			65.62 T2IO1	-34.46	65.80		II	Strong, dark greyish red to dark reddish grey, slightly decomposed slightly altered coarse ash crystal TUFF with very closely to closely spaced, rough and smooth, planar and undulating, tight to extremely narrow, chlorite stained, slightly calcite coated joints, dipping 20°-30°, 40°-50°, 70°-80° and subvertical. 66.00 - 66.30m: Dappled pink, with PEGMATITE.
										-34.66	66.00			
12/06/2008		21.88m at 18:00								-34.96	66.30			
13/06/2008		21.89m at 08:00		100	49	18			66.37 T3IO1					
13/06/2008		21.86m at 18:00												
14/06/2008		22.12m at 08:00		98	76	0	10.4		67.59 T2IO1					
				98	75	67			68.08 T2IO1					
				100	99	80			69.28 T2IO1					
							4.5			-38.66	70.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

LOGGED T T FUNG

DATE 17/06/2008

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DATE 18/06/2008

REMARKS

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Gammon Construction Limited

Ground Engineering & Substructure Department

DRILLHOLE RECORD

DRILLHOLE No. **1024/SIL/D008**

SHEET 8 of 8

CONTRACT NO. NEX/1024

Project Title Ground Investigation For South Island Line

METHOD Rotary	CO-ORDINATES	PROJECT No. J3086
MACHINE & No. DR56	E 834942.58 N 815337.98	DATE from 26/05/2008 to 16/06/2008
FLUSHING MEDIUM WATER	ORIENTATION Vertical	GROUND LEVEL + 31.34 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
										-38.66	70.00			
				100	99	80			T2101 70.62				II	Strong, dark grey, slightly decomposed coarse ash crystal TUFF with medium, locally closely spaced, rough planar, tight, clean and slightly chlorite stained joints, dipping 5°-15°, 20°-30° and 30°-40°.
				100	100	84								
									T2101 72.15	-40.71	72.05			
				100	76	65							II	Strong, greyish pink to pink, slightly decomposed medium grained GRANITE with closely to medium spaced, rough planar and undulating, tight to extremely narrow, chlorite stained joints, dipping 0°-10°, 30°-40°, 65°-75° and 75°-85°. 72.05 - 72.51m: Slightly altered. 72.51 - 73.10m: Reddish pink, PEGMATITE. 73.10 - 73.75m: Dark grey, coarse ash crystal TUFF.
							7.8			-41.17	72.51			
			70						T2101 73.65	-41.76	73.10			
							>20							
14/06/2008		21.89m at 18:00												
16/06/2008		22.08m at 08:00		97	97	58	7.2			-42.41	73.75			
									T2101 74.81					
				100	100	89								
							5.3		T2101 76.12					
16/06/2008		21.87m at 18:00								-44.78	76.12			End of hole at 76.12m depth.
											80.00			

- Small disturbed sample
- Large disturbed sample
- SPT liner sample
- U76 undisturbed sample
- U100 undisturbed sample
- Mazier sample
- Piston sample
- Water sample
- Piezometer / standpipe tip
- Standard penetration test
- Water absorption (Packer) test
- Permeability test
- Impression packer test
- In-situ vane shear test

REMARKS

LOGGED T T FUNG

DATE 17/06/2008

CHECKED KEN MA

DATE 18/06/2008

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Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 0.00 m. To 9.20 m.
Box No. : 1 of 21
Date of Photo : 11/10/2008
0.00
6.00
7.73
7.30
9.20


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 9.20 m. To 12.69 m.
Box No. : 2 of 21
Date of Photo : 11/10/2008
9.20
10.13
11.12
12.15
12.69


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 12.69 m. To 16.31 m.
Box No. : 3 of 21
Date of Photo : 11/10/2008
12.69
13.88
15.38
16.31


J3066
Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 16.31 m. To 19.30 m.
Box No. : 4 of 21
Date of Photo : 11/10/2008
16.31
16.86
17.99
19.30

J3086

Client : MTR Corporation

Contractor : Gammon Construction Ltd.

Project : Contract NEX 1024
Ground Investigation for
South Island Line

Hole No. : 1024/SIL/D008

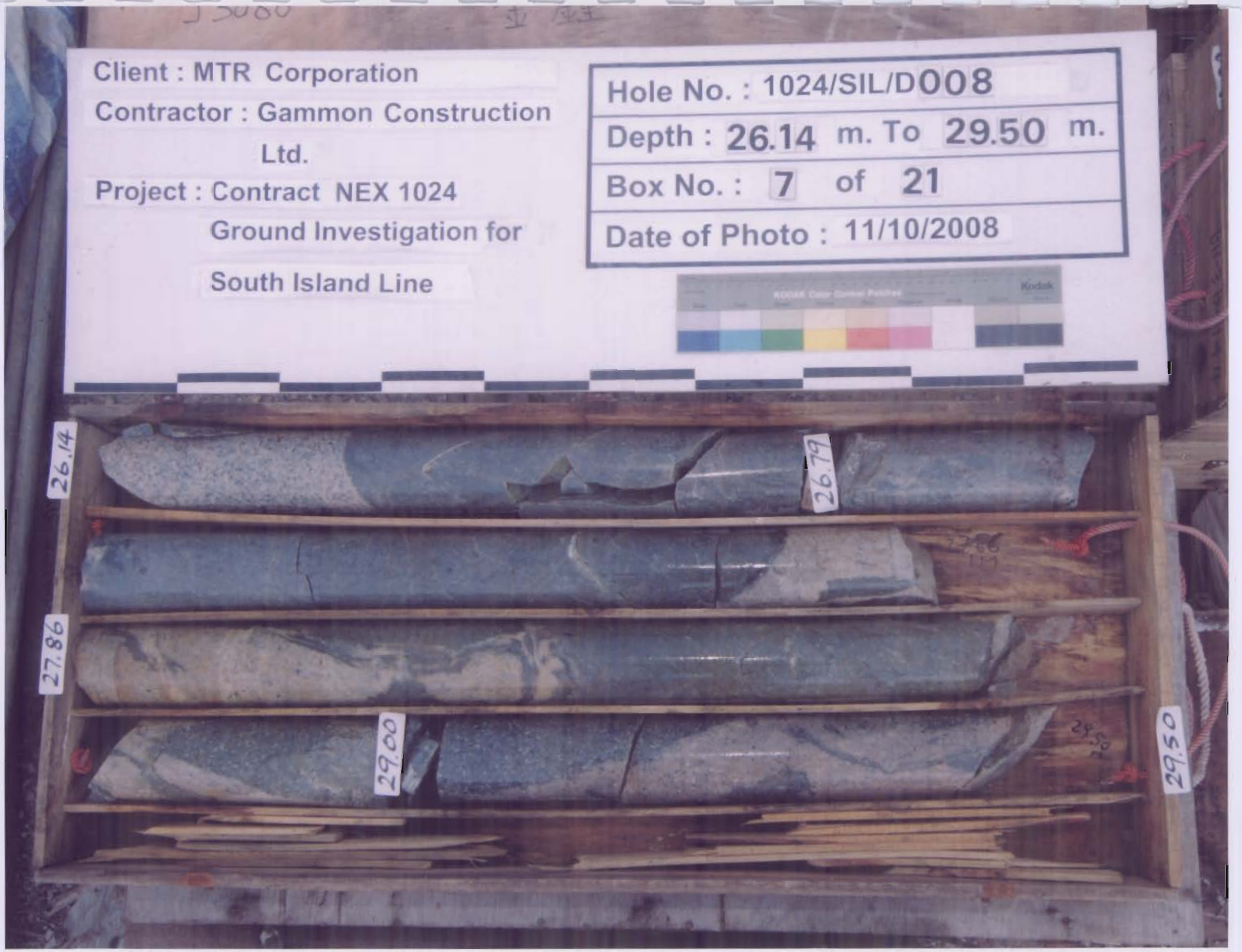
Depth : 19.30 m. To 22.67 m.

Box No. : 5 of 21

Date of Photo : 11/10/2008




Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 22.67 m. To 26.14 m.
Box No. : 6 of 21
Date of Photo : 11/10/2008
22.67
23.14
24.58
25.40
26.14


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 26.14 m. To 29.50 m.
Box No. : 7 of 21
Date of Photo : 11/10/2008
26.14
26.79
27.86
29.00
29.50

J3086 金鍾

Client : MTR Corporation

Contractor : Gammon Construction Ltd.

Project : Contract NEX 1024
Ground Investigation for
South Island Line

Hole No. :	1024/SIL/D008
Depth :	29.50 m. To 33.16 m.
Box No. :	8 of 21
Date of Photo :	11/10/2008




Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 33.16 m. To 36.87 m.
Box No. : 9 of 21
Date of Photo : 11/10/2008
33.16
34.58
36.08
36.87


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 36.87 m. To 40.41 m.
Box No. : 10 of 21
Date of Photo : 11/10/2008
36.87
37.35
38.87
40.41


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 40.41 m. To 43.43 m.
Box No. : 11 of 21
Date of Photo : 11/10/2008
40.41
41.60
42.41
43.43


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 43.43 m. To 46.77 m.
Box No. : 12 of 21
Date of Photo : 11/10/2008
43.43
44.23
45.31
45.87
46.77


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 46.77 m. To 49.96 m.
Box No. : 13 of 21
Date of Photo : 11/10/2008
46.77
47.19
48.53
49.69
49.96


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 49.96 m. To 53.38 m.
Box No. : 14 of 21
Date of Photo : 11/10/2008
49.96
51.42
52.98
53.38


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024 Ground Investigation for South Island Line
Hole No. : 1024/SIL/D008
Depth : 53.38 m. To 56.80 m.
Box No. : 15 of 21
Date of Photo : 11/10/2008
53.38
53.38
54.19
54.70
55.27
56.80


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 56.80 m. To 60.60 m.
Box No. : 16 of 21
Date of Photo : 11/10/2008
56.80
58.19
58.75
58.75M
60.05
0.5M
60.60


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 60.60 m. To 64.11 m.
Box No. : 17 of 21
Date of Photo : 11/10/2008
60.60
61.80
63.29
63.29
64.11


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 64.11 m. To 67.59 m.
Box No. : 18 of 21
Date of Photo : 11/10/2008
64.11
65.62
66.37
67.59


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 67.59 m. To 70.62 m.
Box No. : 19 of 21
Date of Photo : 11/10/2008
67.59
68.08
69.28
70.62


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024 Ground Investigation for South Island Line
Hole No. : 1024/SIL/D008
Depth : 70.62 m. To 73.65 m.
Box No. : 20 of 21
Date of Photo : 11/10/2008
70.62
72.15
73.65


Client : MTR Corporation
Contractor : Gammon Construction Ltd.
Project : Contract NEX 1024
Ground Investigation for
South Island Line
Hole No. : 1024/SIL/D008
Depth : 73.65 m. To 76.12 m.
Box No. : 21 of 21
Date of Photo : 11/10/2008
73.65
74.81
76.12
END

Gammon

STANDPIPE DETAIL AND RESPONSE TEST RECORD

DRILLHOLE No. **1024/SIL/D008**

Contract No. :	NEX/1024	**Standpipe No. :**	D008-S
Job No. :	J3086	**Date Installed :**	18/06/2008
Project :	Ground Investigation For South Island Line	**Date Tested :**	19/06/2008
		Co-ordinates :	
Initial Water Level :	22.15 **m below G.L.**	**E** 834942.58	**N** 815337.98
Tested / Supervised by :	W K KWOK	**Ground Level :**	31.34 **mPD**
Checked by :	KEN MA	**Standpipe bottom :**	-39.06 **mPD**

Time Elapsed (minutes)	Depth of Water from Top of Pipe (m)
0.00	0.00
0.25	0.77
0.50	1.54
0.75	2.31
1.00	3.08
1.50	4.60
2.00	6.12
3.00	9.17
4.00	12.24
5.00	15.30
6.00	18.43
7.00	21.52
8.00	22.11

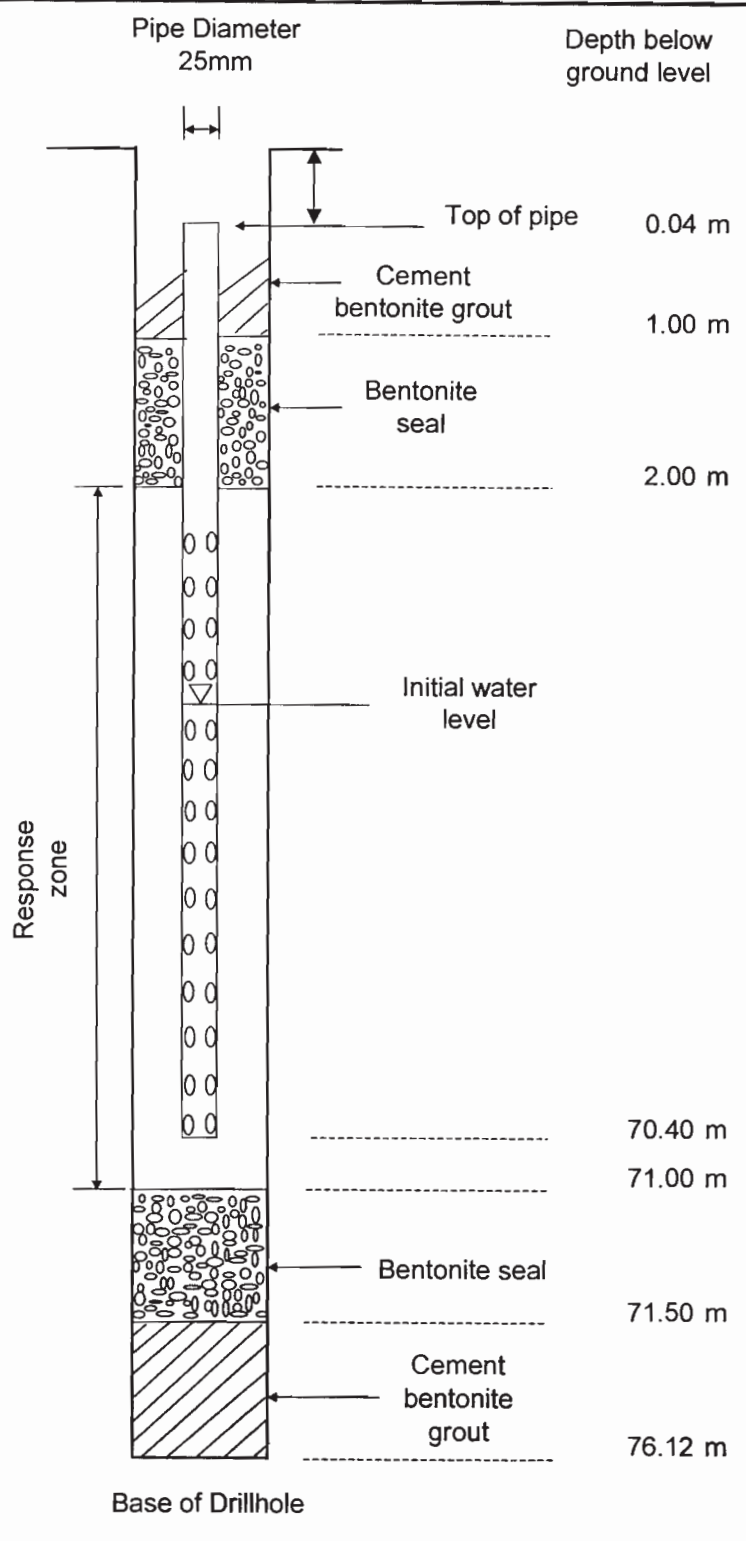
Filter material :

10-16mm Aggregates

Material surrounding response zone :

2.00-6.00m: FILL; 6.00-7.47m: COLLUVIUM; 7.47-71.00m: Slightly, locally moderately decomposed, TUFF locally with granite intrusion

Remarks :



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STANDPIPE / PIEZOMETER MONITORING

DRILLHOLE No.
1024/SIL/D008

Project :	Ground Investigation for South Island Line	**Date of Installation :**	13/05/08 **(Standpipe)**
		Taken and Reported by :	W K Kwok
Project No. :	J3086	**Checked by :**	Ken Ma
Standpipe No. :	D008-S	**Pipe Top Level (mPD) :**	31.30 **mPD**
Base of Drillhole (mPD) :	-44.78 **mPD**	**Ground Level (mPD) :**	31.34 **mPD**
Response Zone (mPD) :	29.34 **To** -39.66 **mPD**	**Tip Level (mPD) :**	-39.06 **mPD**
Depth of Buckets (if any) :	--- **To** --- **m bgl**	**Co-ordinates of Instrument :**	
	at --- **m spacing**	**Easting:** 834942.58	**Northing:** 815337.98

Date	Ground Water Level		Highest Bucket with Entrapped Water (if any)		Remarks
	Depth Below Pipe Top (m)	Elevation (mPD)	Depth Below Pipe Top (m)	Elevation (mPD)	
19/06/08	22.01	9.29			
20/06/08	22.01	9.29			
21/06/08	22.01	9.29			
23/06/08	22.05	9.25			
24/06/08	22.08	9.22			
25/06/08	22.02	9.28			
26/06/08	22.01	9.29			

Gammon

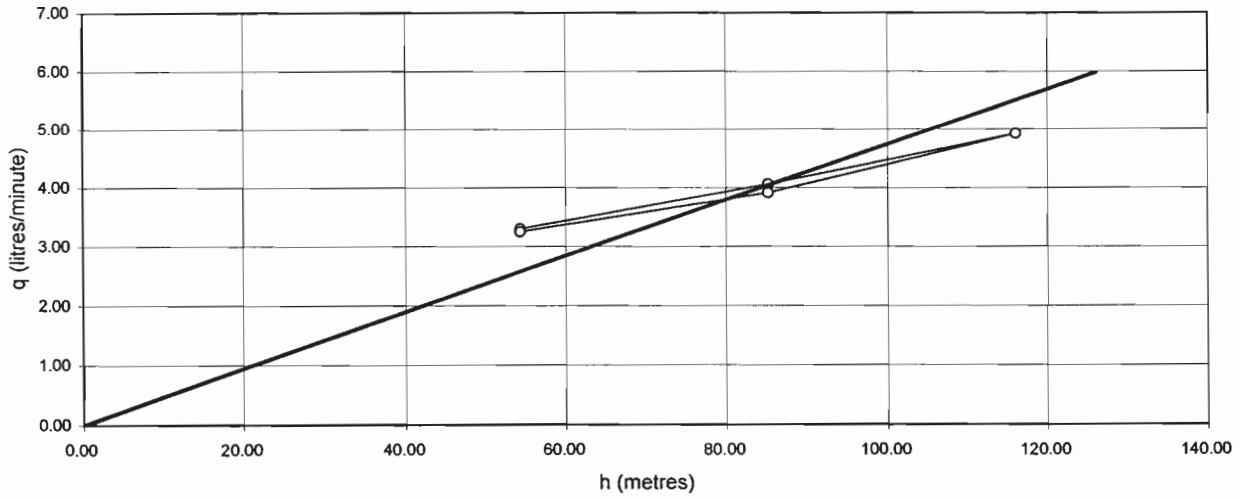
PACKER TEST RECORD SHEET

DRILLHOLE No. 1024/SIL/D008

Contract No. :	NEX/1024	**Test No. :**	1
Project No. :	J3086	**Test Date :**	16/06/2008
Project :	Ground Investigation For South Island Line	**Tested / Supervised by :**	K K NG
Test Section :	49.76 **m** to 51.26 **m**	**Checked by :**	KEN MA

Packer type :	Double	Depth of hole at time of test :	76.12 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	101 mm
Presure gauge No. :	WPC-14	Drillhole inclination from horizontal :	90 degrees
Flowmeter No. :	000879	Rock type : Grade II TUFF	Casing Details : Px 6.00m

LENGTH OF TEST SECTION 1.50 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
	q litres/min	units kPa	head of water m	in basic equipment m	in extra rod or pipes	**h** (2+3+6-7-8) m	
VERTICAL DEPTH TO GROUND - WATER FROM G.L.	(4)	(5)	(6)	(7)	(8)	(9)	
21.90 m (2)	3.30	303.00	30.89			54.29	4.05
	4.06	606.00	61.77			85.17	3.18
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	4.93	909.00	92.66			116.06	2.83
	3.91	606.00	61.77			85.17	3.06
1.50 m (3)	3.25	303.00	30.89			54.29	4.00



Type of Flow TURBULENT

$L = \frac{100}{lh} q =$ **3.16 lugeon units**

Where l = length of test section in metres
Note: If ground water level unknown or below test section use depth to centre of test section

Gammon

PACKER TEST FIELD DATA

DRILLHOLE No. 1024/SIL/D012

Contract No. :	NEX/1024	**Test No. :**	1
Project No. :	J3086	**Date of test :**	30/10/2008
Project :	Ground Investigation For South Island Line	**Tested / Supervised by :**	K K NG
Test Section :	112.30 **m** **to** 113.80 **m**	**Checked by :**	KEN MA

Packer type :	Double	Depth of hole at time of test :	123.70 m
Packer Pressure :	2000 kPa	Diameter of hole in test area :	0.101 m
Pressure gauge No.:	WPC-14	Drillhole inclination from horizontal :	90 degrees
Flowmeter No.:	000879	Rock type : Grade III/II TUFF	Casing Details : Hx 10.00m

Pressure gauge height above ground level :	0.97 m
Depth to centre of test section (measured down line of drillhole) :	113.05 m
Depth to groundwater level (measured down line of drillhole) :	22.10 m

FIRST PERIOD — Gauge Pressure 680.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	441018.7	441071.2	441122.2	441172.7		
Water take	(litres/min)		10.50	10.20	10.10		10.27

SECOND PERIOD — Gauge Pressure 1360.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	441510.3	441588.8	441668.3	441749.8		
Water take	(litres/min)		15.70	15.90	16.30		15.97

THIRD PERIOD — Gauge Pressure 2040.00 kPa

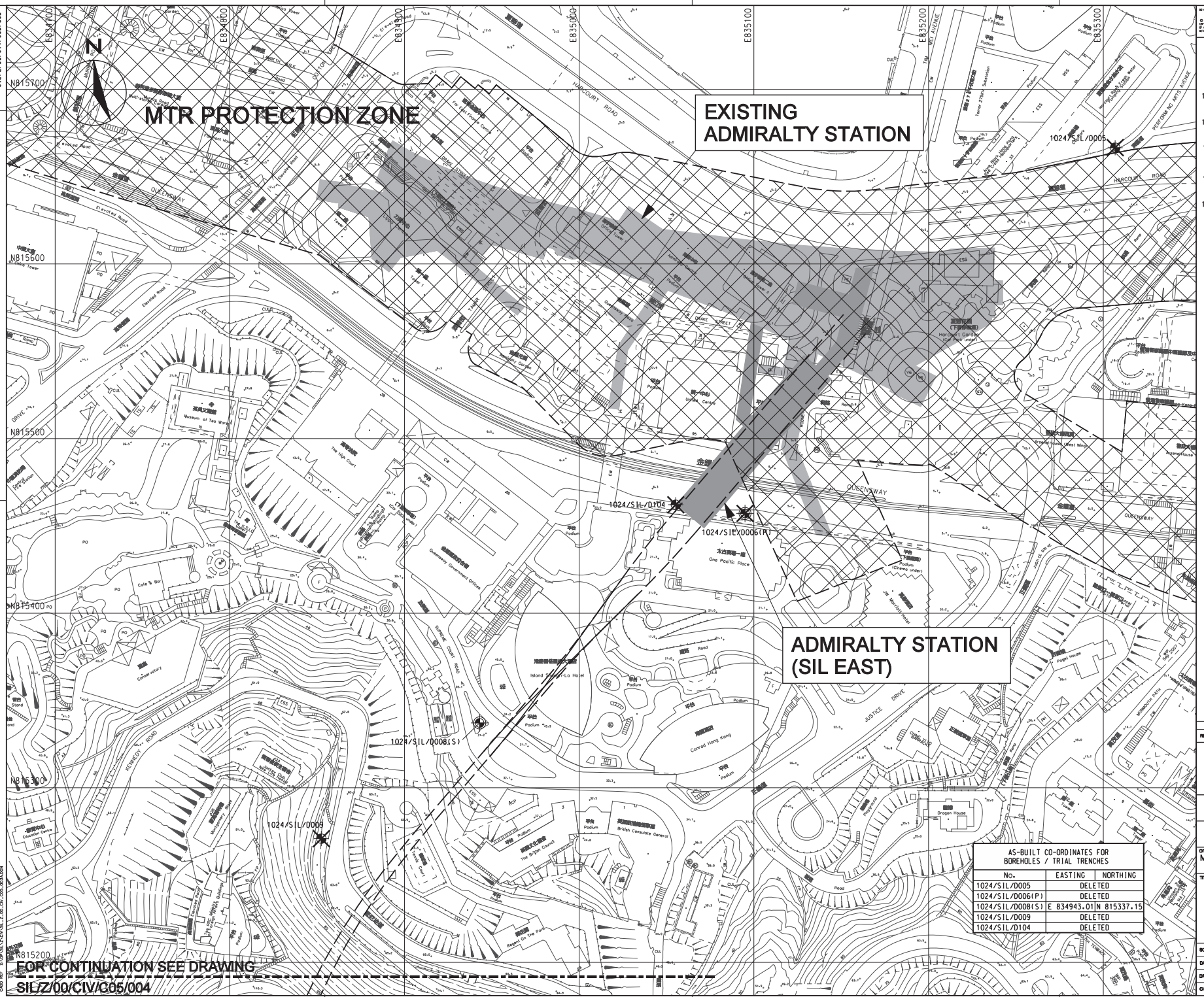
Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	442038.5	442136.0	442237.5	442338.0		
Water take	(litres/min)		19.50	20.30	20.10		19.97

FOURTH PERIOD — Gauge Pressure 1360.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	442625.1	442707.1	442787.6	442867.6		
Water take	(litres/min)		16.40	16.10	16.00		16.17

FIFTH PERIOD — Gauge Pressure 680.00 kPa

Time	(minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading	(litres)	443235.9	443291.9	443347.4	443405.4		
Water take	(litres/min)		11.20	11.10	11.60		11.30



AS-BUILT CO-ORDINATES FOR BOREHOLES / TRIAL TRENCHES		
No.	EASTING	NORTHING
1024/SIL/D005	DELETED	
1024/SIL/D006(P)	DELETED	
1024/SIL/D008(S)	E 834943.01	N 815337.15
1024/SIL/D009	DELETED	
1024/SIL/D104	DELETED	

LEGEND :

- MTR PROTECTION ZONE
- 1024/SIL/D001 — AS-BUILT BOREHOLES
- 1024/SIL/D002(S/P) — AS-BUILT BOREHOLES WITH STANDPIPES OR PIEZOMETERS
- 1024/SIL/D014 — AS-BUILT INCLINED BOREHOLES
- 1024/SIL/TP01 — AS-BUILT TRIAL PITS /TRENCHES
- 1024/SIL/D007 — BOREHOLES DELETED

REVISION	DESCRIPTION	BY	DATE	APPROVED
A	AS-BUILT RECORD FOR BD SUBMISSION	P MA	AUG 2009	TM HUI

MTR

SOUTH ISLAND LINE

ORIGINATOR
MTR CORPORATION LIMITED PROJECTS DIVISION | CIVIL ENGINEERING DEPARTMENT

TITLE
CONTRACT NEX1024
AS-BUILT BOREHOLES AND TRIAL PITS/TRENCHES LOCATION PLAN (NON-SCHEDULED AREA)

SHEET 1 OF 14

SCALE	1 : 1000 (A1)	CAD REF	SIL_Z_00_CIV_C05_003A.DGN	AS BUILT APPROVED	
DATE	14 JAN 2008	AS BUILT DWG NO			
DRAWN	C LI	DESIGNED	P FU	DRAWING NO	REV
CHECKED	TM HUI	APPROVED	AMG	SIL/Z/00/CIV/C05/003	A

DRAWING NO SIL/Z/00/CIV/C05/003

PLOTTING TIME 24/08/09 14:09:23

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號 :
OUR REF 本署檔號 : BD 3/7001/08
FAX 圖文傳真 : 2973 0561
TEL 電話 : 2626 1577
www.bd.gov.hk

22 October 2009

Mr. HUI Tung-man
MTR Corporation Limited
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Hung Hom, Kowloon.

Dear Sir,

South Island Line (East)

I acknowledge receipt of your Form BA 14 submitted on **30 September 2009** in respect of the ground investigation field works (Stage I) for the above together with Ground Investigation Field Works Report, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Civil Engineering Department, MTRCL
MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

AP **Mr. YEUNG Sze-wai, Wilfred**
Architect Department,
8/F Citylink Plaza, Shatin, N.T.

香港九龍旺角彌敦道 750 號先驅中心 12 樓至 18 樓 12/F-18/F Pioneer Centre, 750 Nathan Road, Mongkok, Kowloon, Hong Kong.

FUGRO GEOTECHNICAL SERVICES LTD	DRILLHOLE RECORD	HOLE No. 912/SIL/D286
	CONTRACT No.: MTR contract 912	SHEET: 1 of 3

PROJECT: Ground Investigation for South Island Line (East)

METHOD: Rotary Drilling	CO-ORDINATES:	WORKS ORDER No. N/A
MACHINE & No.: FDR-15	E 834923.03 N 815277.11	DATE from: 23/01/2010 to 04/02/2010
FLUSHING MEDIUM: Water	ORIENTATION: Vertical	GROUND LEVEL + 43.09 mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/ end	Water Return %	T C R %	S C R %	R Q D %	F I	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
25/01/2010	PW								1 INSPECTION PIT 0.45 0.50 2 0.85 1.00 3 1.15 1.20	43.09 41.89	0.00 1.20			Firm, yellowish brown (10YR/5/6), sandy SILT with some angular fine to medium gravel. (FILL)
				82					T2101 1.70					Grey (7.5YR/6/1), angular coarse GRAVEL and COBBLES of moderately strong to strong tuff and occasional concrete. (FILL)
				88					T2101 2.50	40.59	2.50			
				100					4					Firm, yellowish brown (10YR/5/6), sandy clayey SILT. (FILL)
				98					5 3.20 3.30 6 7 4.30 4.40					
	PW 4.90								4.90	38.19	4.90		V	Extremely weak, light yellowish brown (2.5Y/6/4), completely decomposed fine ash vitric TUFF. (Soft to firm, sandy clayey SILT)
	HW							1, 2, 1, 1, 1, 1 N=4	8 5.30 5.35 9 5.80					
	HW 6.90			50					10 6.80 6.90	36.19	6.90		III	Moderately strong, yellowish brown, moderately decomposed fine ash vitric TUFF. Joints are very closely to closely spaced, rough planar and stepped, extremely narrow, iron and manganese oxide stained, dipping at 10°-20°, 35°-45° and subvertical.
				97	56	56			T2101 7.80					
				100	60	48			T2101	34.59	8.50		II	Strong, light grey, slightly decomposed fine ash vitric TUFF with very closely to closely spaced, incipient joints and rock slightly silicified. Joints are closely to medium spaced, rough planar and stepped, extremely narrow, iron and manganese oxide stained, chlorite and kaolin slightly coated, dipping at 10°-20°, 35°-45°, 50°-60° and 65°-75°.
25/01/2010 26/01/2010				100	100	92			9.05 T2101	33.09	10.00			

Small Disturbed Sample
Piston sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
76mm Vibrocore Sample
100mm Vibrocore Sample
Vibrocore Sub-sample
SPT Liner Sample

Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Pressuremeter Test
Televiewer Survey
Packer Test
Impression Packer Test
Water Sample
Standpipe
Piezometer Tip

LOGGED P. Zhang
DATE 11/02/2010
CHECKED S.M. Pyle
DATE 19/02/2010

REMARKS
1. An inspection pit was excavated to a depth of 1.20m.
2. Acoustic borehole televiewer survey test was performed from 9.15m to 28.10m below existing ground level on 02/02/2010.
3. Water absorption (packer) tests were performed from 21.60m to 26.60m, 16.60m to 21.60m and 11.60m to 16.60m below existing ground level on 03/02/2010.
4. A piezometer was installed at 25.50m below existing ground level on 04/02/2010.
5. A standpipe was installed at 10.00m below existing ground level on 04/02/2010.

FUGRO GEOTECHNICAL SERVICES LTD

DRILLHOLE RECORD

HOLE No. **912/SIL/D286**

CONTRACT No.: **MTR contract 912**

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

PROJECT: **Ground Investigation for South Island Line (East)**

METHOD: **Rotary Drilling**

MACHINE & No.: **FDR-15**

CO-ORDINATES:
E **834923.03**
N **815277.11**

WORKS ORDER No. **N/A**

DATE from: **23/01/2010** to **04/02/2010**

FLUSHING MEDIUM: **Water**

ORIENTATION: **Vertical**

GROUND LEVEL **+ 43.09** mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/ end	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
									10.15	33.09	10.00		II	As sheet 1 of 3.
11				100	100	100			T2101 11.50					
12				100	100	88			T2101 12.48					
13				100	100	100			T2101 13.20					
14				100	100	100			T2101 14.65					
26/01/2010 27/01/2010 15				100	100	75			T2101 15.95					
16				100	100	48			T2101 17.10	25.99	17.10		II	Strong, grey, slightly decomposed fine ash vitric TUFF. Joints are closely to medium spaced, rough planar, extremely narrow, chlorite and kaolin coated, dipping at 10°-20°, 35°-45°, 60°-70° and subvertical.
27/01/2010 28/01/2010 17														
18				100	100	55			T2101 18.56					
19				100	100	17			T2101 19.26					
20				100	100	43			T2101	23.09	20.00			

Small Disturbed Sample
Piston sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
76mm Vibrocore Sample
100mm Vibrocore Sample
Vibrocore Sub-sample
SPT Liner Sample

Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Pressuremeter Test
Televiewer Survey
Packer Test
Impression Packer Test
Water Sample
Standpipe
Piezometer Tip

LOGGED **P. Zhang**

DATE **11/02/2010**

CHECKED **S.M. Pyle**

DATE **19/02/2010**

REMARKS

FUGRO GEOTECHNICAL SERVICES LTD

DRILLHOLE RECORD

HOLE No. 912/SIL/D286

CONTRACT No.: MTR contract 912

SHEET: 3 of 3

PROJECT: Ground Investigation for South Island Line (East)

METHOD: Rotary Drilling

MACHINE & No.: FDR-15

FLUSHING MEDIUM: Water

CO-ORDINATES:
E 834923.03
N 815277.11

ORIENTATION: Vertical

WORKS ORDER No. N/A

DATE from: 23/01/2010 to 04/02/2010

GROUND LEVEL + 43.09 mPD

Drilling Progress	Casing depth/size	Water Level (m) Shift start/ end	Water Return %	TCR %	SCR %	RQD %	FI	Tests	Samples No. Type Depth	Reduced Level	Depth (m)	Legend	Grade	Description
									20.06	23.09	20.00		II	As sheet 2 of 3.
				100	100	41			T2I01					
21									20.86					
				100	100	100			T2I01					
22									22.26					
28/01/2010 29/01/2010										20.59	22.50			
				100	100	37			T2I01				II	Strong, light grey, slightly decomposed fine ash vitric TUFF with very closely to closely spaced incipient joints.
23									23.17					Joints are closely spaced, rough planar, extremely narrow, chlorite slightly coated, clean, dipping at 10°-20°, 35°-45°, 60°-70° and subvertical.
				100	71	20			T2I01					
24									23.87					
				100	86	0			T2I01					
25									24.80					
				100	33	0			T2I01					
28/01/2010 30/01/2010									25.78	17.19	25.90			
26									T2I01				II	Strong to very strong, grey, slightly decomposed fine ash vitric TUFF.
				100	100	48								Joints are medium spaced, rough planar, extremely narrow, clean, dipping at 35°-45° and 60°-70°.
27									27.03					
				100	100	100			T2I01					
28														
30/01/2010									28.35	14.74	28.35			End of investigation hole at 28.35m.
29														
30											30.00			

Small Disturbed Sample
Piston sample
U76 Undisturbed Sample
U100 Undisturbed Sample
Mazier Sample
76mm Vibrocore Sample
100mm Vibrocore Sample
Vibrocore Sub-sample
SPT Liner Sample

Standard Penetration Test
In-situ Vane Shear Test
Permeability Test
Pressuremeter Test
Televiewer Survey
Packer Test
Impression Packer Test
Water Sample
Standpipe
Piezometer Tip

LOGGED P. Zhang
DATE 11/02/2010
CHECKED S.M. Pyle
DATE 19/02/2010

REMARKS


MTR
FUGRO
Project : Ground Investigation for South Island Line (East) Contract No.: 912
Hole No. : 912/SIL/ D286
Box No. : 1 of 7
Depth : 0.00 m. To (8.75) m.
Date : From 25/01/2010 to 30/01/2010
Kodak Color Control Patches
0.00
1.20
2.50
6.90
1.70
7.80
(8.75)
(8.75)


MTR
FUGRO
Project : Ground Investigation for South Island Line (East) Contract No.: 912
Hole No. : 912/SIL/ D286
Box No. : 2 of 7
Depth : (8.75) m. To (12.20) m.
Date : From 25/01/2010 to 30/01/2010
Kodak Color Control Patches
(8.75)
9.05
10.15
11.50
(12.20)


MTR
FUGRO
Project : Ground Investigation for South Island Line (East) Contract No.: 912
Hole No. : 912/SIL/ D286
Box No. : 3 of 7
Depth : (12.20) m. To (15.41) m.
Date : From 25/01/2010 to 30/01/2010
Kodak Color Control Patches
(12.20)
12.48
13.20
14.65
(15.41)


MTR
FUGRO
Project : Ground Investigation for South Island Line (East) Contract No.: 912
Hole No. : 912/SIL/ D286
Box No. : 4 of 7
Depth : (15.41) m. To 18.56 m.
Date : From 25/01/2010 to 30/01/2010
Kodak Color Control Patches
(15.41)
15.95
17.10
18.56


MTR
FUGRO
Project : Ground Investigation for South Island Line (East) Contract No.: 912
Hole No. : 912/SIL/ D286
Box No. : 5 of 7
Depth : 18.56 m. To (21.80) m.
Date : From 25/01/2010 to 30/01/2010
Kodak Color Control Patches
18.56
19.26
20.06
20.86
(21.80)
20.86m


MTR
FUGRO
Project : Ground Investigation for South Island Line (East) Contract No.: 912
Hole No. : 912/SIL/ D286
Box No. : 6 of 7
Depth : (21.80) m. To (25.10) m.
Date : From 25/01/2010 to 30/01/2010
Kodak Color Control Patches
(21.80)
22.26
23.17
23.87
24.80
(25.10)


MTR
FUGRO
Project : Ground Investigation for South Island Line (East) Contract No.: 912
Hole No. : 912/SIL/ D286
Box No. : 7 of 7
Depth : (25.10) m. To 28.35 m.
Date : From 25/01/2010 to 30/01/2010
Kodak Color Control Patches
(25.10)
25.78
27.03
28.35
END

FUGRO GEOTECHNICAL SERVICES LTD

PACKER TEST FIELD DATA

Contractor: Fugro Geotechnical Services Ltd.	Drillhole No.: 912/SIL/D286
Contract No.: 912	Test No.: 1
Works Order No.: N/A	Date of test: 03/02/2010
Project: Ground Investigation for South Island Line (East)	Test Section: 21.60 m to 26.60 m
Tested / Supervised by: K.C.Ng	Checked by: A.B-Hollinshead

Packer Type	Double Pneumatic (H size)	Depth of hole at time of test	28.35 m
		Details of casing at time of test	PW to 9.10 m
		Gauge height above G.L.	0.40 m
Packer Pressure	2000 kPa	Rock Type	Slightly decomposed TUFF

Depth to centre of test section (measured down line of drillhole): 23.10 m

Depth to groundwater level (measured down line of drillhole): 6.10 m

First Period Gauge Pressure 100 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	420.50	420.50	420.50			
Water intake (l)	0.00		0.00			0.00

Second Period Gauge Pressure 200 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	428.50	428.50	428.50			
Water intake (l)	0.00		0.00			0.00

Third Period Gauge Pressure 300 kPa

Test Continued, but a break in the readings.

Time (minutes)	0	5	0	15	20	Average Flow (litre/min)
Flowmeter reading (l)	433.00	433.50	434.00			
Water intake (l)	0.50		0.50			0.10

Fourth Period Gauge Pressure 200 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	433.00	433.00	433.00			
Water intake (l)	0.00		0.00			0.00

Fifth Period Gauge Pressure 100 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	433.00	433.00	433.00			
Water intake (l)	0.00		0.00			0.00

FUGRO GEOTECHNICAL SERVICES LTD

PACKER TEST RECORD SHEET

Contractor: Fugro Geotechnical Services Ltd.	Drillhole No.: 912/SIL/D286
Contract No.: 912	Test No.: 1
Works Order No.: N/A	Date of test: 03/02/2010
Project: Ground Investigation for South Island Line (East)	Test Section: 21.60 m to 26.60 m
Tested / Supervised by: K.C.Ng	Checked by: A.B-Hollinshead

Packer Type: Double Pneumatic (H size)

Packer Pressure: 2000 kPa

Depth of hole at time of test: 28.35 m

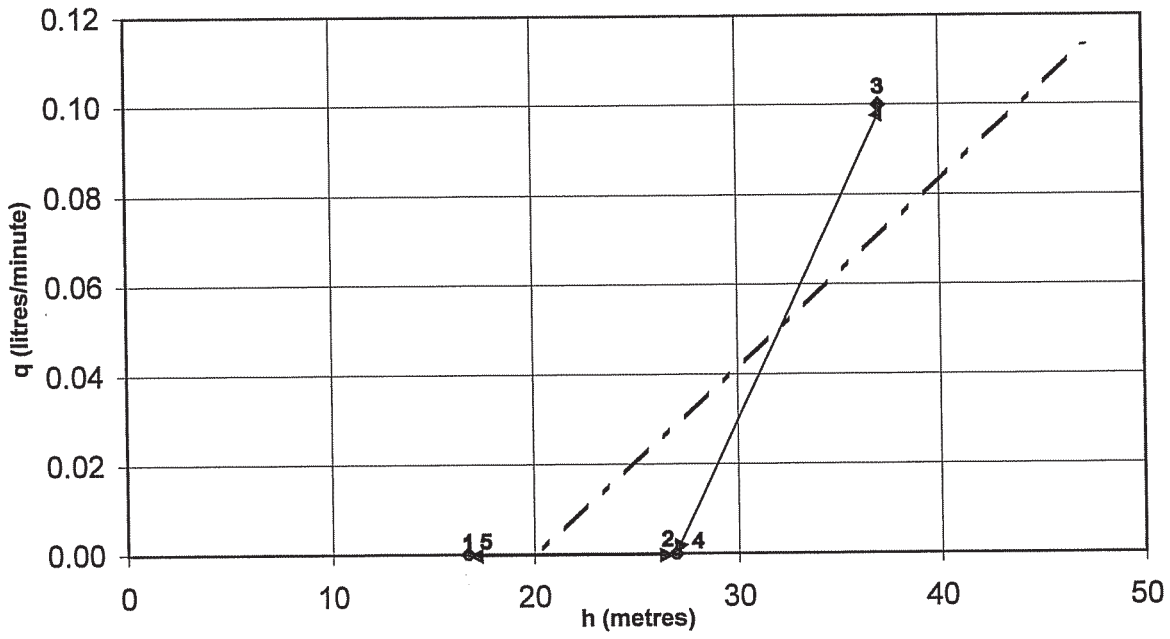
Diameter of hole in test area: 101 mm

Drillhole inclination from horizontal: 90 degrees

Casing Details: PW to 9.10 m

Rock Type: Slightly decomposed TUFF

LENGTH OF TEST SECTION	FLOW	GUAGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD	LUGEON VALUE
5.00 m	q (litre / min)	Units (kPa)	head of water (m)	in basic equipment (m)	in extra rod or pipes	h (2+3+6-7-8) (m)	
	(4)	(5)	(6)	(7)	(8)	(9)	
VERTICAL DEPTH TO GROUND-WATER FROM G.L.	0.00	100	10.20	0.00	0.00	16.70	0.00
6.10 m (2)	0.00	200	20.40	0.00	0.00	26.90	0.00
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	0.10	300	30.60	0.00	0.00	37.10	0.05
	0.00	200	20.40	0.00	0.00	26.90	0.00
0.40 m (3)	0.00	100	10.20	0.00	0.00	16.70	0.00



Type of Flow: Pilating flow.

$L = \frac{100}{l\,h} q$ L= 0.08 Lugeon units

Where l = length of test section in meters

Remarks:

FUGRO GEOTECHNICAL SERVICES LTD

PACKER TEST FIELD DATA

Contractor: Fugro Geotechnical Services Ltd.	Drillhole No.: 912/SIL/D286
Contract No.: 912	Test No.: 2
Works Order No.: N/A	Date of test: 03/02/2010
Project: Ground Investigation for South Island Line (East)	Test Section: 16.60 m to 21.60 m
Tested / Supervised by: K.C.Ng	Checked by: A.B-Hollinshead

Packer Type	Double Pneumatic (H size)	Depth of hole at time of test	28.35 m
		Details of casing at time of test	PW to 9.10 m
		Gauge height above G.L.	0.40 m
Packer Pressure	2000 kPa	Rock Type	Slightly decomposed TUFF

Depth to centre of test section (measured down line of drillhole): 19.10 m

Depth to groundwater level (measured down line of drillhole): 6.10 m

First Period Gauge Pressure 90 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	441.50	441.50	441.50			
Water intake (l)	0.00		0.00			0.00

Second Period Gauge Pressure 180 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	447.50	448.50	449.50			
Water intake (l)	1.00		1.00			0.20

Third Period Gauge Pressure 270 kPa

Test Continued, but a break in the readings.

Time (minutes)	0	5	0	15	20	Average Flow (litre/min)
Flowmeter reading (l)	457.00	461.50	466.00			
Water intake (l)	4.50		4.50			0.90

Fourth Period Gauge Pressure 180 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	466.00	467.00	468.00			
Water intake (l)	1.00		1.00			0.20

Fifth Period Gauge Pressure 90 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	467.00	467.00	467.00			
Water intake (l)	0.00		0.00			0.00

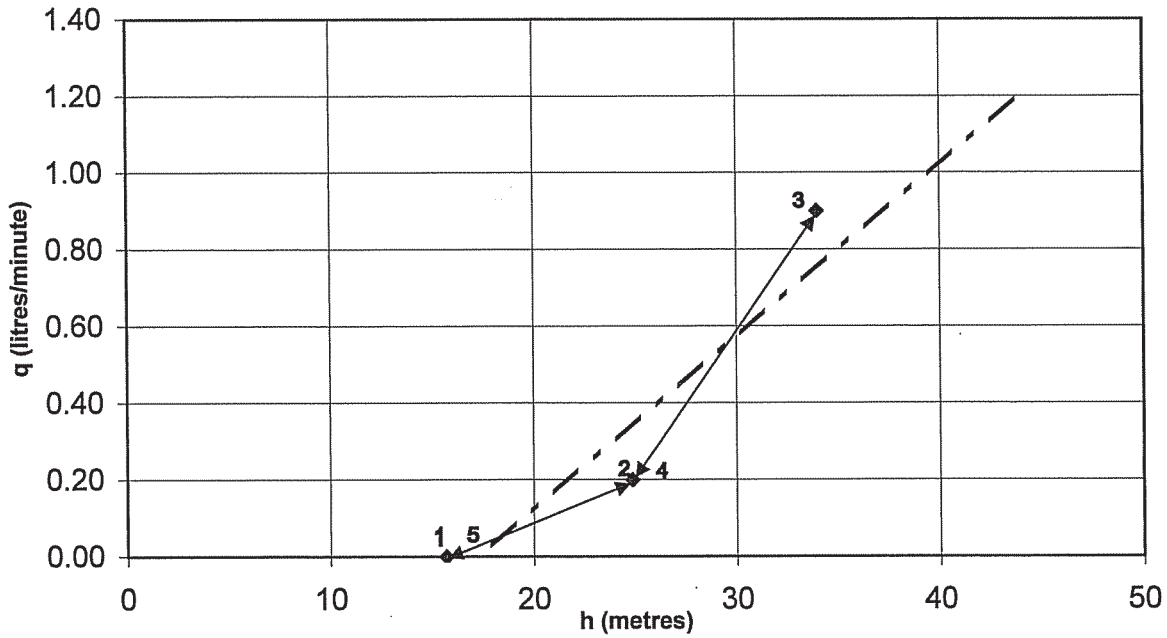
FUGRO GEOTECHNICAL SERVICES LTD

PACKER TEST RECORD SHEET

Contractor: Fugro Geotechnical Services Ltd.	Drillhole No.: 912/SIL/D286
Contract No.: 912	Test No.: 2
Works Order No.: N/A	Date of test: 03/02/2010
Project: Ground Investigation for South Island Line (East)	Test Section: 16.60 m to 21.60 m
Tested / Supervised by: K.C.Ng	Checked by: A.B-Hollinshead

Packer Type	Double Pneumatic (H size)	Depth of hole at time of test	28.35 m
		Diameter of hole in test area	101 mm
		Drillhole inclination from horizontal	90 degrees
		Casing Details	PW to 9.10 m
Packer Pressure	2000 kPa	Rock Type	Slightly decomposed TUFF

LENGTH OF TEST SECTION 5.00 m	FLOW q (litre / min)	GUAGE PRESSURE Units (kPa)	GUAGE PRESSURE head of water (m)	FRICTION HEAD LOSS in basic equipment (m)	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) (m)	LUGEON VALUE
	(4)	(5)	(6)	(7)	(8)	(9)	
VERTICAL DEPTH TO GROUND-WATER FROM G.L.	0.00	90	9.18	0.00	0.00	15.68	0.00
6.10 m (2)	0.20	180	18.36	0.01	0.00	24.85	0.16
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	0.90	270	27.54	0.04	0.00	34.00	0.53
	0.20	180	18.36	0.01	0.00	24.85	0.16
0.40 m (3)	0.00	90	9.18	0.00	0.00	15.68	0.00



Type of Flow Lamina flow.

$L = \frac{100\ q}{l\ h}$ L= 0.90 Lugeon units

Where l = length of test section in meters

Remarks:

FUGRO GEOTECHNICAL SERVICES LTD

PACKER TEST FIELD DATA

Contractor: Fugro Geotechnical Services Ltd.	Drillhole No.: 912/SIL/D286
Contract No.: 912	Test No.: 3
Works Order No.: N/A	Date of test: 2/3/2010
Project: Ground Investigation for South Island Line (East)	Test Section: 11.60 m to 16.60 m
Tested / Supervised by: K.C.Ng	Checked by: A.B-Hollinshead

Packer Type	Double Pneumatic (H size)	Depth of hole at time of test	28.35 m
		Details of casing at time of test	PW to 9.10 m
		Gauge height above G.L.	0.40 m
Packer Pressure	2000 kPa	Rock Type	Slightly decomposed TUFF

Depth to centre of test section (measured down line of drillhole): 14.10 m

Depth to groundwater level (measured down line of drillhole): 6.10 m

First Period Gauge Pressure 80 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	469.00	469.00	469.00			
Water intake (l)	0.00	0.00				0.00

Second Period Gauge Pressure 160 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	472.00	472.50	473.00			
Water intake (l)	0.50	0.50				0.10

Third Period Gauge Pressure 240 kPa

Test Continued, but a break in the readings.

Time (minutes)	0	5	0	15	20	Average Flow (litre/min)
Flowmeter reading (l)	476.00	478.00	480.00			
Water intake (l)	2.00		2.00			0.40

Fourth Period Gauge Pressure 160 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	480.00	481.00	482.00			
Water intake (l)	1.00		1.00			0.20

Fifth Period Gauge Pressure 80 kPa

Time (minutes)	0	5	10	15	20	Average Flow (litre/min)
Flowmeter reading (l)	482.00	482.00	482.00			
Water intake (l)	0.00		0.00			0.00

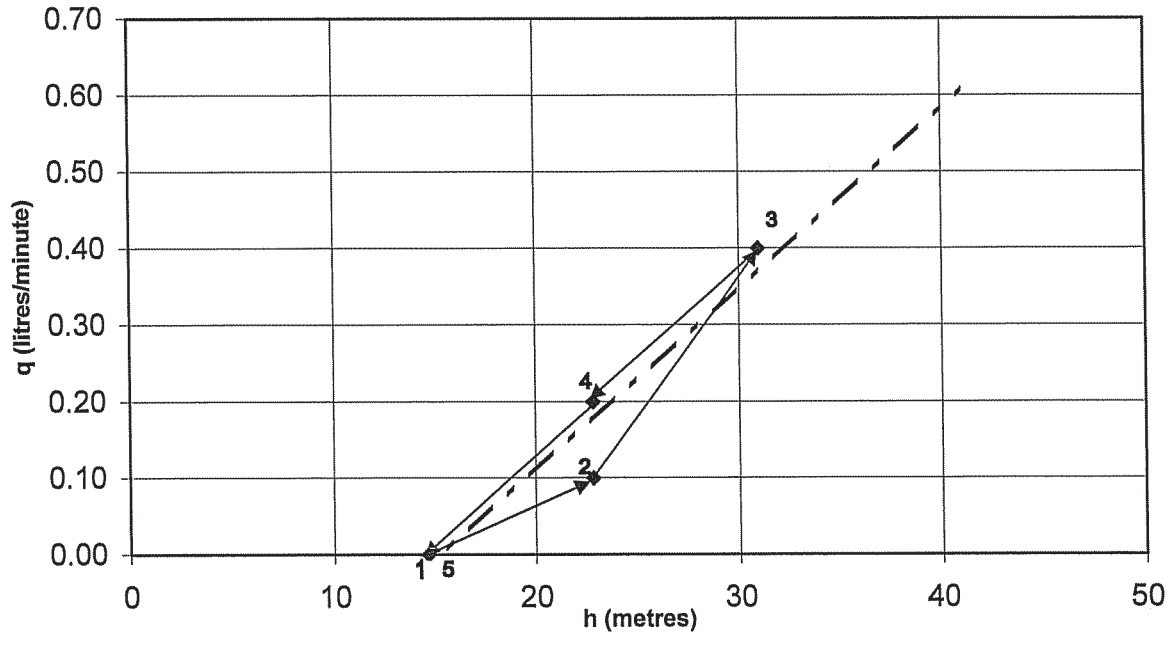
FUGRO GEOTECHNICAL SERVICES LTD

PACKER TEST RECORD SHEET

Contractor: Fugro Geotechnical Services Ltd.	Drillhole No.: 912/SIL/D286
Contract No.: 912	Test No.: 3
Works Order No.: N/A	Date of test: 2/3/2010
Project: Ground Investigation for South Island Line (East)	Test Section: 11.60 m to 16.60 m
Tested / Supervised by: K.C.Ng	Checked by: A.B-Hollinshead

Packer Type	Double Pneumatic (H size)	Depth of hole at time of test	28.35 m
		Diameter of hole in test area	101 mm
		Drillhole inclination from horizontal	90 degrees
		Casing Details	PW to 9.10 m
Packer Pressure	2000 kPa	Rock Type	Slightly decomposed TUFF

LENGTH OF TEST SECTION 5.00 m	FLOW q (litre / min)	GUAGE PRESSURE Units (kPa)	GUAGE PRESSURE head of water (m)	FRICTION HEAD LOSS in basic equipment (m)	FRICTION HEAD LOSS in extra rod or pipes	TOTAL HEAD h (2+3+6-7-8) (m)	LUGEON VALUE
	(4)	(5)	(6)	(7)	(8)	(9)	
VERTICAL DEPTH TO GROUND-WATER FROM G.L.	0.00	80	8.16	0.00	0.00	14.66	0.00
6.10 m (2)	0.10	160	16.32	0.00	0.00	22.82	0.09
HEIGHT OF PRESSURE GAUGE ABOVE G.L.	0.40	240	24.48	0.02	0.00	30.96	0.26
	0.20	160	16.32	0.01	0.00	22.81	0.18
0.40 m (3)	0.00	80	8.16	0.00	0.00	14.66	0.00



Type of Flow Lamina flow.

$L = \frac{100}{l\,h} q$ L= 0.47 Lugeon units

Where l = length of test section in meters

Remarks:

FUGRO GEOTECHNICAL SERVICES LTD

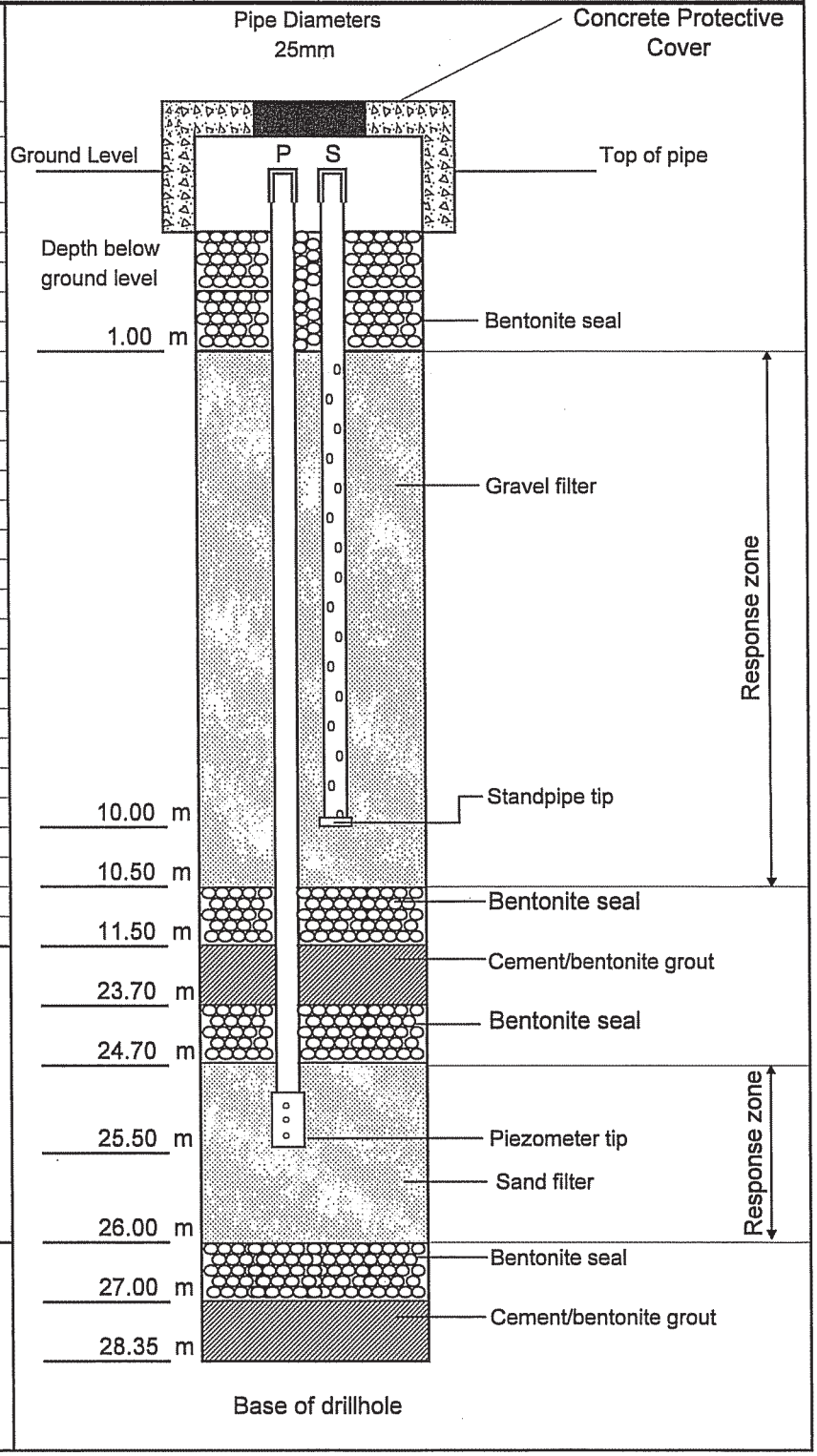
STANDPIPE DETAIL AND RESPONSE TEST RECORD SHEET

Contractor	:Fugro Geotechnical Services Ltd	Drillhole No.:	912/SIL/D286(S)
Contract No.	:912	Date of Test:	05/02/2010
W.O. No.	:NIL	Ground Level:	+43.09 mP.D.
Project:	Ground Investigation for South Island Line (East)	Co-ordinates(m):	E 834923.03 N 815277.11
Initial Water Level:	6.10 m below G.L.	Standpipe Tip Level:	+33.09 mP.D.
Test/Supervised By:	K.C.Ng	Checked By:	A.B-Hollinshead

Elapsed Time (minutes)	Depth of Water from top of pipe (m)
0.00	0.00
0.25	4.78
0.50	4.90
0.75	5.08
1.00	5.89
1.50	5.97
2.00	6.00
3.00	6.10

Material Surrounding Response Zone:
1.00-1.20 : Sandy SILT.(FILL)
1.20-2.50 : GRAVEL and COBBLES.(FILL)
2.50-4.90 : Sandy clayey SILT.(FILL)
4.90-6.90 : Completely decomposed TUFF.(Sandy clayey SILT)
6.90-8.50 : Moderately decomposed TUFF.
8.50-10.50 : Slightly decomposed TUFF.

Remarks:



FUGRO GEOTECHNICAL SERVICES LTD

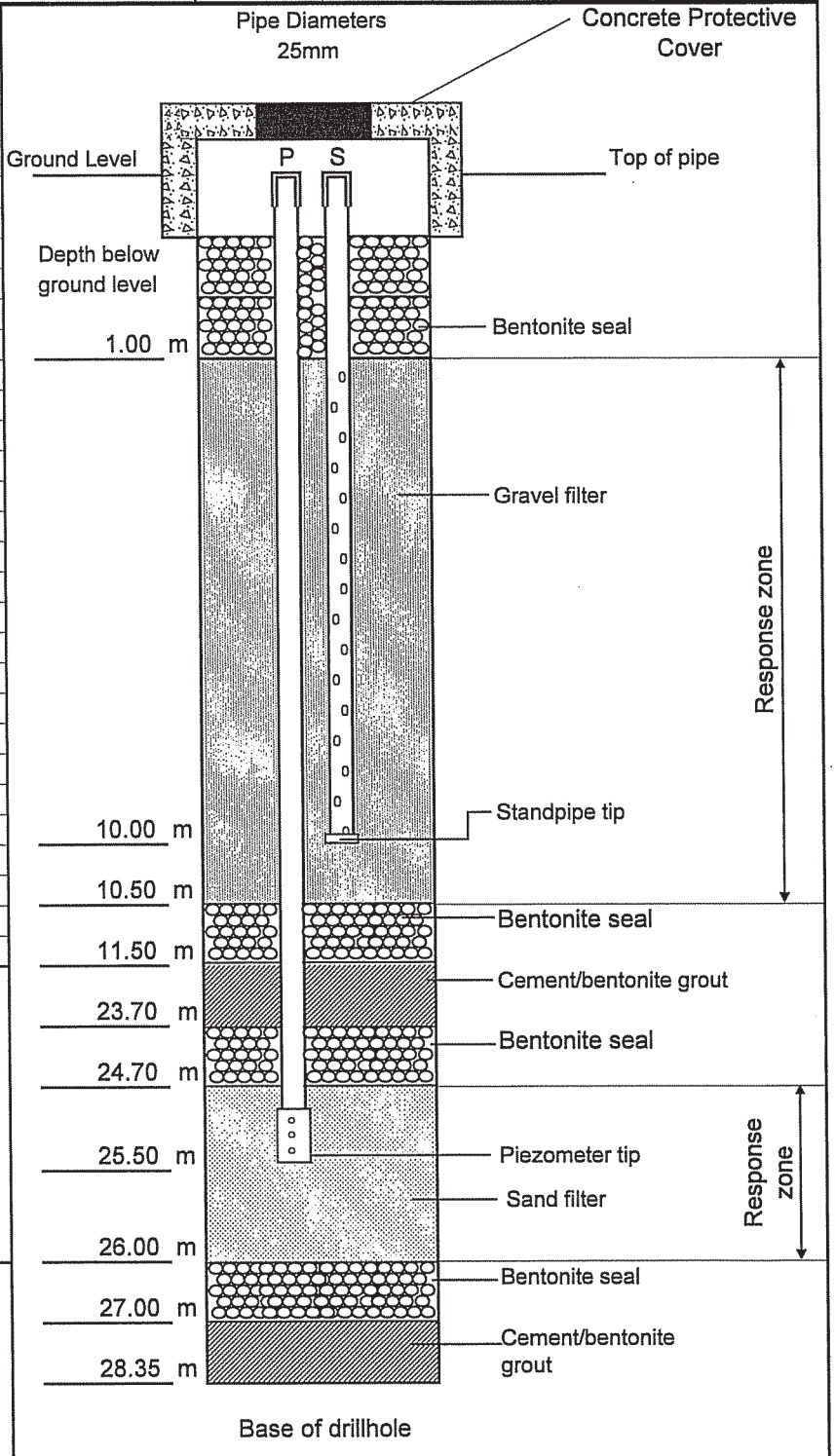
PIEZOMETER DETAIL AND RESPONSE TEST RECORD SHEET

Contractor	:Fugro Geotechnical Services Ltd	Drillhole No.:	912/SIL/D286(P)
Contract No.	:912	Date of Test:	05/02/2010
W.O. No.	:NIL	Ground Level:	+43.09 mP.D.
Project:	Ground Investigation for South Island Line (East)	Co-ordinates(m):	E 834923.03 N 815277.11
Initial Water Level:	11.98 m below G.L.	Piezometer Tip Level:	+17.59 mP.D.
Test/Supervised By:	K.C.Ng	Checked By:	A.B-Hollinshead

Elapsed Time (minutes)	Depth of Water from top of pipe (m)
0.00	0.00
0.25	0.03
0.50	0.03
0.75	0.05
1.00	0.10
1.50	0.17
2.00	0.20
3.00	0.28
4.00	0.39
5.00	0.46
6.00	0.55
7.00	0.66
8.00	0.73
9.00	0.80
10.00	0.89
15.00	1.30
20.00	1.67
25.00	2.08
30.00	2.43
45.00	3.47
60.00	4.49

Material Surrounding Response Zone:
24.70-26.00 : Slightly decomposed TUFF.

Remarks:



FUGRO GEOTECHNICAL SERVICES LTD

Groundwater Level Record Sheet

Contract No:	912	Works Order No :	NIL
Project :	Ground Investigation for South Island Line (East)		

Drillhole No.	912/SIL/D286
Instrument No.	Standpipe
Installation Date	04/02/2010
AGMD Level (mPD)	N/A
AGMD S/N	N/A
Logger S/N	N/A
Gauge Factor (psi/Digit)	N/A
Thermal Factor (psi/°C)	N/A
R_0 ($F^2 \times 10^{-3}$)	N/A
T_0 (°C)	N/A

Co-ordinates:

Easting	(m)	834923.03
Northing	(m)	815277.11

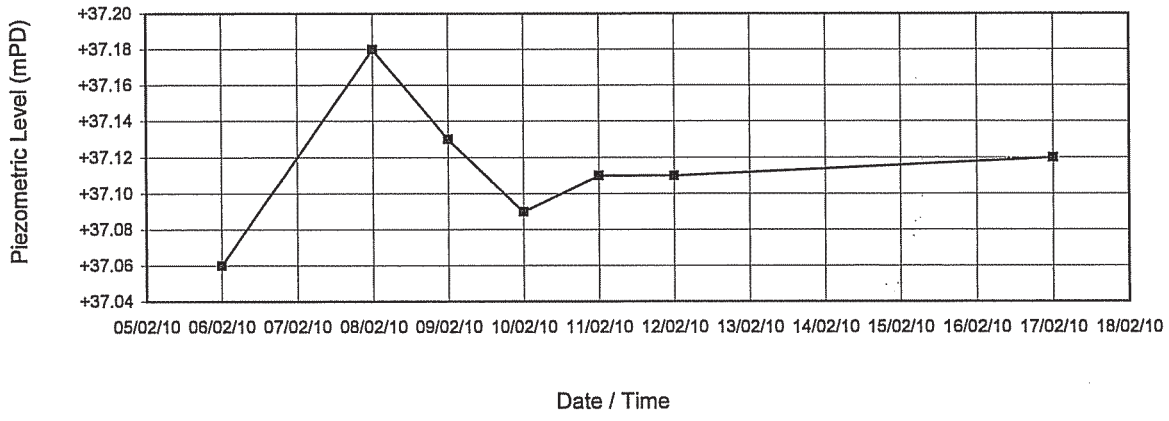
Season:

Wet	1 Apr to 31 Oct
Dry	1 Nov to 31 Mar

Standpipe:

Top Level (mPD)	+43.09
Installed Tip Depth from Top Level (m)	10.00
Tip Level (mPD)	+33.09

Contractor: Fugro Geotechnical Services Ltd. Logged By: K.C. Ng Checked By : A.B-Hollinshead



(Automatic Groundwater Monitoring Device)					(Piezometer/Standpipe)			
Date / Time dd/mm/yy hh:mm	R_1 (Hz)	Temp (°C)	Pressure (mH_2O) Above	Piezometric Level (mPD)	Date Time dd/mm/yy hh:mm	Manual Dip (m below top)	Piezometric Level (mPD)	Remark
					06/02/10 09:10	6.03	+37.06	
					08/02/10 09:10	5.91	+37.18	
					09/02/10 09:20	5.96	+37.13	
					10/02/10 09:40	6.00	+37.09	
					11/02/10 09:30	5.98	+37.11	
					12/02/10 09:20	5.98	+37.11	
					17/02/10 09:20	5.97	+37.12	

* AGMD = Automatic groundwater monitoring device

FUGRO GEOTECHNICAL SERVICES LTD

Groundwater Level Record Sheet

Contract No:	912	Works Order No :	NIL
Project :	Ground Investigation for South Island Line (East)		

Drillhole No.	912/SIL/D286
Instrument No.	Piezometer
Installation Date	04/02/2010
AGMD Level (mPD)	N/A
AGMD S/N	N/A
Logger S/N	N/A
Gauge Factor (psi/Digit)	N/A
Thermal Factor (psi/°C)	N/A
R_0 ($F^2 \times 10^{-3}$)	N/A
T_0 (°C)	N/A

Co-ordinates:

Easting	(m)	834923.03
Northing	(m)	815277.11

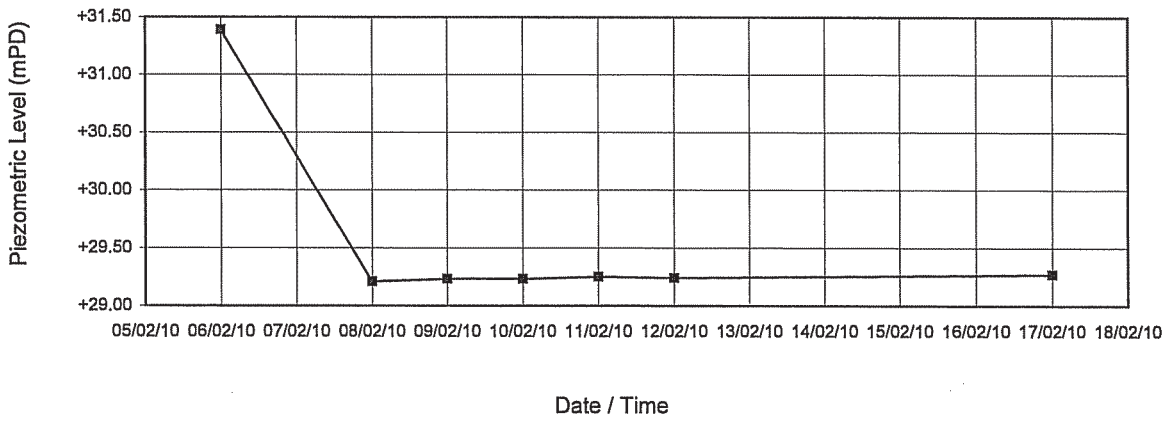
Season:

Wet	1 Apr to 31 Oct
Dry	1 Nov to 31 Mar

Piezometer:

Top Level (mPD)	+43.09
Installed Tip Depth from Top Level (m)	25.50
Tip Level (mPD)	+17.59

Contractor: Fugro Geotechnical Services Ltd. Logged By: K.C. Ng Checked By : A.B-Hollinshead



(Automatic Groundwater Monitoring Device)					(Piezometer/Standpipe)			
Date / Time dd/mm/yy hh:mm	R_1 (Hz)	Temp (°C)	Pressure (mH_2O) Above	Piezometric Level (mPD)	Date Time dd/mm/yy hh:mm	Manual Dip (m below top)	Piezometric Level (mPD)	Remark
					06/02/10 09:10	11.70	+31.39	
					08/02/10 09:10	13.88	+29.21	
					09/02/10 09:20	13.86	+29.23	
					10/02/10 09:40	13.86	+29.23	
					11/02/10 09:30	13.84	+29.25	
					12/02/10 09:20	13.85	+29.24	
					17/02/10 09:20	13.82	+29.27	

* AGMD = Automatic groundwater monitoring device

MATCH LINE
FOR CONTINUATION
SEE DWG 912/Z/000/MTR/C05/203

834600E
834800E
835000E
815200N
815000N

912/SIL/D207(P)
912/SIL/IH02
912/SIL/D286
912/SIL/IH01
912/SIL/D208
912/SIL/D209(P)
912/SIL/D209A

MATCH LINE
FOR CONTINUATION
SEE DWG 912/Z/000/MTR/C05/205

LEGEND

- MTR PROTECTION ZONE
- 912/SIL/D211 — AS-BUILT BOREHOLES
- 912/SIL/D215 — AS-BUILT INCLINED BOREHOLES
- 912/SIL/TP201 — AS-BUILT TRIAL PITS
- 912/SIL/ETP290 — AS-BUILT ENVIRONMENTAL TRIAL PITS
- 912/SIL/IH01 — AS-BUILT CORE HOLES
- 912/SIL/IH05 — AS-BUILT VERTICAL CORE HOLES
- 912/SIL/D203 — BOREHOLES DELETED
- 912/SIL/TP206 — TRIAL PITS DELETED
- 912/SIL/EDH70 — AS-BUILT ENVIRONMENTAL BOREHOLES DELETED
- 912/SIL/U-TP07 — TRIAL TRENCH DELETED

AS-BUILT CO-ORDINATES FOR BOREHOLES, TRIAL PITS AND TRIAL TRENCHES

NO.	EASTING	NORTHING
~~912/SIL/D207(P)~~	DELETED	
~~912/SIL/D208~~	DELETED	
912/SIL/D209A(P)	E 834887.09	N 814896.04
~~912/SIL/D209(P)~~	DELETED	
912/SIL/D286	E 834923.03	N 815277.11
912/SIL/IH01	E 834948.59	N 815287.81
912/SIL/IH02	E 834948.58	N 815287.80

Registered Geotechnical Engineer

HUI TUNG MAN

REV	DESCRIPTION	BY	DATE	APPROVED
A	AS-BUILT RECORD FOR BD SUBMISSION	YCC	19JAN11	AMG

DRAWN	A017
DESIGNED	PFU
CHECKED	TMH
APPROVED	AMG
DATE	30/AUG/2010

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MTR

SOUTH ISLAND LINE (EAST)

ORIGINATOR
PROJECTS DIVISION | CIVIL & PLANNING DEPARTMENT

CADD REF. 912_Z_000_MTR_C05_204A.DGN

TITLE
CONTRACT 912
GROUND INVESTIGATION (STAGE II)
AS-BUILT BOREHOLES AND TRIAL PITS / TRENCHES LOCATION PLAN (NON-SCHEDULED AREA)
(SHEET 2 OF 18)

SCALE 1 : 2000 @ A3
DRAWING NO. 912/Z/000/MTR/C05/204
REV. A

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PLOT DRV:
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19/01/11 12:55:30

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號：
OUR REF 本署檔號： **BD 3/7001/08**
FAX 圖文傳真： **2973 0561**
TEL 電話： **2626 1577**
www.bd.gov.hk

Mr. HUI Tung-man
MTR Corporation Limited
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Hung Hom, Kowloon.

21 March 2011

Dear Sir,

South Island Line (East)

I acknowledge receipt of your letter/Form BA 14 dated **9 February 2011** and received on **18 February 2011** in respect of the Ground Investigation Field Works – (Portion of Stage II) for the above together with the Ground Investigation Field Works Report and as-built record plans, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Civil Engineering Department, MTRCL
MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

AP - Mr. YEUNG Sze-wai, Wilfred
Architect Department,
8/F Citylink Plaza, Shatin, N.T.

PE-CIVIL & PLANNING DEPT.					
CIVIL ENGINEERING SECTION					
SP# SIL(E)-COR-BD-GEO-000022					
Doc Classification: UC ☐ /R ☐ /C ☐ /S ☐			File No.		
Rec'd 29 MAR 2011					Encl ☐
Name	Info.	Action	Name	Info.	Action
G S Harris			Sam Choy		
C K Ho			Corey Ho		
Edward Ngai			C H Tse		
Linda Yeung			Charles Pang		
Evan Tsui					
Jack Lai					
Raymond Yu					

* delete as appropriate

SE-SL1 (07/2002)

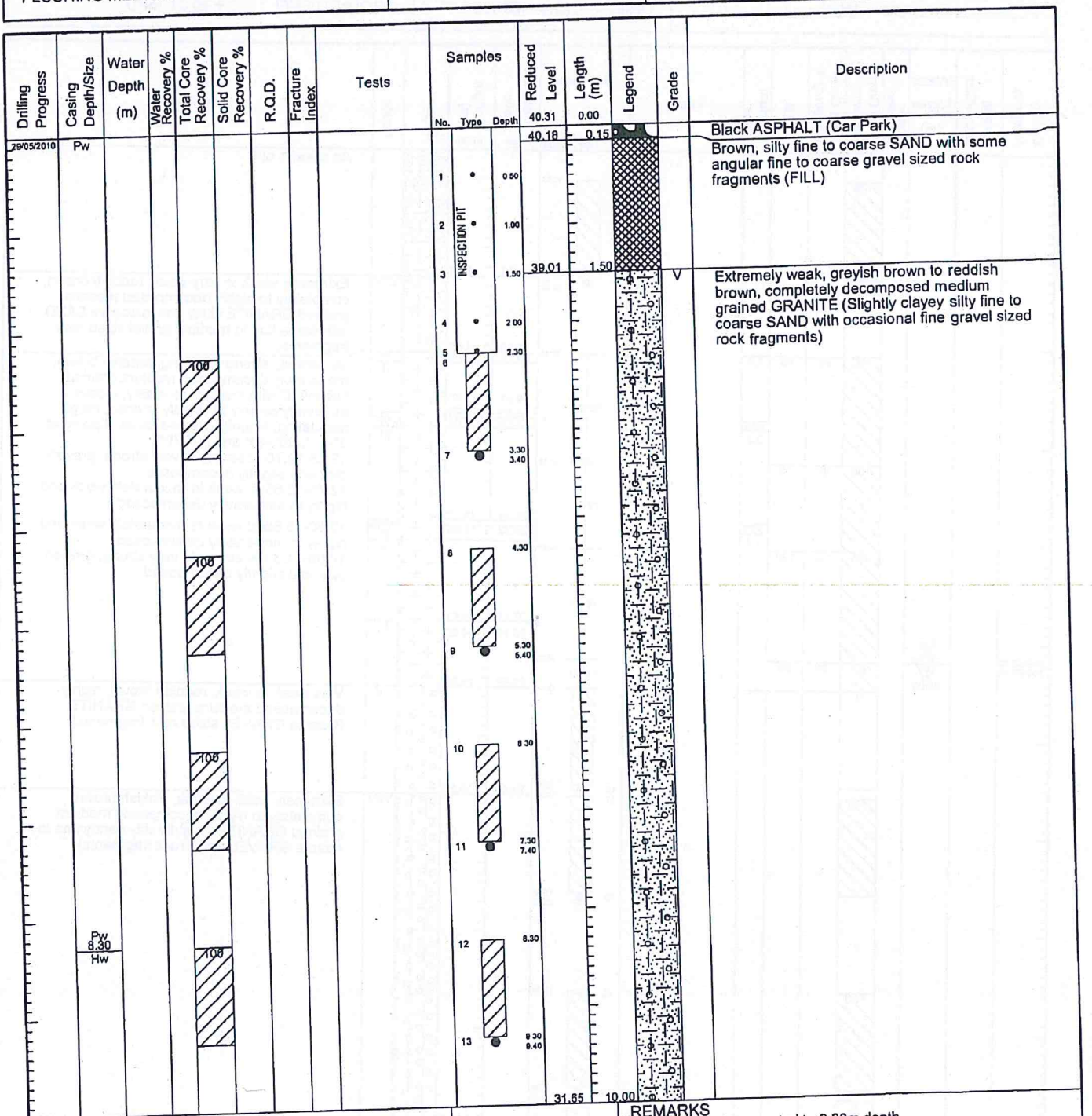
DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/IDH152**

SHEET 1 of 9

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836849.53** N **818933.35**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **29/05/2010** to **07/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **-60°/033.1°**	GROUND LEVEL : **+ 40.31 mPD**



- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED C.M.Ting

DATE 07/06/2010

CHECKED C.M.Yee

DATE 11/06/2010

REMARKS
1. Inspection pit excavated to 2.30m depth.
2. Televiewer test carried out at 20.54-86.62m depth.

DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/IDH152**

SHEET **2** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836849.53** N **818933.35**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **29/05/2010** to **07/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **-60°/033.1°**	GROUND LEVEL : **+ 40.31 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 31.65	Length (m) 10.00	Legend	Grade	Description
														As sheet 1 of 9
				100					14 10.30					
									15 11.30 11.40	30.52	11.30		V/IV	Extremely weak to very weak, reddish brown, completely to highly decomposed medium grained GRANITE (Silty fine to coarse SAND with some fine to medium gravel sized rock fragments)
				100	95	88	1.5		12.08	29.85 29.76	12.08 12.18		III	Moderately strong to strong, reddish brown, moderately decomposed medium grained GRANITE with medium to widely, locally extremely closely to closely spaced, rough undulating, limonite stained joints, dipping at 0°-10°, 30°-40° and 60°-70°
							≥20 3.2		T2101	29.31	12.70			12.18-12.70m: strong to very strong, greyish pink and slightly decomposed
				100	96	75			13.19	29.27 29.18	12.75 12.85		III/II	12.75-12.85m: weak to moderately weak and highly to moderately decomposed
							≥20 1.3		T2101	28.36	13.80			13.80-13.85m: weak to moderately weak and highly to moderately decomposed
				100	100	100			14.07	28.32	13.85		IV/III	14.00-14.83m: strong to very strong, greyish pink and slightly decomposed
									T2101	27.47	14.83			
29/05/2010 31/05/2010		Dry at 18:00 Dry at 08:00		83	80	80			15.20	28.19	14.00		III	
				0					T2101 15.50	26.89	15.50			
									16 16.50 16.60	25.93	16.60		IV	Very weak to weak, reddish brown, highly decomposed medium grained GRANITE (Coarse GRAVEL sized rock fragments)
				100					17				V/IV	Extremely weak to weak, pinkish brown, completely to highly decomposed medium grained GRANITE (Slightly silty sandy fine to coarse GRAVEL sized rock fragments)
									18 17.60 17.70					
				100					18.60					
									19					
				0					20 19.60 19.70	22.99	20.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **07/06/2010**

CHECKED **C.M.Yee**

DATE **11/06/2010**

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/IDH152**

SHEET **3** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836849.53** N **818933.35**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **29/05/2010** to **07/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **-60°/033.1°**	GROUND LEVEL : **+ 40.31 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	Length (m)	Legend	Grade	Description
												22.99	20.00			
	Hw 20.43															As sheet 2 of 9
				100	92	83	3.3		21		20.33	22.62	20.43		IV	
											20.43	22.56	20.50			
											20.54				II	Strong to very strong, greyish pink, spotted black, slightly decomposed medium grained GRANITE with closely to widely, locally very closely spaced, rough planar and undulating, limonite and manganese oxide stained, kaolin coated joints
										T2101						
				100	100	100					21.30					20.43-20.50m: weak to moderately weak, brown and highly decomposed
							13.3			T2101						
							2.0									
				100	88	61					21.98					
										T2101						
												20.65	22.70			
							9.3								III	22.70-23.50m: moderately strong, brown and moderately decomposed
				100	94	86					23.20					
										T2101						
							0.5					19.96	23.50		II	
1/05/2010		15.90m at 18:00														
01/06/2010		16.10m at 08:00		100	100	100				T2101	23.86					
				100	100	100					24.49					
										T2101						
				100	100	100					25.09					
										T2101						
				100	100	100					26.06					
										T2101						
				100	100	78					26.67					
							>20			T2101						
							5.7									
							>20									
							8.6									
				100	98	53	>20				28.01	16.02	28.05		III	Moderately strong to strong, brown, moderately decomposed medium grained GRANITE with very closely to medium spaced, rough planar and undulating, limonite stained, kaolin coated joints
							5.2			T2101						
											29.10					
				100	83	56				T2101						
							20.0									
							7.7					14.33	30.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **07/06/2010**

CHECKED **C.M.Yee**

DATE **11/06/2010**

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/IDH152**

SHEET **4** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**	E **836849.53** N **818933.35**	DATE from **29/05/2010** to **07/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **-60°/033.1°**	GROUND LEVEL : **+ 40.31 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	Length (m)	Legend	Grade	Description
										14.33	30.00			As sheet 3 of 9
				100	91	81	>20 2.5		T2101 30.28	13.81	30.60		II	Strong, pink spotted grey and black, slightly decomposed medium grained GRANITE with very closely to widely, locally extremely closely spaced, rough planar and undulating, limonite stained, kaolin coated joints
							5.1		T2101 31.77					
				100	87	52			T2101 33.10					
				100	87	82	>20 4.3		T2101 34.59					
				100	88	88	>20 1.8		T2101 36.11					
				100	100	100			T2101 37.33					
01/06/2010		18.30m at 18:00												
02/06/2010		21.35m at 08:00		100	100	100			T2101 38.35					
				100	100	90			T2101 39.79					
				100	100	100	>20 4.4			5.67	40.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **07/06/2010**

CHECKED **C.M.Yee**

DATE **11/06/2010**

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/IDH152**

SHEET **5** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836849.53** N **818933.35**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **29/05/2010** to **07/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **-60°/033.1°**	GROUND LEVEL : **+ 40.31 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	Length (m)	Legend	Grade	Description
										5.67	40.00			As sheet 4 of 8
							1.8		T2101 41.27					
				100	100	100								
							6.7		T2101 42.63					
				100	100	100	1.1							
							8.6		T2101 43.98					
				100	100	90	1.5							
									T2101 45.33	1.08	45.30		III	Moderately strong to strong, reddish brown, striped grey, sheared and moderately decomposed medium grained GRANITE with closely to widely spaced, rough planar and undulating, slickensided limonite stained joints
				100	100	100	>20 4.7							
									T2101 46.73					
				100	100	100				-0.48	47.10		II	47.10-48.36m: strong, pinkish and slightly decomposed
									T2101 48.23					
				100	97	87				-1.57	48.36		III	48.36-48.60m: pegmatite vein
							>20 5.0			-1.78	48.60			
									T2101	-2.34	49.25		II	Strong to very strong, greyish pink, spotted black, slightly decomposed medium grained GRANITE with medium to widely spaced, rough undulating, limonite stained joints
							1.0							
02/06/2010 03/06/2010		20.80m at 18:00 17.80m at 08:00		100	92	92			T2101 49.72	-2.99	50.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **07/06/2010**

CHECKED **C.M.Yee**

DATE **11/06/2010**

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/IDH152**

SHEET **6** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836849.53** N **818933.35**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **29/05/2010** to **07/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **-60°/033.1°**	GROUND LEVEL : **+ 40.31 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 -2.99	Length (m) 50.00	Legend	Grade	Description
														As sheet 5 of 9
				100	100	100	5.0		T2101 51.12	-3.73	50.85		II	Strong to very strong, pinkish grey and greyish pink, spotted black, slightly decomposed fine grained GRANITE with some mega-minerals with closely to widely, locally very closely spaced, rough planar and undulating, limonite stained, kaolin coated joints
				100	100	93	>20		T2101 52.62					
							1.7							
							7.5		T2101 53.98					
				100	97	32	>20							
							9.4		T2101 55.48					
				100	92	92	2.2							
							>20		T2101 56.98					
							1.1							
				100	100	89			T2101 58.36	-9.70	57.75		II	Strong to very strong, greyish pink, spotted black, slightly decomposed medium grained GRANITE with closely to widely, locally extremely closely to very closely spaced, rough planar and undulating, limonite stained joints
							11.4							
				100	100	100	3.3		T2101 59.78					
							1.1							
				100	100	100					60.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **07/06/2010**

CHECKED **C.M.Yee**

DATE **11/06/2010**

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/IDH152**

SHEET 7 of 9

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836849.53** N **818933.35**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **29/05/2010** to **07/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **-60°/033.1°**	GROUND LEVEL : **+ 40.31 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	Length (m)	Legend	Grade	Description
										-11.65	60.00			
				100	100	77	>20		T2101 60.45					
							2.6		T2101 61.45					
03/06/2010		20.50m at 18:00		100	78	78			T2101 62.38					
04/06/2010		21.35m at 08:00		100	100	98				-13.89	62.58			62.58-62.88m: fine grained granite
									T2101 63.49	-14.15	62.88			
				100	92	90			T2101 64.74					
				100	100	95	>20		T2101 66.05					
							0.9							
				100	100	100			T2101 67.00	-17.37	66.60		III	Moderately weak to moderately strong, brown, mottled grey, sheared and altered, moderately decomposed medium grained GRANITE with closely to widely spaced, rough planar and undulating, slickensided limonite and manganese oxide stained, chlorite coated joints (Fault zone) 66.60-67.95m: foliated - a fault 66.60-67.50m: fine grained granite
				100	84	73	4.4		T2101 68.14	-18.15	67.50			
				100	100	67	>20		T2101 69.34	-18.54	67.95			
							2.2			-18.80	68.26		II	Strong to very strong, greyish grey, spotted black, slightly decomposed medium grained GRANITE with closely to widely, locally very closely spaced, rough planar and undulating, limonite stained joints
							16.7							
							4.1							
				100	90	90			T2101	-20.31	70.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED C.M.Ting

DATE 07/06/2010

CHECKED C.M.Yee

DATE 11/06/2010

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/IDH152**

SHEET **8** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836849.53** N **818933.35**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **29/05/2010** to **07/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **-60°/033.1°**	GROUND LEVEL : **+ 40.31 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	Length (m)	Legend	Grade	Description
										-20.31	70.00			As sheet 7 of 9
04/06/2010		21.00m at 16:00		100	99	99	20.0 9.3		T2101 70.79					
05/06/2010		21.35m at 08:00		100	99	50			T2101 72.13					
				100	83	83	>20 2.1		T2101 73.63	-22.82	72.90		III	Moderately weak to moderately strong, reddish brown, mottled white, moderately decomposed medium grained GRANITE with very closely to medium spaced, rough planar and undulating, limonite, kaolin coated joints
										-23.04	73.15		IV/III	73.15-73.95m: weak to moderately weak, sheared and highly to moderately decomposed
										-23.73	73.95		II	Strong to very strong, greyish pink, spotted black, slightly decomposed medium grained GRANITE with medium to widely, locally extremely closely to very closely spaced, rough planar and undulating, limonite stained, kaolin coated joints
				100	97	80	>20 2.2		T2101 75.13					
							>20 5.0		T2101 76.60					
				100	94	86			T2101 78.00					
				100	98	78	1.3		T2101 79.28					
				100	97	57	3.1 >20 5.0		T2101	-28.97	80.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **07/06/2010**

CHECKED **C.M.Yee**

DATE **11/06/2010**

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/IDH152**

SHEET **9** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836849.53** N **818933.35**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **29/05/2010** to **07/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **-60°/033.1°**	GROUND LEVEL : **+ 40.31 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	Length (m)	Legend	Grade	Description
							>20 1.8			-28.97	80.00			As sheet 8 of 9
		21.20m at 18:00 05/06/2010					>20 3.2		T2101 60.78					
		21.35m at 08:00 07/06/2010		100	100	96	>20 1.3		T2101 62.13					
				100	100	96	4.6		T2101 63.53					
							>20 2.1		T2101 64.37					
				100	100	97	>20 1.5		T2101 65.57					
				100	100	92	>20 3.4		T2101 66.62					
		20.50m at 18:00 07/06/2010		100	85	78			67.01	-35.04	87.01			End of investigation hole at 87.01m
											90.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **07/06/2010**

CHECKED **C.M.Yee**

DATE **11/06/2010**

REMARKS


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH152
BOX NO. 1 OF 20
DEPTH 0.00 mTO 14.84 m
DATE:5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
0.00
12.08
13.19
14.07
14.84


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH 152
BOX NO. 2 OF 20
DEPTH(14.84) mTO 23.20 m
DATE:5 - 7 - 10
0.0m
0.5m
1.0m
(14.84)
15.20
15.50
20.43
21.30 M
21.98
23.20


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH 152
BOX NO · 3 OF 20
DEPTH 23.20 mTO (27.03) m
DATE:5 – 7 – 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
23.20
23.86
24.49
25.09
26.06
26.67
(27.03)

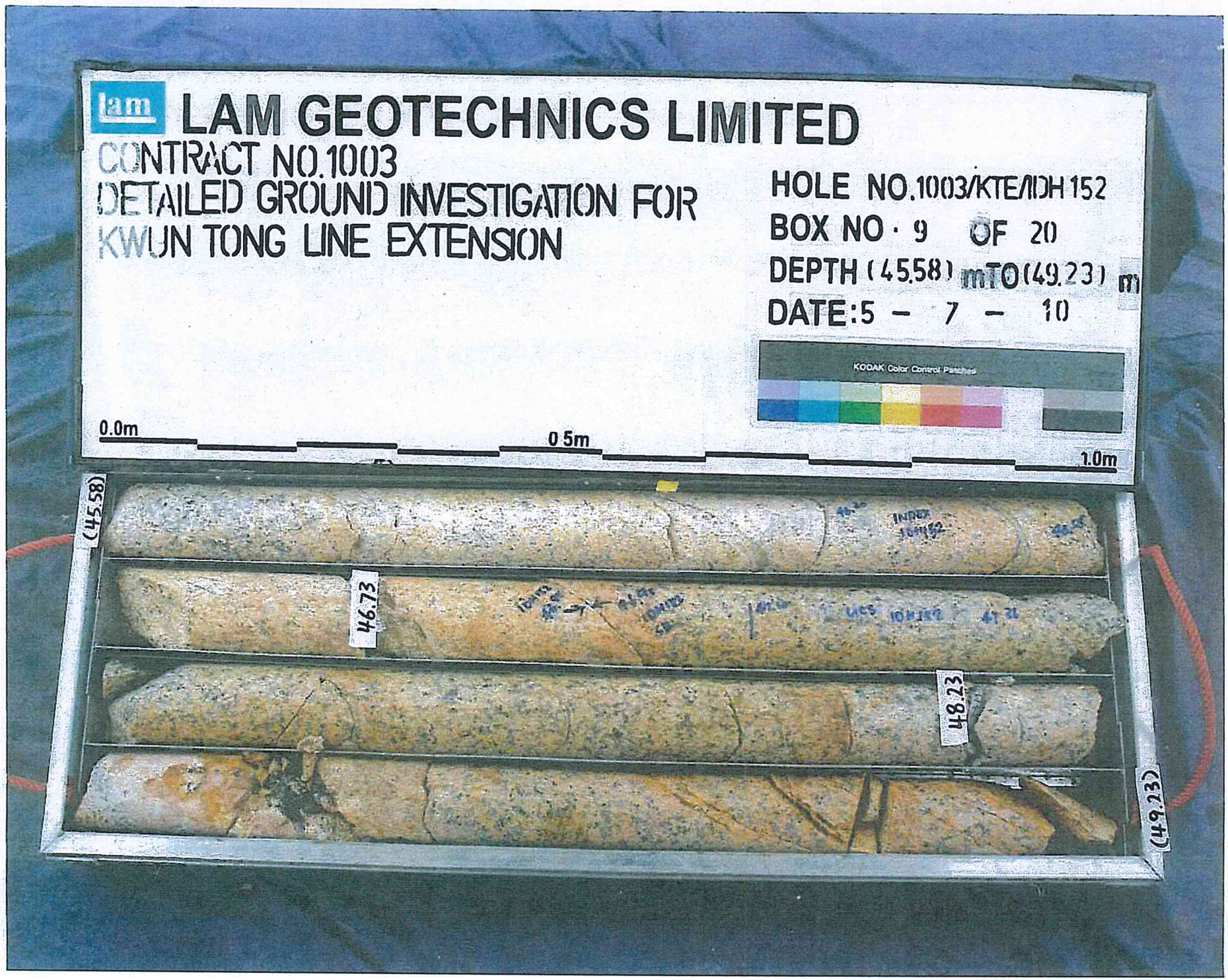

LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH152
BOX NO. 4 OF 20
DEPTH (27.03) mTO (30.54) m
DATE: 5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(27.03)
28.01
29.10
30.28
(30.54)

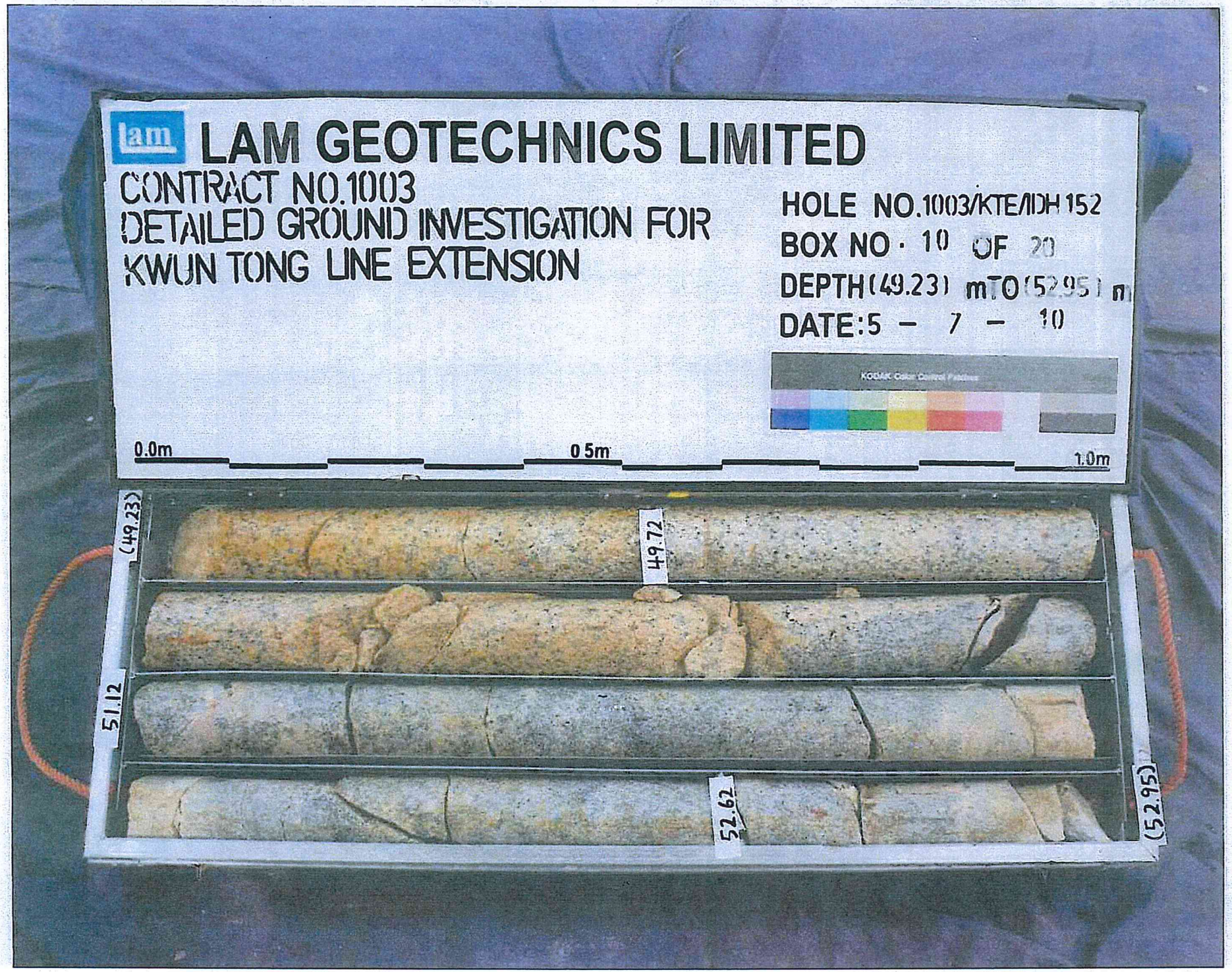

LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH152
BOX NO. 5 OF 20
DEPTH(30.54) mTO(34.24) m
DATE:5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(30.54)
31.77
33.10
(34.24)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH152
BOX NO. 6 OF 20
DEPTH (34.24) mTO (38.03) m
DATE:5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(34.24)
34.59
36.11
37.33
(38.03)


lam
LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH152
BOX NO. 7 OF 20
DEPTH (38.03) mTO 41.73
DATE:5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(38.03)
38.35
39.79
41.27
41.73


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH 152
BOX NO. 8 OF 20
DEPTH (41.73) mTO (45.58) m
DATE: 5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(41.73)
42.63
42.98
45.33
(45.58)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH152
BOX NO. 9 OF 20
DEPTH (45.58) mTO (49.23) m
DATE:5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(45.58)
46.73
48.23
(49.23)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH 152
BOX NO. 10 OF 20
DEPTH (49.23) mTO (52.95) m
DATE: 5 - 7 - 10
0.0m
0.5m
1.0m
(49.23)
49.72
51.12
52.62
(52.95)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH 152
BOX NO · 11 OF 20
DEPTH(52.95) mTO(56.63) m
DATE:5 – 7 – 10
0.0m
0.5m
1.0m
(52.95)
53.98
54.48
(56.63)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH 152
BOX NO · 12 OF 21
DEPTH(56.63) mTO 60.45 m
DATE:5 - 7 - 10
0.0m
0.5m
1.0m
(56.63)
56.98
58.36
59.76
60.45


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH 152
BOX NO. 13 OF 20
DEPTH 60.45 mTO(64.25) m
DATE:5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
60.45
61.45
62.38
63.49
(64.25)

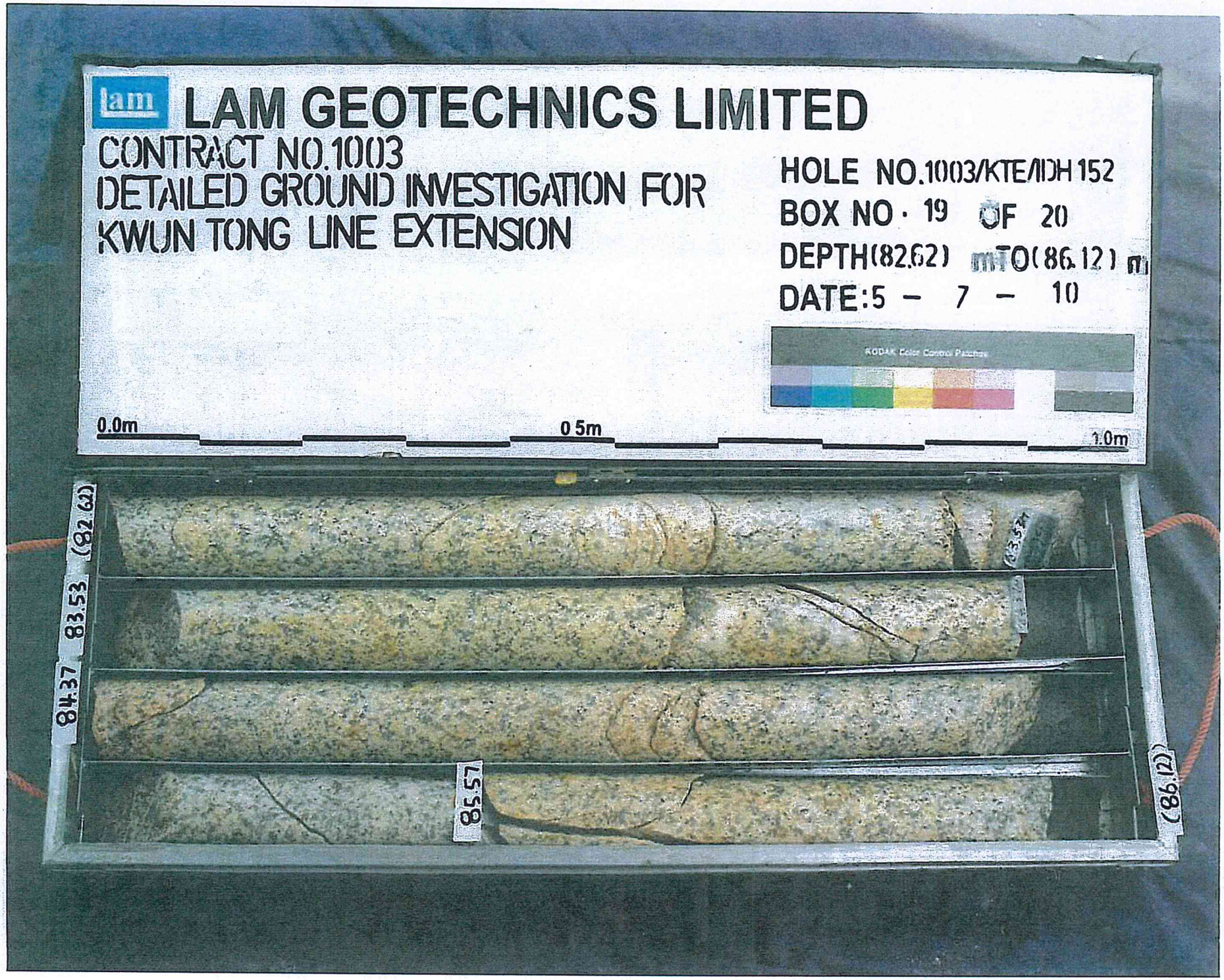

LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH 152
BOX NO · 14 OF 20
DEPTH (64.25) mTO (67.95) m
DATE:5 – 7 – 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(64.25)
64.49
66.05
67.00
(67.95)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH152
BOX NO. 15 OF 20
DEPTH(67.95) mTO(71.76) m
DATE:5 - 7 - 10
0.0m
0.5m
1.0m
(67.95)
68.14
69.34
70.79
(71.76)

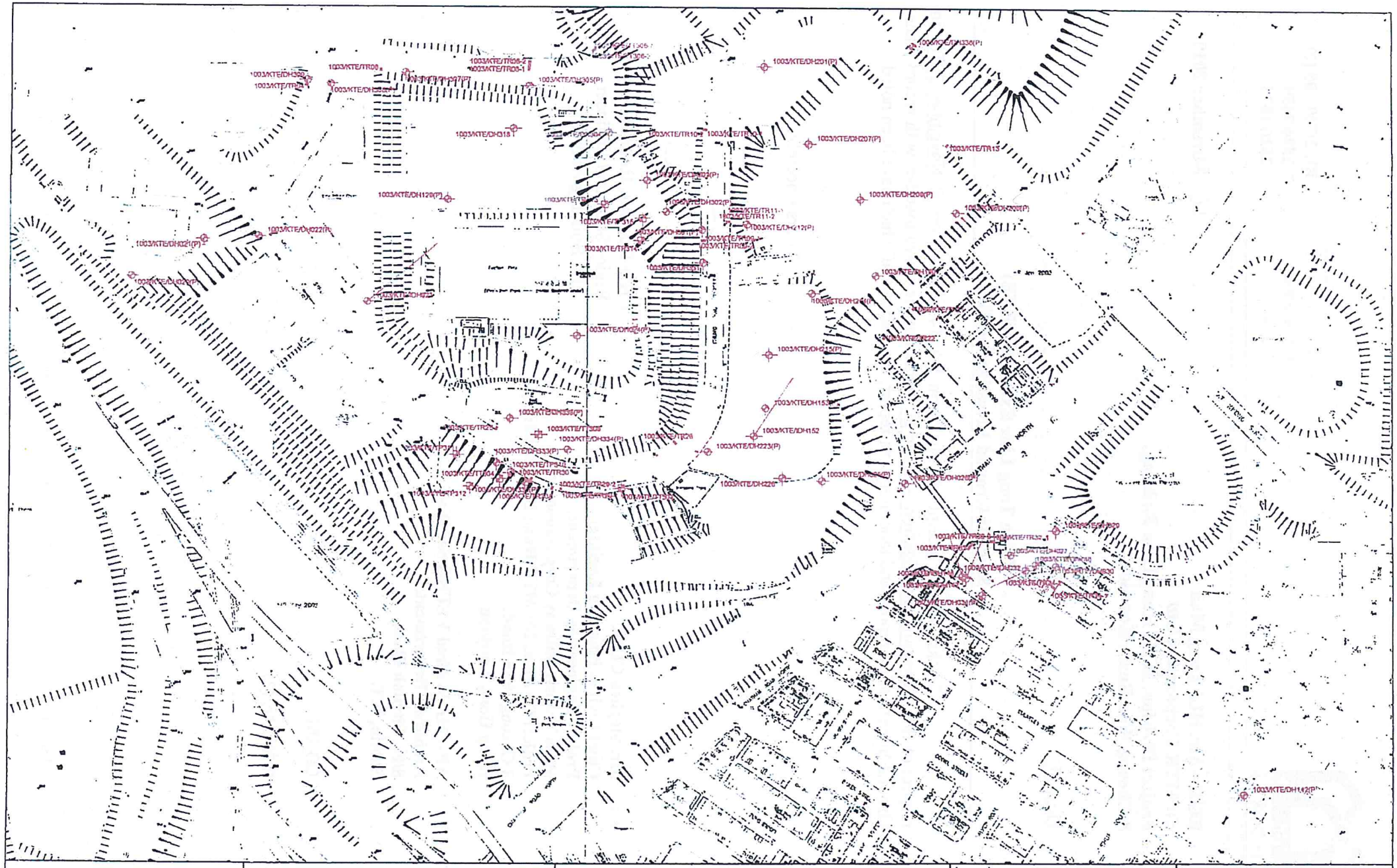

LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH152
BOX NO. 16 OF 20
DEPTH(71.76) mTO(75.21) m
DATE:5 - 7 - 10
0.0m
0.5m
1.0m
(71.76)
72.13
73.63
75.13
(75.21)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH152
BOX NO. 17 OF 20
DEPTH(75.21) mTO(79.00) m
DATE:5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(75.21)
76.60
78.00
(79.00)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH 152
BOX NO. 18 OF 20
DEPTH(79.00) mTO (82.62) m
DATE:5 - 7 - 10
0.0m
0.5m
1.0m
(79.00)
79.28
80.18
82.13
(82.62)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH152
BOX NO. 19 OF 20
DEPTH(82.62) mTO(86.12) m
DATE:5 - 7 - 10
0.0m
0.5m
1.0m
(82.62)
83.53
84.37
85.57
(86.12)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/IDH 152
BOX NO. 20 OF 20
DEPTH (86.12) mTO 87.01 m
DATE: 5 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(86.12)
87.01
END



Lam Geotechnics Limited
Ground Investigation Professionals

Contract :
Contract 1003
Detailed Ground Investigation for
Kwun Tong Line Extension

Title :
As-Built Location Plan for
Ground Investigation Stations

Legend:
- Drillhole
- Trial Pit
- Trial Trench

Scale
1:2000

Sheet No.:
Sheet 3 of 4

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號：
OUR REF 本署檔號： BD 3/7002/08 (2)
FAX 圖文傳真： 2526 7430
TEL 電話： 2626 1575
www.bd.gov.hk

RGE – Mr. HUI Tung Man
c/o MTR Corporation Ltd.
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

16 **November 2010**

Dear Sir,

Kwun Tong Line Extension (KTE)
Stage II Ground Investigation Works

I acknowledge receipt of your Form BA 14 received on 2 November 2010 in respect of the **Ground Investigation – Stage II** works at the above together with record plans, Ground Investigation report, and laboratory test report, the contents of which have been noted.

Yours sincerely,

(HO Hon-kit, Humphrey)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Project Engineering Department,
Mass Transit Railway Corporation Ltd.
Project Division, 1/F MTR Hung Hom Building,
8 Cheong Wan Road,
Hung Hom, Kowloon

AP – Mr. Wilfred YEUNG Sze Wai
Architects Department,
8/F., Citylink Plaza,
Shatin, N.T.

CO/SM

2/7002/08 (2)

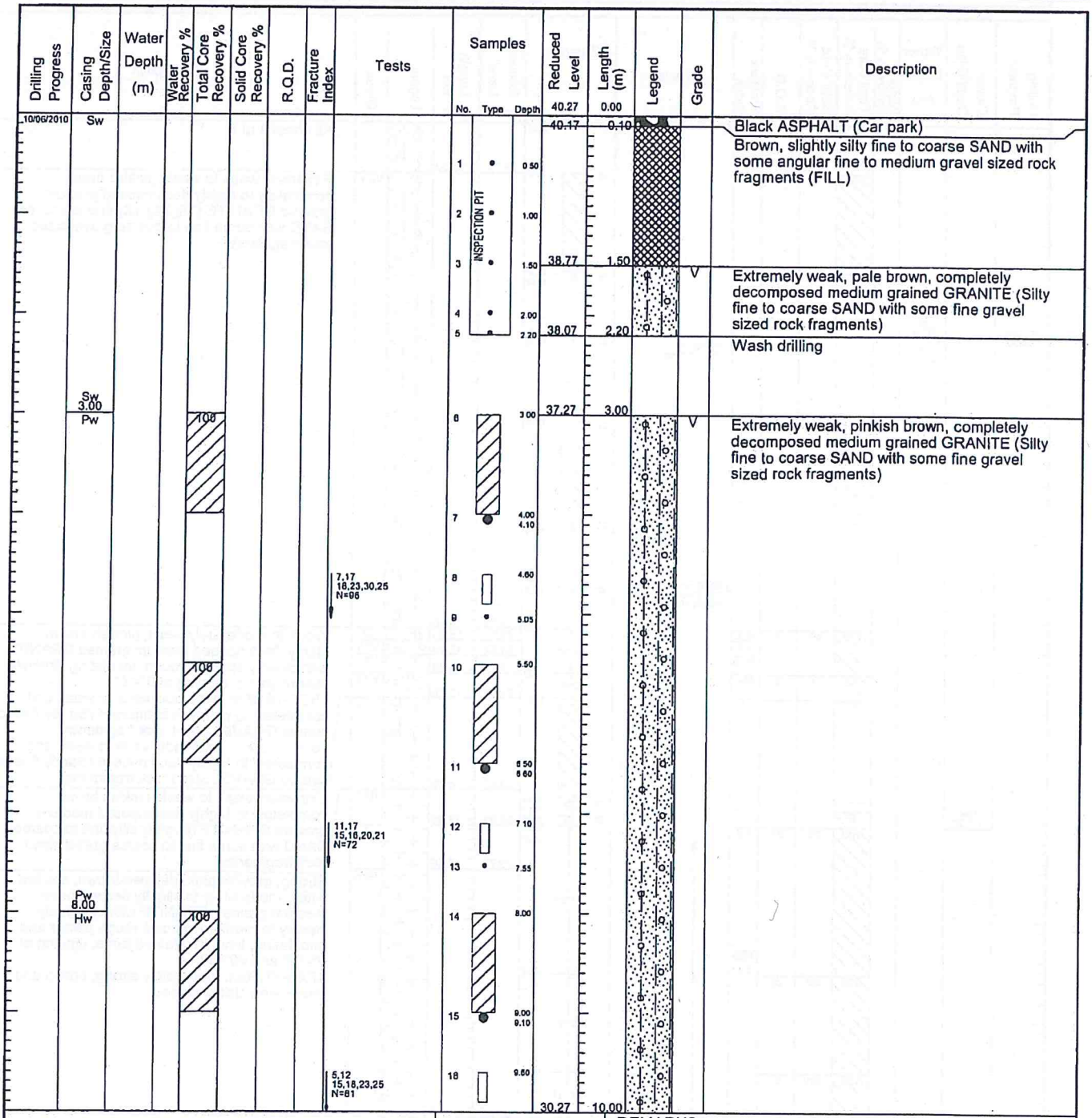
DRILLHOLE RECORD

DRILLHOLE No **1003/KTE/DH153(P)**

SHEET 1 of 9

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**	E **836856.30** N **818950.02**	DATE from **10/06/2010** to **22/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 40.27 mPD**



- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **19/06/2010**

CHECKED **C.M.Yee**

DATE **23/06/2010**

REMARKS
1. Inspection pit excavated to 2.20m depth.
2. Televiewer test carried out at 17.20-75.42m depth.
3. Standpipe intalled to 16.50m depth.
4. Water sample taken at 81.01m depth.

DRILLHOLE RECORD

DRILLHOLE No 1003/KTE/DH153(P)

SHEET 2 of 9

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836856.30** N **818950.02**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **10/06/2010** to **22/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 40.27 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	Length (m)	Legend	Grade	Description
										30.27	10.00			As sheet 1 of 8
				100					18 10.50	29.77	10.50		V/IV	Extremely weak to weak, pinkish brown, completely to highly decomposed medium grained GRANITE (Slightly silty fine to coarse SAND with some fine to coarse gravel sized rock fragments)
10/06/2010		10.00m at 18:00							19 11.50 11.50					
11/06/2010		10.10m at 08:00						50/40mm 100/80mm 100bls/80mm	20 12.10 12.20					
				100					21 13.00					
									22 14.00 14.10					
								50/60mm 100/40mm 100bls/40mm	23 14.60 14.70					
									15.08	25.19	15.08			
				100	40	0	8.3			25.07	15.20		IV	Weak to moderately weak, pinkish brown, highly decomposed medium grained GRANITE with closely spaced, rough undulating, limonite stained joints, dipping at 0°-10°
							NA		T2101	24.92	15.35		V/IV	15.20-15.35m: extremely weak to weak and completely to highly decomposed (Sandy fine to coarse GRAVEL sized rock fragments)
							10.0		15.53	24.74	15.53		IV	15.53-15.78m: extremely weak to weak and completely to highly decomposed (Sandy fine to coarse GRAVEL sized rock fragments)
				72	0	0	NA		T2101				V/IV	
				0					15.80	24.49	15.78		V/IV	
									18.50	23.57	16.70		III/II	Extremely weak to weak, pinkish brown, completely to highly decomposed medium grained GRANITE (Slightly silty fine to coarse SAND with some fine to coarse gravel sized rock fragments)
	Hw 17.06			0					24 16.80 16.90 25 16.96 17.06	23.21	17.06		III	
				100	99	91	4.8		17.20	22.77	17.50		III/II	
									T2101					Strong, greyish pink, dappled brown, spotted white, moderately to slightly decomposed medium grained GRANITE with extremely closely to medium spaced, rough planar and undulating, limonite stained joints, dipping at 0°-10° and 40°-50°
							>20 5.8		18.55					17.06-17.50m: moderately strong, brown and moderately decomposed
				100	99	66			T2101					
									19.54					
				100	100	93			T2101					
							>20			20.27	20.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe.Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeabillty Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED C.M.Ting

DATE 19/06/2010

CHECKED C.M.Yee

DATE 23/06/2010

REMARKS

DRILLHOLE RECORD

DRILLHOLE No **1003/KTE/DH153(P)**

SHEET **3** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**	E **836856.30** N **818950.02**	DATE from **10/06/2010** to **22/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 40.27 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	Length (m)	Legend	Grade	Description
							3.8			20.27	20.00		II	Strong to very strong, greyish pink, slightly decomposed medium grained GRANITE with medium to widely spaced, rough planar and undulating, limonite stained joints, dipping at 10°-20° and 60°-70°
							1.5		T2101 21.04					
				100	100	97			T2101 22.17	18.17	22.10			
11/06/2010		15.00m at 18:00					>20						III/II	Moderately strong to strong, pinkish red, spotted black, mottled yellow, sheared moderately to slightly decomposed medium grained GRANITE with closely to medium, locally extremely closely to very closely spaced, rough planar and undulating, limonite stained, kaolin coated joints, dipping at 0°-10°, 30°-40° and 60°-70°
12/06/2010		15.10m at 08:00		100	93	87	6.2							
							>20		T2101 23.87					
							3.9							
				98	88	45			T2101 24.43					
							>20							
				98	84	38	5.0							
							>20		T2101 25.33					
							7.3							
				100	100	53								
							>20		T2101 26.43					
							4.0							
							>20							
							5.5							
				100	100	78								
							>20		T2101 27.82					
							5.0							
							>20							
							5.0							
				100	98	56								
							>20		T2101 28.96					
							7.8							
				100	89	38	>20							
							6.3		T2101 29.86					
				100	94	64	>20			10.27	30.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **19/06/2010**

CHECKED **C.M.Yee**

DATE **23/06/2010**

REMARKS

DRILLHOLE RECORD

DRILLHOLE No 1003/KTE/DH153(P)

SHEET 4 of 9

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836856.30** N **818950.02**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **10/06/2010** to **22/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 40.27 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	Length (m)	Legend	Grade	Description
							3.3			10.27	30.00			As sheet 3 of 8
							>20		T2101					
							10.0		31.08					
				100	85	58	>20							
							7.0		T2101					
							>20							
				100	100	88	2.7		32.57					
									T2101	6.97	33.30			
							>20						II	Strong to very strong, pinkish red and greyish pink, spotted black, slightly decomposed medium grained GRANITE with closely to widely, locally extremely closely to very closely spaced, rough planar and undulating, limonite stained, kaolin coated joints, dipping at 0°-10°, 40°-50° and 60°-70°
							4.5							
12/06/2010		15.50m at 16:00		100	95	81			33.79					
14/06/2010		15.80m at 06:00					>20							
							2.7		T2101					
										5.59	34.68			34.68-35.00m: pegmatite vein, dipping at 60°-70°
										5.37	34.90			34.90-35.05m: sheared a brecciated along joints, dipping at 30°-40°
										5.27	35.00			
							>20			5.22	35.05			
							6.7		35.27					
				100	100	74								
							>20			4.37	35.90			35.90-36.60m: with 2 nos. of pegmatite veins, dipping at 30°-40°
							2.9		T2101					
							>20							
							4.6			3.67	36.60			
				100	100	67			36.72					
							>20		T2101					
				100	100	79	6.3		37.14					
										2.91	37.36			37.36-37.45m: pegmatite vein, dipping at 50°-60°
										2.82	37.45			
							2.0		T2101	2.32	37.95			37.95-38.40m: fine to medium grained granite vein with some mega-minerals, dipping at 50°-60°
										1.87	38.40			
				100	100	100			38.58					
										1.49	38.78			38.78-40.00m: fine grained granite vein with some mega-minerals, dipping at 50°-60°
									T2101					
							10.0			0.27	40.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED C.M.Ting

DATE 19/06/2010

CHECKED C.M.Yee

DATE 23/06/2010

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. 1003/KTE/DH153(P)

SHEET 5 of 9

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836856.30** N **818950.02**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **10/06/2010** to **22/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 40.27 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	Length (m)	Legend	Grade	Description
				100	100	76	1.2			0.27	40.00			
									40.07					
									T2101					
							20.0			-0.60	40.87			40.87-42.55m: fine grained granite contact dipping at 50°-70°
		15.80m at 18:00					3.3							
14/06/2010 15/06/2010		15.75m at 08:00		100	90	63			41.36					
									T2101					
				100	100	100			42.34					
										-2.28	42.55			
										-2.53	42.80			42.80-43.62m: fine grained granite, contact dipping at 30°-40°
									T2101					
							2.1			-3.35	43.62			
				97	77	77			43.89					
									T2101					
							>20 0.7		44.43					
				100	100	100								
									T2101					
				100	100	100			45.96					
									T2101					
15/06/2010 17/06/2010		16.00m at 18:00 16.20m at 08:00		100	100	100			47.42					
									T2101					
				100	100	100			48.88					
		16.00m							T2101		50.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED C.M.Ting

DATE 19/06/2010

CHECKED C.M.Yee

DATE 23/06/2010

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. **1003/KTE/DH153(P)**

SHEET **6** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**	E **836856.30** N **818950.02**	DATE from **10/06/2010** to **22/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 40.27 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	Length (m)	Legend	Grade	Description
17/06/2010 18:00 – 18/06/2010 08:00		16.00m at 08:00		100	100	100	5.0		T2101 50.15	-9.73	50.00			
									T2101	-10.83	51.10			51.10-58.40m: slightly altered and with slickensided joints 51.15-51.65m: fine grained granite vein with some mega-minerals, dipping at 50°-60°
				100	94	87	>20 0.9		51.63	-10.88	51.15			
										-11.38	51.65			
									T2101	-11.78	52.05			52.05-53.60m: fine to medium grained granite with some mega-minerals, contact dipping at 50°-60°
				100	97	90	>20 5.2		53.07	-13.33	53.60			
									T2101					
				100	84	57			54.41	-14.40	54.67			54.67-58.95m: with subvertical to vertical joints
									T2101	-15.33	55.60			
				100	92	87	>20 1.0		55.81					55.60-57.45m: medium fine grained granite with some mega-minerals, contact dipping at 0°-10°
							>20 3.4		T2101					
				100	96	83			57.31	-17.18	57.45			
									T2101	-18.13	58.40			
				100	99	99	>20 0.4		58.75	-18.68	58.95			
									T2101		60.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **19/06/2010**

CHECKED **C.M.Yee**

DATE **23/06/2010**

REMARKS

DRILLHOLE RECORD

DRILLHOLE No.1003/KTE/DH153(P)

SHEET 7 of 9

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836856.30** N **818950.02**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **10/06/2010** to **22/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 40.27 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	Length (m)	Legend	Grade	Description
				100	100	96			T2101 60.25					
									T2101					
				100	100	100	>20 1.7		61.77	-21.93	62.20			62.20-63.50m: with subvertical to vertical joints
									T2101					
				100	100	100			63.30	-23.23	63.50			
									T2101					
				100	99	91			64.81	-24.96	65.23		III	65.23-66.30m: moderately strong to strong, brown and moderately decomposed
							>20 4.4		T2101	-25.80	66.07			
				100	100	100			66.33	-26.03	66.30		II	66.07-67.00m: with subvertical to vertical joints
									T2101	-26.73	67.00			
18/06/2010		16.50m at 18:00												
19/06/2010		17.40m at 08:00		100	93	87	>20 2.9		67.40					
									T2101					
										-28.38	68.65		III	Strong, pinkish red and reddish brown, moderately decomposed medium grained GRANITE with very closely to medium spaced, rough planar and undulating, limonite stained joints, dipping at 0°-10°, 30°-40° and 60°-70°
				100	80	51			68.90					
									T2101					
				100	100	95			T2101 69.84	-29.73	70.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
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- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED C.M.Ting

DATE 19/06/2010

CHECKED C.M.Yee

DATE 23/06/2010

REMARKS

DRILLHOLE RECORD

DRILLHOLE No **1003/KTE/DH153(P)**

SHEET **8** of **9**

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES E **836856.30** N **818950.02**	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**		DATE from **10/06/2010** to **22/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 40.27 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	Length (m)	Legend	Grade	Description
							7.8		T2101 70.96					As sheet 7 of 8
				99	99	68	2.0							
							>20 8.0		T2101 72.46	-31.73	72.00		III	Moderately weak to moderately strong, pale brown and reddish brown, sheared, moderately decomposed medium grained GRANITE with very closely to medium spaced, rough and smooth, planar and undulating limonite stained, kaolin coated joints, dipping at 10°-20°, 30°-40° and 60°-70°
				100	95	52	>20 6.2		T2101 73.96	-33.03	73.30			73.30-73.60m: with subvertical to vertical joints
										-33.33	73.60			
				99	41	41	NI		T2101 74.81	-33.81	74.08		IV	74.08-74.51m: weak to moderately weak and highly decomposed and fractured
							12.0			-34.24	74.51		III	
				100	100	100	1.3		T2101 75.42	-35.06	75.33			75.33-75.77m: fine grained granite with some mega-minerals, contact dipping at 40°-50°
19/06/2010		16.50m at 18:00							T2101 75.77	-35.50	75.77			
21/06/2010		17.20m at 08:00		100	95	90	>20 4.6		T2101 77.24					
				100	97	79			T2101 78.73					
				100	100	92	2.9							
							3.4		T2101 79.69					
21/06/2010		17.50m at 18:00												
22/06/2010		17.20m		100	98	34	>20		T2101		60.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
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- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **19/06/2010**

CHECKED **C.M.Yee**

DATE **23/06/2010**

REMARKS

DRILLHOLE RECORD

DRILLHOLE No. 1003/KTE/DH153(P)

SHEET 9 of 9

JOB TITLE **Detailed Ground Investigation for Kwun Tong Line Extension**

METHOD **IP+W+RC**	CO-ORDINATES	CONTRACT No. **1003**
MACHINE & No. **Edeco H40, D78**	E **836856.30** N **818950.02**	DATE from **10/06/2010** to **22/06/2010**
FLUSHING MEDIUM **Water**	ORIENTATION **Vertical**	GROUND LEVEL : **+ 40.27 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	Length (m)	Legend	Grade	Description
		at 08:00					10.0			-39.73	80.00			
							>20		T2101	-39.83	80.10		III/II	80.10-81.01m: strong, pinkish red, spotted yellow and moderately to slightly decomposed
22/06/2010		17.30m at 12:00					6.5		81.01	-40.74	81.01			End of investigation hole at 81.01m
											90.00			

- Small Disturbed Sample
- Water Sample
- SPT Liner Sample
- U76 Undisturbed Sample
- U100 Undisturbed Sample
- Mazier Sample
- Piston Sample
- Packer Test
- Piezometer / Standpipe Tip
- Standard Penetration Test
- Pressuremeter Test
- Permeability Test
- Impression Packer / Televiewer Test
- In-situ Vane Shear Test

LOGGED **C.M.Ting**

DATE **19/06/2010**

CHECKED **C.M.Yee**

DATE **23/06/2010**

REMARKS


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 1 OF 18
DEPTH 0.00 m TO 18.32 m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
0.00
2.20
3.00
15.08
15.53
15.78
17.06
(18.32)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 2 OF 18
DEPTH (18.32) m TO (22.04) m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
(18.32)
18.55
19.54
21.04
(22.04)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 3 OF 18
DEPTH (22.04) mTO 25.68) m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
(22.04)
22.17
23.67
24.43
25.33
(25.68)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 4 OF 18
DEPTH(25.68) mTO (29.38) m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
(25.68)
26.43
27.82
28.96
(29.38)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 5 OF 18
DEPTH(29.38) m TO(33 11) m
DATE: 6 - 7 - 10
0.0m
0 5m
1.0m
(29.38)
29.86
31.08
32.57
(33.11)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO · 6 OF 18
DEPTH(33.11) mTO 36.72 m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
33.97 (33.11)
35.27
36.72


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 7 OF 18
DEPTH 36.72 mTO(40.47) m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
36.72
37.14
38.56
40.07
(40.47)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 8 OF 18
DEPTH(40.47) mTO(44.31) m
DATE: 6 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
42.34
41.38
(40.47)
43.69
(44.31)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO · 9 OF 18
DEPTH(44.31) m TO(48.17) m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
(44.31)
44.43
45.96
47.42
(48.17)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 10 OF 18
DEPTH (48.17) mTO (52.05) m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
(48.17)
48.88
50.15
51.63
(52.05)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 11 OF 18
DEPTH(52.05) m TO 55.81 m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
(52.05)
53.01
54.41
55.81


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 12 OF 18
DEPTH 55.81 m TO (59.65) m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
55.81
57.31
58.75
(59.65)


LAM GEOTECHNICS LIMITED
CONTRACT NO. 1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO. 1003/KTE/DH153 (P)
BOX NO. 13 OF 18
DEPTH (59.65) m TO (63.50) m
DATE: 6 — 7 — 10
0.0m
0.5m
1.0m
(59.65)
60.25
61.77
63.30
(63.50)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 14 OF 18
DEPTH (63.50) m TO (67.26) m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
(63.50)
64.81
66.33
(67.26)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 15 OF 18
DEPTH (67.26) mTO 70.96 m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
(67.26)
67.40
68.90
69.84
70.96


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 16 OF 18
DEPTH 70.96 mTO(74.51) m
DATE: 6 - 7 - 10
0.0m
0.5m
1.0m
70.96
72.46
73.96
(74.51)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO · 17 OF 18
DEPTH(74.51) mTO(78.06) m
DATE: 6 – 7 – 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(74.51)
74.81
75.77
77.24
(78.06)


LAM GEOTECHNICS LIMITED
CONTRACT NO.1003
DETAILED GROUND INVESTIGATION FOR
KWUN TONG LINE EXTENSION
HOLE NO.1003/KTE/DH153(P)
BOX NO. 18 OF 18
DEPTH (78.06) mTO 81.01 m
DATE: 6 - 7 - 10
KODAK Color Control Patches
0.0m
0.5m
1.0m
(78.06)
78.73
79.68
81.01
END

STANDPIPE DETAIL AND RESPONSE TEST RECORD SHEET

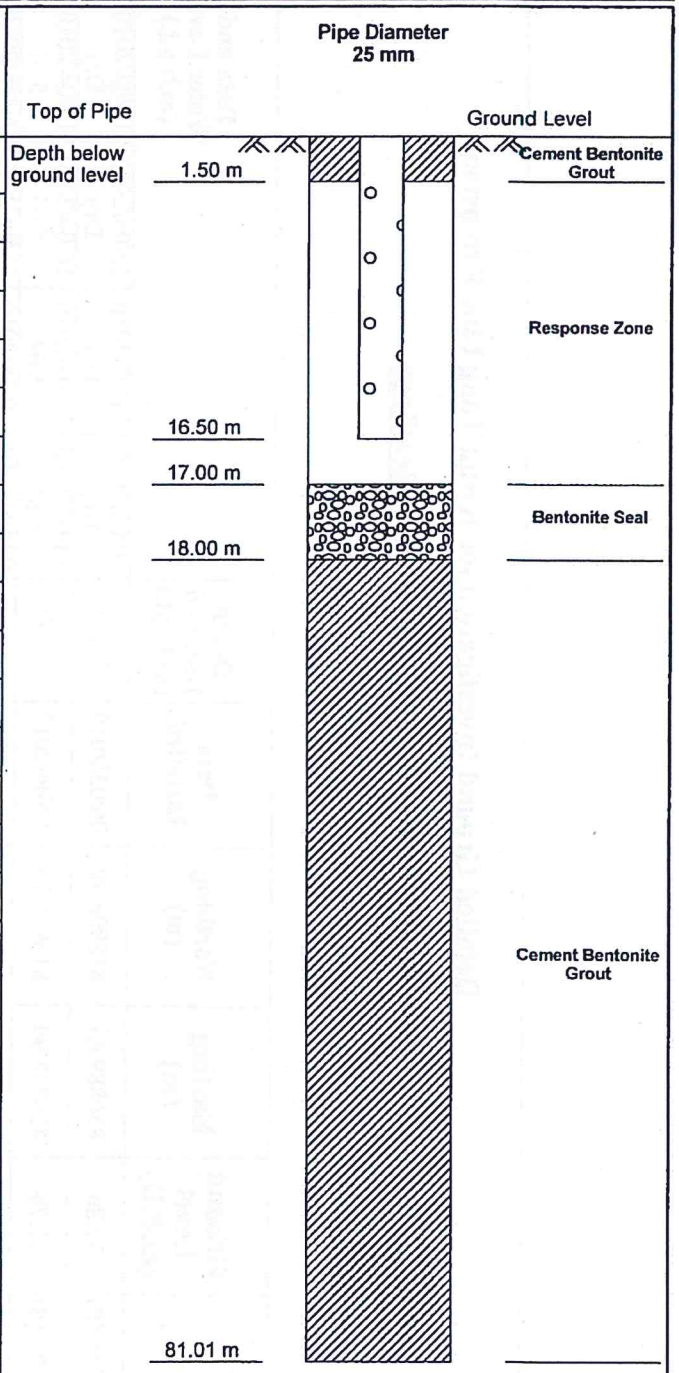
Contractor : Lam Geotechnics Limited	**Drillhole No. :** 1003/KTE/DH153(P)
Contract No.: 1003	**Date of test :** 25/06/2010
Project : Detailed Ground Investigation for Kwun Tong Line Extension	**Ground Level :** +40.27 mPD
	Co-ordinates : E 836856.30 N 818950.02
Initial Water Level : 15.10 m below G.L.	**Standpipe bottom :** 16.50 m
Tested / Supervised by : W.Y. Leung	**Checked by :** C.M.Yee

Time Elapsed (min : sec)	Depth of Water from top of pipe (m)
0	0.00
00:15	7.82
00:30	9.63
00:45	10.95
01:00	11.72
01:30	13.42
02:00	14.40
03:00	14.59
04:00	14.68
05:00	14.72
06:00	14.75
07:00	14.78
08:00	14.79
09:00	14.80
10:00	14.81
15:00	14.85
20:00	14.89
25:00	14.92
30:00	14.95

Filter material : Aggregate

Material surrounding response zone :
1.50-17.00: Grade V/IV GRANITE

Remarks

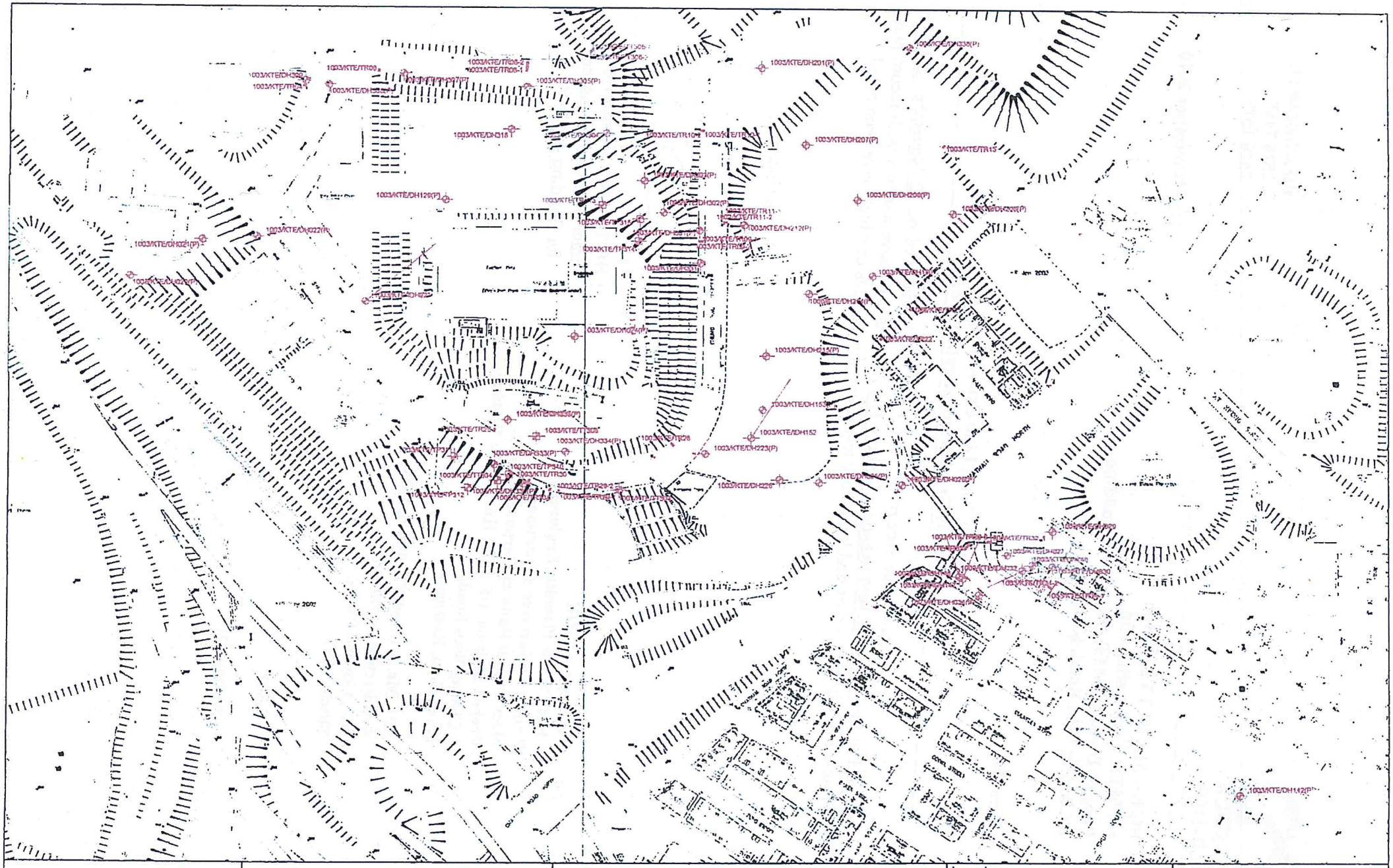


Detailed Ground Investigation for Kwun Tong Line Extension

Table 7 - Water level Readings

Drillhole No.	Ground Level (m.P.D)	Easting (m)	Northing (m)	Date Installed	Depth Installed (m.b.g.l.)	Date and Water Level (m.b.g.l.)						
1003/KTE/DH025(P) (P)	37.86	836889.63	818906.70	06/03/2010	21.00	10/03/2010 Dry	11/03/2010 Dry	12/03/2010 Dry	13/03/2010 Dry	15/03/2010 Dry	16/03/2010 Dry	17/03/2010 Dry
1003/KTE/DH026(P) (S)	11.78	836938.90	818905.29	12/04/2010	20.00	14/04/2010 5.65	15/04/2010 5.64	16/04/2010 5.65	17/04/2010 5.61	19/04/2010 5.57	20/04/2010 5.53	21/04/2010 5.56
1003/KTE/DH031(P) (P)	5.44	836984.34	818839.96	06/05/2010	8.00	08/05/2010 1.92	10/05/2010 1.95	11/05/2010 1.93	12/05/2010 2.01	13/05/2010 1.97	14/05/2010 1.90	15/05/2010 1.94
1003/KTE/DH044(P) (P)	4.03	837731.03	818327.05	02/01/2010	9.40	05/01/2010 2.77	06/01/2010 2.76	07/01/2010 2.77	08/01/2010 2.75	09/01/2010 2.76	11/01/2010 2.74	12/01/2010 2.76
1003/KTE/DH129(P) (S)	79.49	836667.43	819072.37	13/07/2010	50.00	19/07/2010 32.03	20/07/2010 31.96	21/07/2010 31.92	22/07/2010 31.85	23/07/2010 31.80	24/07/2010 31.83	26/07/2010 31.94
1003/KTE/DH142(P) (P)	4.01	837137.30	818721.78	24/04/2010	11.00	30/04/2010 1.47	03/05/2010 1.49	04/05/2010 1.46	05/05/2010 1.48	06/05/2010 1.50	07/05/2010 1.45	08/05/2010 1.42
1003/KTE/DH145(P) (S)	4.36	837376.23	818575.34	15/05/2010	16.00	22/05/2010 1.42	24/05/2010 1.40	25/05/2010 1.43	26/05/2010 1.39	27/05/2010 1.37	28/05/2010 1.40	29/05/2010 1.41
1003/KTE/DH150(P) (S)	36.80	836921.35	819028.79	03/08/2010	35.00	05/08/2010 21.47	06/08/2010 21.46	07/08/2010 21.48	09/08/2010 21.48	10/08/2010 21.45	11/08/2010 21.43	12/08/2010 21.46
1003/KTE/DH153(P) (P)	40.27	836856.30	818950.02	23/06/2010	16.50	26/06/2010 14.86	28/06/2010 14.31	29/06/2010 14.10	30/06/2010 14.98	02/07/2010 14.64	03/07/2010 14.31	05/07/2010 14.87
1003/KTE/DH201(P) (S)	44.68	836855.59	819150.36	15/01/2010	19.50	19/01/2010 16.65	20/01/2010 16.68	21/01/2010 16.72	22/01/2010 16.76	23/01/2010 16.81	25/01/2010 16.88	26/01/2010 16.92
1003/KTE/DH201(P) (P)	44.68	836855.59	819150.36	15/01/2010	42.00	19/01/2010 20.04	20/01/2010 20.08	21/01/2010 20.12	22/01/2010 20.15	23/01/2010 20.17	25/01/2010 20.19	26/01/2010 20.20
1003/KTE/DH206(P) (S)	36.70	836969.20	819065.06	15/01/2010	8.00	19/01/2010 Dry	20/01/2010 Dry	21/01/2010 Dry	22/01/2010 Dry	23/01/2010 Dry	25/01/2010 Dry	26/01/2010 Dry

Notes: (S) - denotes standpipe
(P) - denotes piezometer



Lam Geotechnics Limited
Ground Investigation Professionals

Contract :
Contract 1003
Detailed Ground Investigation for
Kwun Tong Line Extension

Title :
As-Built Location Plan for
Ground Investigation Stations

Legend:
- Drillhole
- Trial Pit
- Trial Trench

Scale
1:2000

Sheet No.:
Sheet 3 of 4

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號 :
OUR REF 本署檔號 : BD 3/7002/08 (2)
FAX 圖文傳真 : 2526 7430
TEL 電話 : 2626 1575
www.bd.gov.hk

16 November 2010

RGE – Mr. HUI Tung Man
c/o MTR Corporation Ltd.
Project Division, MTR Hung Hom Building,
8 Cheong Wan Road, Kowloon.

Dear Sir,

Kwun Tong Line Extension (KTE)
Stage II Ground Investigation Works

I acknowledge receipt of your Form BA 14 received on 2 November 2010 in respect of the **Ground Investigation – Stage II** works at the above together with record plans, Ground Investigation report, and laboratory test report, the contents of which have been noted.

Yours sincerely,

(**HO Hon-kit, Humphrey**)
Senior Structural Engineer
for Building Authority

c.c. **Mr. Stephen CHIK**
Chief Civil & Planning Engineer
Project Engineering Department,
Mass Transit Railway Corporation Ltd.
Project Division, 1/F MTR Hung Hom Building,
8 Cheong Wan Road,
Hung Hom, Kowloon

AP – Mr. Wilfred YEUNG Sze Wai
Architects Department,
8/F., Citylink Plaza,
Shatin, N.T.

CO/SM

2/7002/08 (2)

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. 11202/SCL/DH041(P)

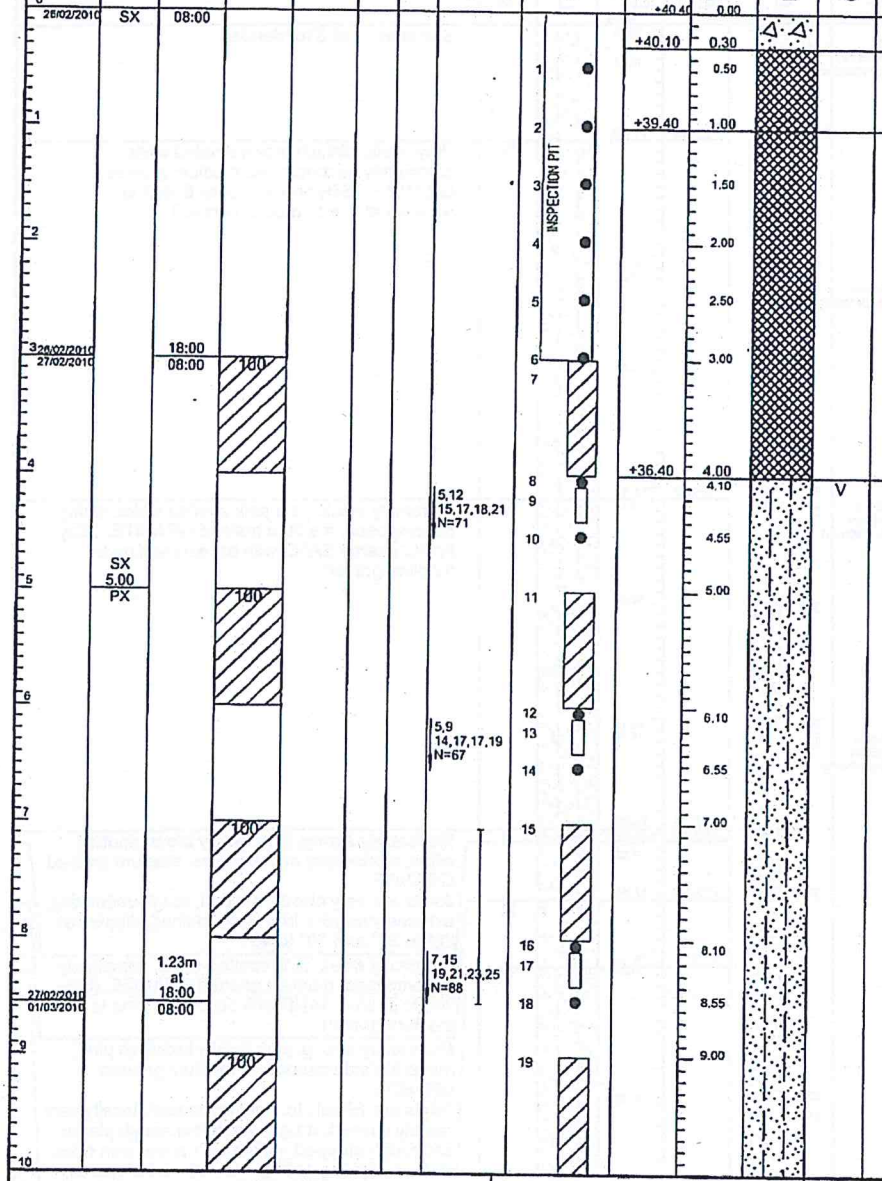
SHEET 1 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836862.29 N 818937.34	JOB NO. GCE1001SI
MACHINE & NO.	DR96/DR81		DATE FROM 26/02/2010 TO 11/03/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.40 mPD



Description

Grey, CONCRETE.

Grey, silty fine to coarse SAND with occasional angular to subangular fine to medium gravel sized moderately decomposed granite and concrete. (FILL)

Pink, silty fine to coarse SAND with some angular to subangular fine to medium gravel sized moderately decomposed granite. (FILL)

V Extremely weak, pink spotted white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND)

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/03/2010

CHECKED James Lu

DATE 13/03/2010

REMARKS

1. Packer tests were carried out from the depths of 28.00m to 31.00m, 34.00m to 37.00m, 46.00m to 49.00m, 49.00m to 52.00m and 52.00m to 55.00m.
2. Piezometer tip was installed at a depth of 47.50m.
3. Standpipe was installed at a depth of 20.50m.
4. Constant head permeability test was carried out from the depths of 7.05m to 8.55m.
5. Acoustic televiewer survey was carried out from the depths of 21.00m to 67.00m.
6. Water sample was taken at a depth of 35.10m.

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO. **11202/SCL/DH041(P)**

SHEET 2 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836862.29 N 818937.34	JOB NO. GCE1001SI
MACHINE & NO.	DR96/DR81		DATE FROM 26/02/2010 TO 11/03/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.40 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
	PX						13,25 48,52/45mm (100bls/120mm)	20 21 22		10.00 10.10 10.37			See sheet 1 of 8 for details.
			100					23	+29.40	11.00		IV	Very weak, pinkish brown spotted white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND with occasional fine to medium gravel)
							50 100/45mm (100bls/45mm)	24 25		12.10 12.22			
			95					26		13.00			
								27	+26.30	14.10			
							50/50mm 100/40mm (100bls/40mm)	28		14.19		IV	Extremely weak, pale pink spotted white, highly decomposed, medium grained GRANITE. (Silty fine to coarse SAND with occasional fine to medium gravel)
			95					29		15.00			
							50/45mm 100/40mm (100bls/40mm)	30 31		16.10 16.18			
	PX 16.95 HX		100/ 0	60	0	>20			+23.45 +23.35	16.85 17.05		III V	Moderately strong, pink locally brown spotted white, moderately decomposed, medium grained GRANITE. Joints are very closely spaced, rough undulating, extremely narrow, iron oxide stained, dipping at 20° to 30° and 30° to 40°.
			100	100	84	6.2		32	+22.84	17.56		III	
		9.80m at 18:00 01/03/2010				11.5	T2101		+22.26	18.14			Extremely weak, pink spotted white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND with occasional fine to medium gravel)
		08:00 02/03/2010	0							18.20		V	Moderately strong, pink locally brownish pink, moderately decomposed, medium grained GRANITE. Joints are closely to medium spaced, locally very closely spaced, rough undulating, rough planar and rough stepped, extremely narrow, iron oxide stained, dipping at 0° to 10°, 10° to 20° and 20°
			98					33 34		19.30			

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/03/2010

CHECKED James Lu

DATE 13/03/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. 11202/SCL/DH041(P)

SHEET 3 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836862.29 N 818937.34	JOB NO. GCE1001SI
MACHINE & NO.	DR96/DR81		DATE FROM 26/02/2010 TO 11/03/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.40 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
20	HX 20.52						150/45mm 100/45mm (100blS/45mm)	35 36 T2I01	+19.88	20.00 20.40 20.48 20.52		III	to 30°. From 18.04m to 18.14m : Moderately weak. Extremely weak, pink spotted white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND with some fine to medium gravel)
21			100	100	77	20.0 3.8 >20 6.2 10.0 9.1				21.61			Moderately strong, pink locally brown spotted white, moderately decomposed, medium grained GRANITE. Joints are closely to medium spaced, locally very closely spaced, rough planar, rough undulating and rough stepped, extremely narrow, iron and oxide stained, kaolin coated and locally kaolin infilled, dipping at 0° to 10°, 10° to 20°, 20° to 30°, 30° to 40°, 40° to 50°, 50° to 60°, 60° to 70°, 70° to 80° and subvertically.
22			100	98	81	10.0 2.5 10.0 6.7 >20 1.6		T2I01					
23			100	100	84	15.4 4.3 >20 1.3		T2I01		23.11			
24			100	80	78	3.3 >20 6.7 16.7 0.8		T2I01		24.42			
25			100	88	85	>20 7.1 10.0 5.9		T2I01		25.75			
26													
27	02/03/2010 03/03/2010	7.60m at 18:00 18.85m at 08:00	100	87	87	6.2 >20 4.1		T2I01		27.12			
28			100	100	100	>20 13.6 >20 3.9		T2I01		28.46			From 28.24m to 28.38m : Moderately weak.
29			100	100	34	2.9 >20		T2I01		29.41			
30													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/03/2010

CHECKED James Lu

DATE 13/03/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. **11202/SCL/DH041(P)**

SHEET 4 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836862.29 N 818937.34	JOB NO. GCE1001SI
MACHINE & NO.	DR96/DR81		DATE FROM 26/02/2010 TO 11/03/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.40 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
30										30.00			From 30.10m to 30.35m : Very fracture.
31			100	95	88	15.8 >20 2.3 2.4 7.8		T2I01 T2I01		30.78			
32		7.70m at 18:00	100	100	100	>20 7.4 20.0 0.7		T2I01		32.31			
33	26/03/2010	18.80m at 08:00	100	100	100			T2I01		32.85			
34			100	100	73	5.0 10.0 >20 9.7 8.0		T2I01		34.16			
35			100	82	47	4.8 >20 13.3 >20 10.0		T2I01		35.09			
36			100	82	63	5.6 8.0 >20 6.7 >20 9.5		T2I01		36.06			
37			100	76	70	10.0 >20 6.7 >20 3.0		T2I01		36.99			
38			100	83	73	1.2 >20 3.6		T2I01		38.00			
39			100	76	76	20.0 5.7 1.2		T2I01		38.99			
40													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/03/2010

CHECKED James Lu

DATE 13/03/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO. 11202/SCL/DH041(P)

SHEET 5 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836862.29 N 818937.34	JOB NO. GCE1001SI
MACHINE & NO.	DR96/DR81		DATE FROM 26/02/2010 TO 11/03/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.40 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
40										40.00			
			100	100	100	13.8		T2101		40.05			
41		10.10m at 18:00				>20							
		08/03/2010 08/03/2010				7.7							
		18.65m at 08:00				20.0							
			100	99	88	7.8				41.46			
42						10.0		T2101					
						8.3							
						>20							
			100	74	54	8.3				42.64			
43						>20		T2101					
						6.7							
			100	86	70	10.0		T2101		43.25			
						6.7							
44						>20							
						7.7		T2101					
						>20							
						13.3							
						>20							
						4.0							
			100	100	100	10.0		T2101		44.70			
45						7.9							
						2.5		T2101					
						6.2							
46										46.17			From 45.90m to 46.01m : Pegmatite.
			100	80	23	19.0		T2101					
						>20							
			100	73	11	12.0		T2101		46.73			
47						>20							
													From 47.33m to 47.91m : 1mm kaolin infilling.
			100	64	52			T2101		47.63			From 47.69m to 48.16m : With a subvertical joint.
48													From 47.85m to 48.17m : Pegmatite.
						5.0		T2101					From 48.36m to 49.06m : With a subvertical joint.
						>20							From 48.52m to 48.90m : 1mm kaolin infilling.
49			100	57	54					48.97			From 49.08m to 49.20m : Pegmatite.
						3.1		T2101					From 49.60m to 49.85m : 1mm kaolinite.
50													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/03/2010

CHECKED James Lu

DATE 13/03/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. **11202/SCL/DH041(P)**

SHEET 6 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836862.29 N 818937.34	JOB NO. GCE1001SI
MACHINE & NO.	DR96/DR81		DATE FROM 26/02/2010 TO 11/03/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.40 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
50		8.70m at 18:00				12.5		T2IOI		50.00			
08/03/2010 09/03/2010		18.50m at 08:00	100	67	59	8.3				50.30			From 50.42m to 50.64m : Fine grained granite. From 50.64m to 50.84m : Pegmatite.
51						2.5		T2IOI					
						>20							From 51.31m to 51.91m : With a subvertical joint. From 51.45m to 52.66m : Fine grained granite.
			100	69	0			T2IOI		51.70			
52										52.35			
			100	75	24	16.7		T2IOI					
						>20				52.88			
53			100	76	46	11.6							
						>20		T2IOI					
						8.7							
						>20							From 53.70m to 53.86m : 1mm kaolin infilling.
54						3.7				54.22			
			100	85	75	7.1		T2IOI					
						1.8							
55						8.1							From 55.07m to 55.42m : 1mm kaolinite.
						>20				55.52		IV	From 55.42m to 55.52m : Weak and highly decomposed. From 55.52m to 55.62m : Moderately weak. From 55.59m to 55.95m : 2 nos. of 20mm basalt veins.
			100	100	100	10.0						III	
56						3.2							
						1.7		T2IOI					
						20.0							
						2.7				56.87			
57			100	100	91								
								T2IOI					
58		9.20m at 18:00				8.0							
						6.8							From 57.71m to 59.20m : Fine grained granite.
09/03/2010 10/03/2010		19.10m at 08:00	100	100	100					58.27			
						2.2		T2IOI					
59						5.7				59.20			
			100	92	51	11.3							
								T2IOI		59.91			From 59.81m to 61.20m : Fine grained granite.
60													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/03/2010

CHECKED James Lu

DATE 13/03/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. 11202/SCL/DH041(P)

SHEET 7 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836862.29 N 818937.34	JOB NO. GCE1001SI
MACHINE & NO.	DR96/DR81		DATE FROM 26/02/2010 TO 11/03/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.40 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
60			100	100	90	8.7		T2IOI		60.00			From 59.86m to 61.82m : With a subvertical joint.
						20.0							
						9.1							
61						0.7				61.25			
			100	100	78			T2IOI					
62						10.3				62.66			
			100	94	77	4.8		T2IOI					
63						>20				63.46			From 62.92m to 63.26m : 1mm kaolinite.
			100	100	88	17.6		T2IOI					
						5.6							
64						1.4				64.66			
			100	100	98	6.5		T2IOI					
65						1.2							
						>20							
66			100	100	100	5.6		T2IOI		66.02			
						2.5							
67		10.00m at 18:00											
10/03/2010													
11/03/2010		18.65m at 08:00	100	100	100	>20		T2IOI		67.12			
68						6.3							
						2.3							
			100	99	77			T2IOI		68.35			
69						3.3							
						11.1							
			100	100	62			T2IOI		69.45			
70						4.2							

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/03/2010

CHECKED James Lu

DATE 13/03/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. 11202/SCL/DH041(P)

SHEET 8 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836862.29 N 818937.34	JOB NO. GCE1001SI
MACHINE & NO.	DR96/DR81		DATE FROM 26/02/2010 TO 11/03/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.40 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
70						8.0				70.00			From 70.06m to 70.24m : 1mm kaolinite.
						>20		T2101					
						14.3							
71			100	79	31	>20				70.79			
						10.0							
						>20		T2101					
						8.3							
						>20							
						6.7							
72						10.0				72.19			
						3.6							
			100	82	72			T2101					
						16.0							
						>20							
73						3.3				73.22			
			100	100	71			T2101					
						6.3							
						15.8							
74		11.20m at 18:00							-33.78	74.18			Hole completed at 74.18m.
11/03/2010													
75													
76													
77													
78													
79													
80													

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

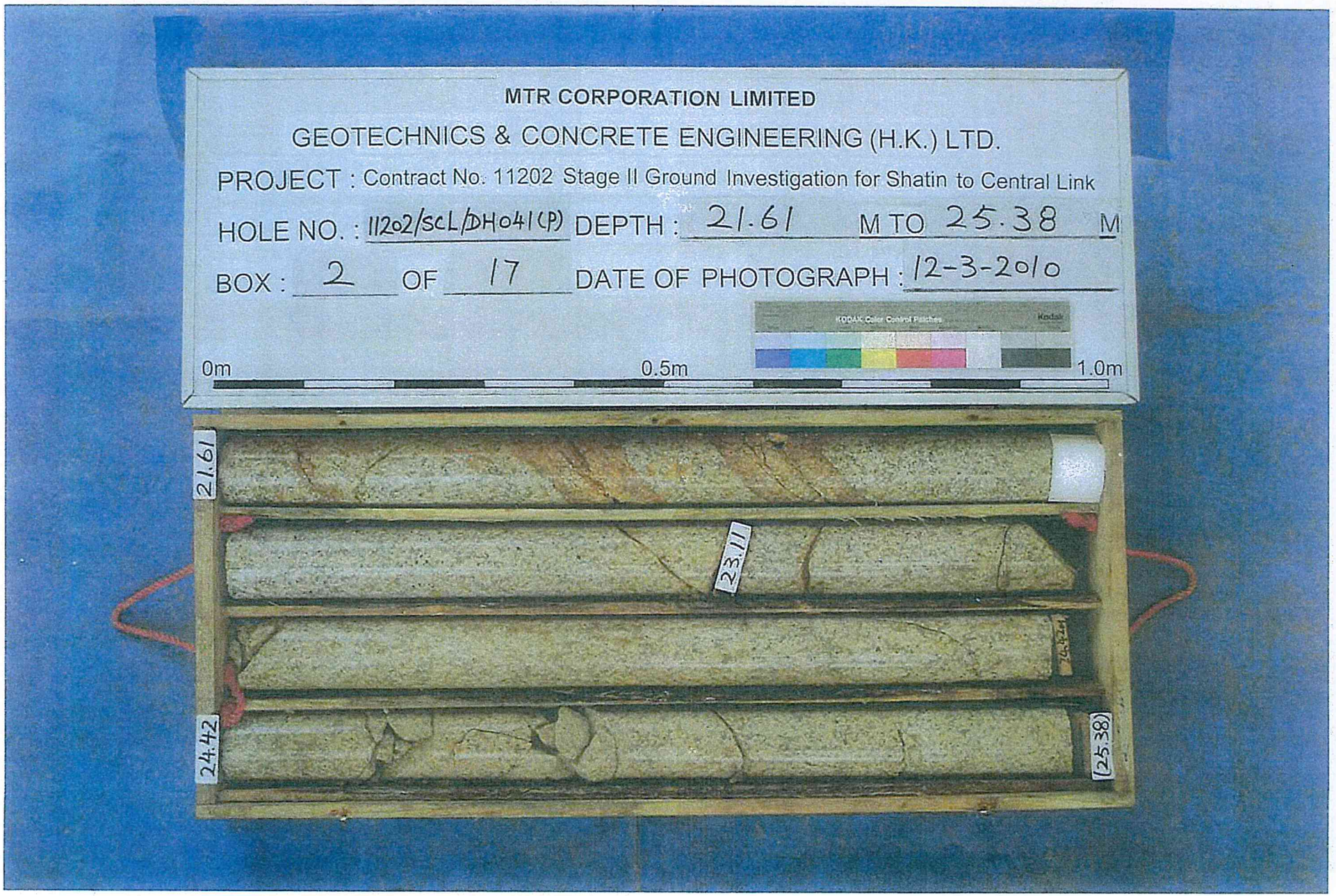
DATE 12/03/2010

CHECKED James Lu

DATE 13/03/2010

REMARKS


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH041(P) DEPTH : 0.00 M TO 21.61 M
BOX : 1 OF 17 DATE OF PHOTOGRAPH : 12-3-2010
0m
0.5m
1.0m
0.00
16.95
17.05
17.56
18.14
20.52
21.61


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH041(P) DEPTH : 21.61 M TO 25.38 M
BOX : 2 OF 17 DATE OF PHOTOGRAPH : 12-3-2010
KODAK Color Control Patches
Kodak
0m
0.5m
1.0m
21.61
23.11
24.42
(25.38)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH041(P) DEPTH : 25.38 M TO 28.90 M
BOX : 3 OF 17 DATE OF PHOTOGRAPH : 12-3-2010
0m
0.5m
1.0m
(25.38)
25.75
27.12
28.46
(28.90)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH041(P) DEPTH : 28.90 M TO 32.31 M
BOX : 4 OF 17 DATE OF PHOTOGRAPH : 12-3-2010
0m
0.5m
1.0m
(28.90)
29.41
30.78
32.31

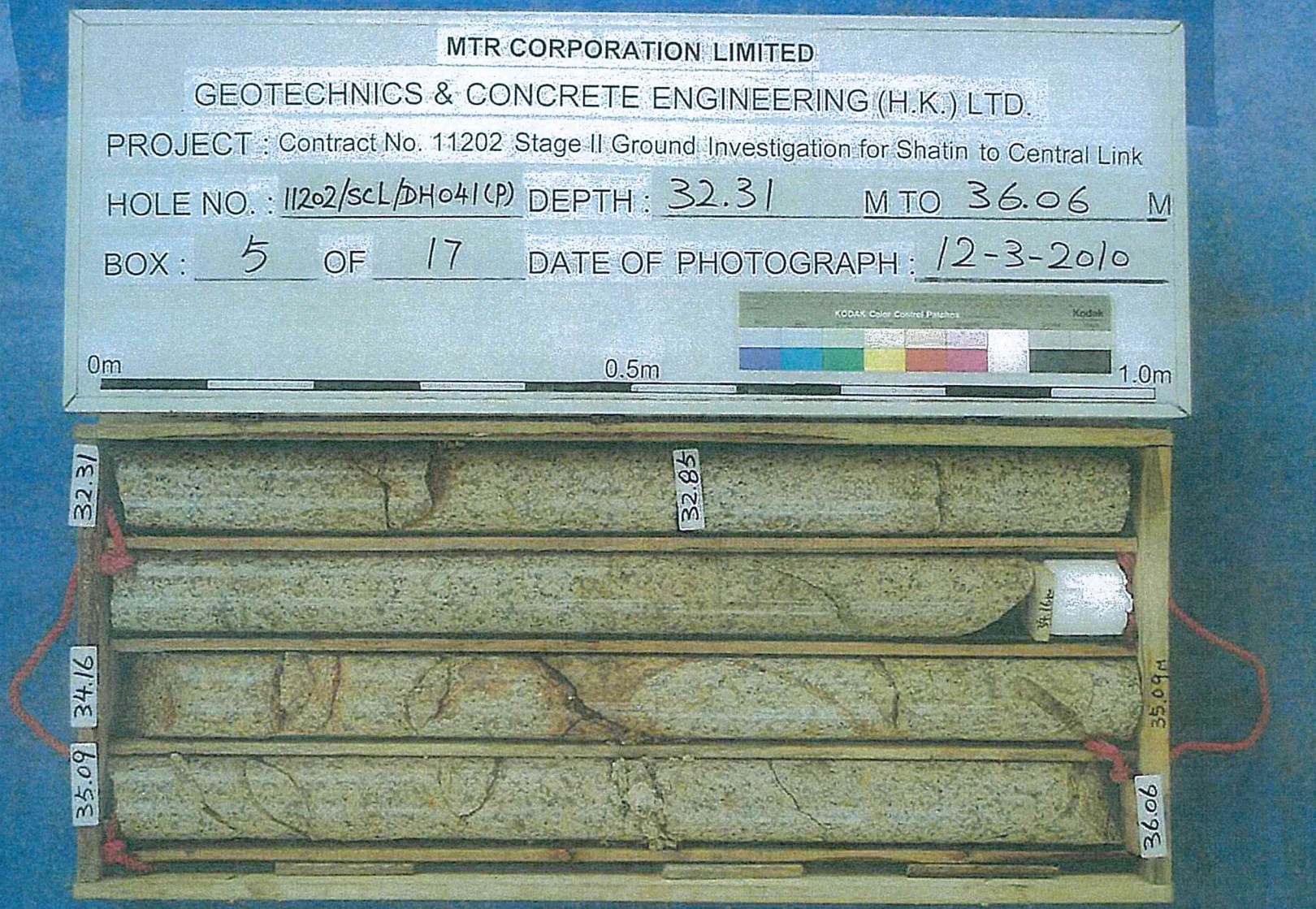
MTR CORPORATION LIMITED

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.

PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

HOLE NO. : 11202/SCL/DH041(P) DEPTH : 32.31 M TO 36.06 M

BOX : 5 OF 17 DATE OF PHOTOGRAPH : 12-3-2010



MTR CORPORATION LIMITED

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD

PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

HOLE NO. : 11202/SCL/DH041(P) DEPTH : 36.06 M TO 39.34 M

BOX : 6 OF 17 DATE OF PHOTOGRAPH : 12-3-2010



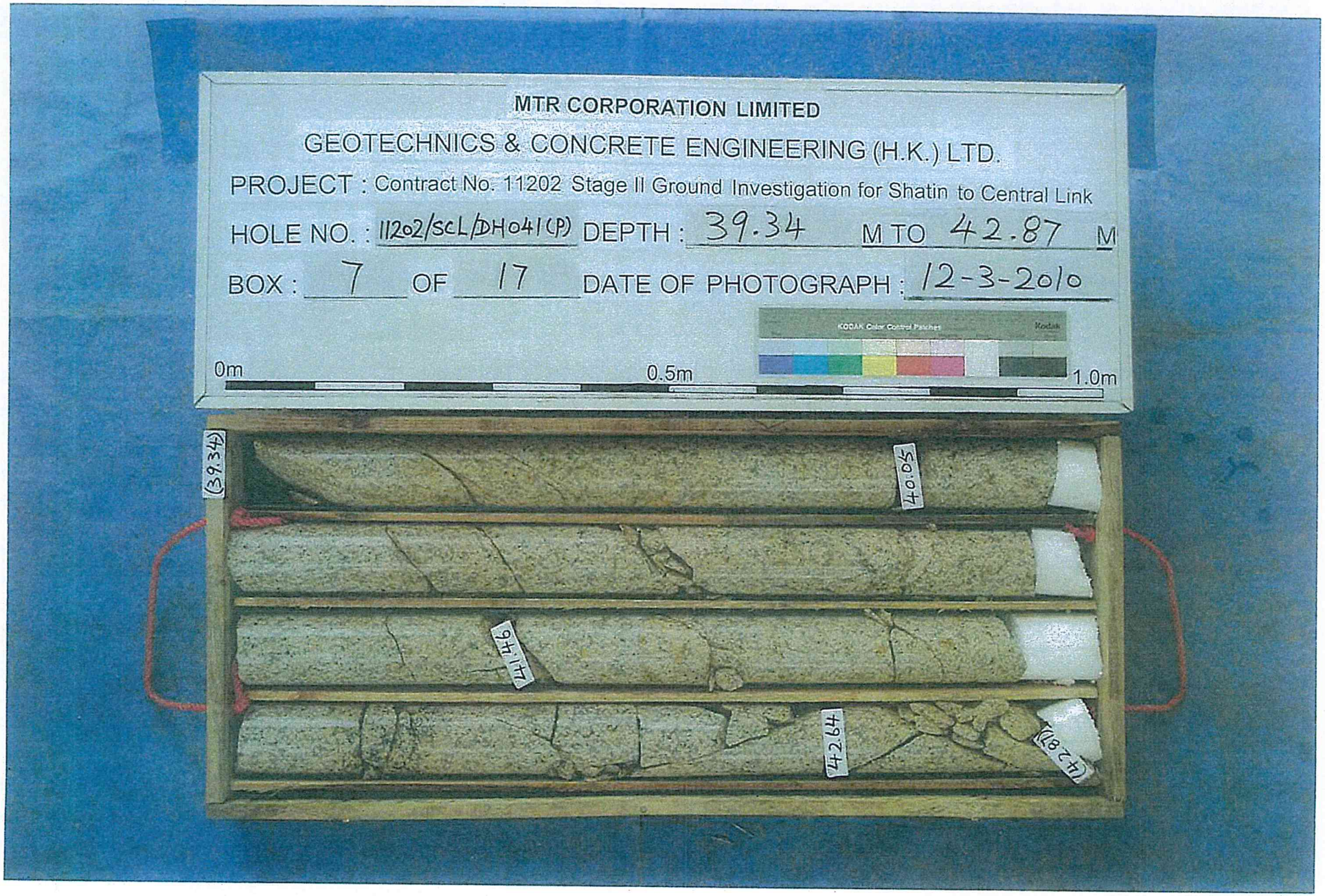
MTR CORPORATION LIMITED

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.

PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

HOLE NO. : 11202/SCL/DH041(P) DEPTH : 39.34 M TO 42.87 M

BOX : 7 OF 17 DATE OF PHOTOGRAPH : 12-3-2010




MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH041(P) DEPTH : 42.87 M TO 46.17 M
BOX : 8 OF 17 DATE OF PHOTOGRAPH : 12-3-2010
0m
0.5m
1.0m
(42.87)
43.25
44.70
46.17

MTR CORPORATION LIMITED

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.

PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

HOLE NO. : 11202/SCL/DH041(P) DEPTH : 46.17 M TO 49.44 M

BOX : 9 OF 17 DATE OF PHOTOGRAPH : 12-3-2010



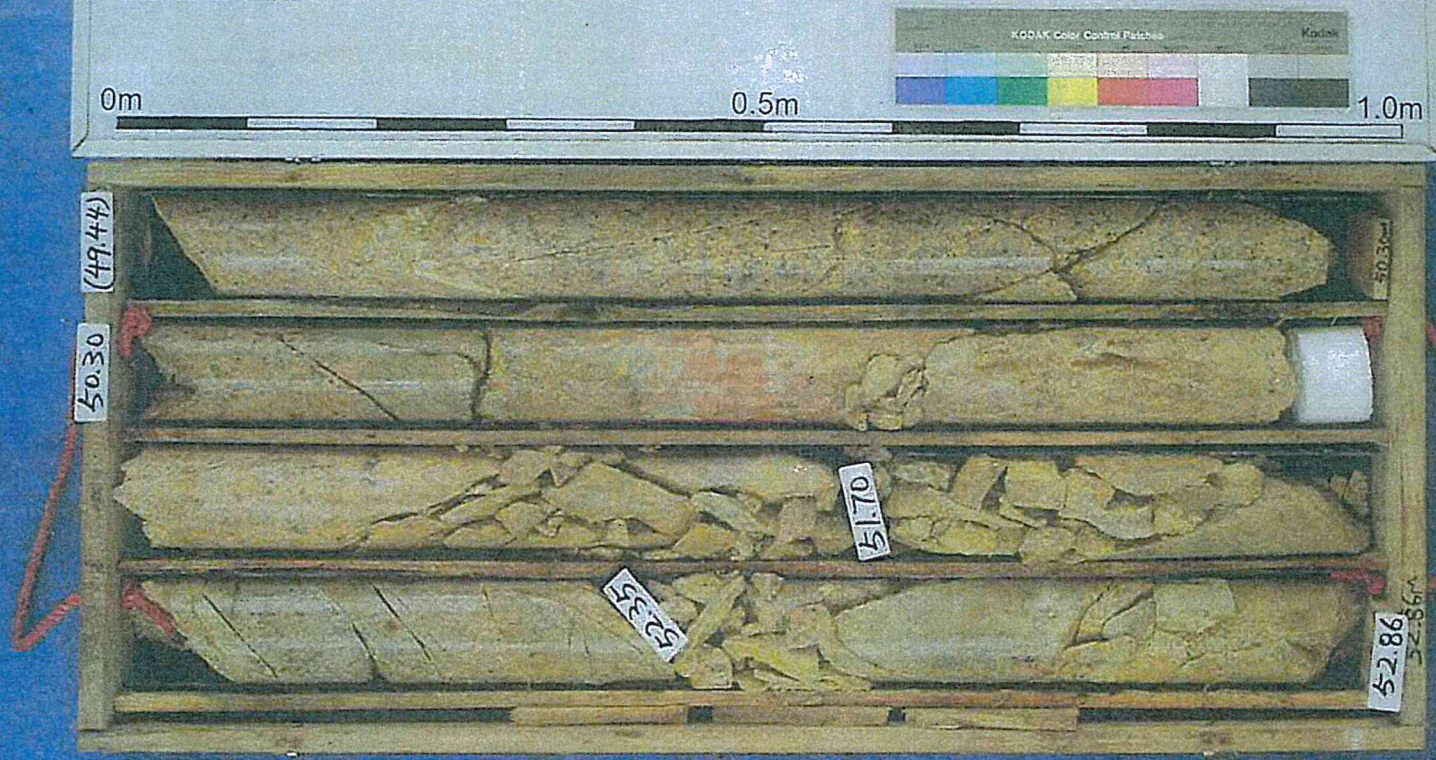
MTR CORPORATION LIMITED

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.

PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

HOLE NO. : 11202/SCL/DH041(P) DEPTH : 49.44 M TO 52.86 M

BOX : 10 OF 17 DATE OF PHOTOGRAPH : 12-3-2010




MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 1202/SCL/DH041(P) DEPTH : 52.86 M TO 55.93 M
BOX : 11 OF 17 DATE OF PHOTOGRAPH : 12-3-2010
0m
0.5m
1.0m
52.86
54.22
55.52
(55.93)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH041(P) DEPTH : 55.93 M TO 59.20 M
BOX : 12 OF 17 DATE OF PHOTOGRAPH : 12-3-2010
KODAK Color Control Patches
Kodak
0m
0.5m
1.0m
(55.93)
56.87
58.27
59.20

MTR CORPORATION LIMITED

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.

PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

HOLE NO. : 11202/SCL/DH041(P) DEPTH : 59.20 M TO 62.66 M

BOX : 13 OF 17 DATE OF PHOTOGRAPH : 12-3-2010



MTR CORPORATION LIMITED

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.

PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

HOLE NO. : 11202/SCL/DH041(P) DEPTH : 62.66 M TO 66.18 M

BOX : 14 OF 17 DATE OF PHOTOGRAPH : 12-3-2010




MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH041(P) DEPTH : 66.18 M TO 69.29 M
BOX : 15 OF 17 DATE OF PHOTOGRAPH : 12-3-2010
KODAK Color Control Patches
Kodak
0m
0.5m
1.0m
(66.18)
67.12
68.35
(69.29)

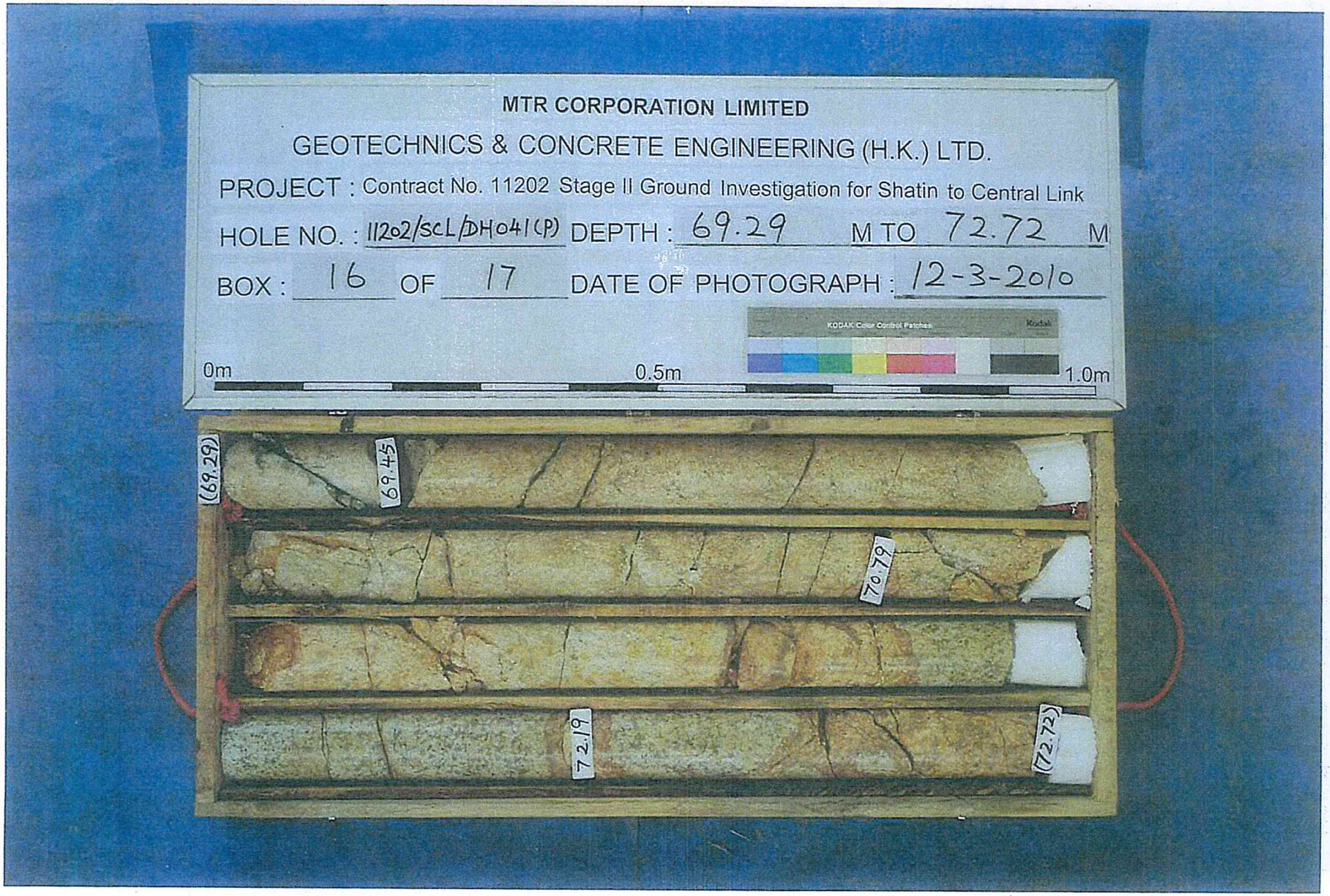
MTR CORPORATION LIMITED

GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.

PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

HOLE NO. : 11202/SCL/DH041(P) DEPTH : 69.29 M TO 72.72 M

BOX : 16 OF 17 DATE OF PHOTOGRAPH : 12-3-2010




MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH041(P) DEPTH : 72.72 M TO 74.18 M
BOX : 17 OF 17 DATE OF PHOTOGRAPH : 12-3-2010
KODAK Color Control Patches
0m
0.5m
1.0m
(72.72)
73.22
74.18
END

Geotechnics & Concrete Engineering (HK) Ltd.		Drillhole No. : 11202/SCL/DH041(P)
WATER ABSORPTION (PACKER) TEST	Contract No: 11202	Test No. : 1
Project : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link		Job No. GCE1001SI

Date of test :	15/03/2010	Test section from 28.00 m to 31.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test :	74.18 m
Flowmeter ID No. :	M008-31	Depth of casing at time of test :	20.52 m
Dip Meter ID No. :	M009-55	Rock Type :	M.D. GRANITE
Stop Watch ID No. :	M024-15	Gauge height above ground level :	0.85 m
Pressure Gauge ID No. :	M007-10	Packer pressure :	2000 kPa
Depth to centre of test section (measured down line of drillhole) :		29.50	m
Depth to ground water level (measured down line of drillhole) :		22.30	m

FIRST PERIOD GAUGE PRESSURE 180 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15434.20	15434.20	15434.20	15434.20				
Water intake (litres)	0.00	0.00	0.00					0.00

SECOND PERIOD GAUGE PRESSURE 360 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15488.70	15488.70	15488.70	15488.70				
Water intake (litres)	0.00	0.00	0.00					0.00

THIRD PERIOD GAUGE PRESSURE 540 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15527.00	15527.00	15527.00	15527.00				
Water intake (litres)	0.00	0.00	0.00					0.00

FOURTH PERIOD GAUGE PRESSURE 360 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15540.00	15540.00	15540.00	15540.00				
Water intake (litres)	0.00	0.00	0.00					0.00

FIFTH PERIOD GAUGE PRESSURE 280 kPa

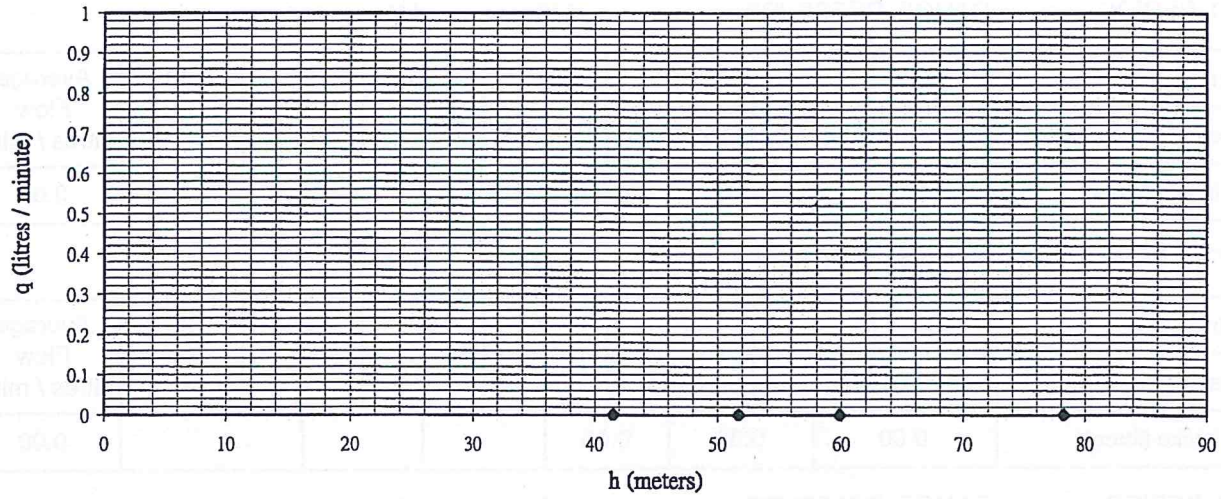
Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15555.30	15555.30	15555.30	15555.30				
Water intake (litres)	0.00	0.00	0.00					0.00

Tested by : C.K. Lai	Date : 15/03/2010	Remark :	
Checked by : James Lu	Date : 16/03/2010		

Geotechnics & Concrete Engg. (HK) Ltd.	Contract No. : 11202	Job No. : GCE1001SI
WATER ABSORPTION (PACKER) TEST	Drillhole No. : 11202/SCL/DH041(P)	Test No. : 1

Date of test :	15/03/2010	Test section from 28.00 m to 31.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test : 74.18 m	
Flowmeter ID No. :	M008-31	Diameter of hole in test section : m	
Dip Meter ID No. :	M009-55	Rock Type : M.D. GRANITE	
Stop Watch ID No. :	M024-15	Casing details	
Pressure Gauge ID No. :	M007-10	Orientation : Vertical	Packer pressure 2000 kPa

LENGTH OF TEST SECTION (1) 3.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD
	q (litres / min.)	Units (kPa)	Head of Water (m)	in Basic Pipework (m)	in Extra Rods / Pipes (m)	h (2)+(3)+(6)-(7)-(8) (m)
	(4)	(5)	(6)	(7)	(8)	(9)
VERTICAL DEPTH TO GROUNDWATER FROM GROUND LEVEL (2) 22.30 m	0.00	180	18.36			41.51
	0.00	360	36.72			59.87
HEIGHT OF PRESSURE GAUGE ABOVE GROUND LEVEL (3) 0.85 m	0.00	540	55.08			78.23
	0.00	360	36.72			59.87
	0.00	280	28.56			51.71



FROM GRAPH : $\frac{q}{h} = \frac{(\ 0.00\ -\ 0.00\ )}{(\ 59.87\ -\ 46.61\ )}$

$L = \frac{100q}{lh} = 0.00$ lugeon units

where l = length of test section in meters

Date calculated	Date checked
15/03/2010	16/03/2010
Calculated by	**Checked by**
C.K. Lai	James Lu

Remark :

Note : If ground water level unknown or below test section, use depth to centre of test section.

PRESSURE CONVERSION TABLE

PRESSURE :	1 lb / in^2	1 kg / cm^2	1 MN / m^2	1 kN / m^2	1 bar
EQUIVALENT HEAD OF WATER	0.7m	10m	100m (101.972m)	0.1m (0.1020m)	10m

Geotechnics & Concrete Engineering (HK) Ltd.		Drillhole No. : 11202/SCL/DH041(P)
WATER ABSORPTION (PACKER) TEST	Contract No: 11202	Test No. : 1
Project : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link		Job No. GCE1001SI

Date of test :	15/03/2010	Test section from 34.00 m to 37.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test : 74.18 m	
Flowmeter ID No. :	M008-31	Depth of casing at time of test : 20.52 m	
Dip Meter ID No. :	M009-55	Rock Type : M.D. GRANITE	
Stop Watch ID No. :	M024-15	Gauge height above ground level : 0.84 m	
Pressure Gauge ID No. :	M007-10	Packer pressure : 2000 kPa	
Depth to centre of test section (measured down line of drillhole) :		35.50 m	
Depth to ground water level (measured down line of drillhole) :		22.30 m	

FIRST PERIOD GAUGE PRESSURE 220 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15414.90	15414.90	15414.90	15414.90				
Water intake (litres)	0.00	0.00	0.00					0.00

SECOND PERIOD GAUGE PRESSURE 440 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15416.50	15416.50	15416.50	15416.50				
Water intake (litres)	0.00	0.00	0.00					0.00

THIRD PERIOD GAUGE PRESSURE 660 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15418.00	15418.00	15418.00	15418.00				
Water intake (litres)	0.00	0.00	0.00					0.00

FOURTH PERIOD GAUGE PRESSURE 440 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15419.00	15419.00	15419.00	15419.00				
Water intake (litres)	0.00	0.00	0.00					0.00

FIFTH PERIOD GAUGE PRESSURE 220 kPa

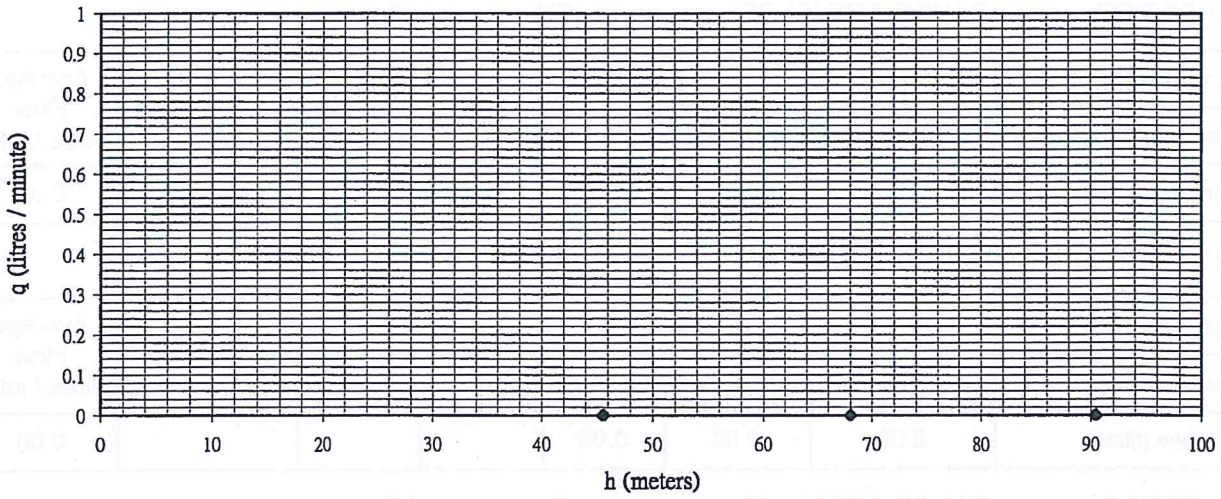
Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15420.10	15420.10	15420.10	15420.10				
Water intake (litres)	0.00	0.00	0.00					0.00

Tested by :	C.K. Lai	Date : 15/03/2010	Remark :
Checked by :	James Lu	Date : 16/03/2010	

Geotechnics & Concrete Engg. (HK) Ltd.	Contract No. : 11202	Job No. : GCE1001SI
WATER ABSORPTION (PACKER) TEST	Drillhole No. : 11202/SCL/DH041(P)	Test No. : 1

Date of test :	15/03/2010	Test section from 34.00 m to 37.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test : 74.18 m	
Flowmeter ID No. :	M008-31	Diameter of hole in test section : m	
Dip Meter ID No. :	M009-55	Rock Type : M.D. GRANITE	
Stop Watch ID No. :	M024-15	Casing details	
Pressure Gauge ID No. :	M007-10	Orientation : Vertical	Packer pressure 2000 kPa

LENGTH OF TEST SECTION (1) 3.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD
	q (litres / min.)	Units (kPa)	Head of Water (m)	in Basic Pipework (m)	in Extra Rods / Pipes (m)	h (2)+(3)+(6)-(7)-(8) (m)
	(4)	(5)	(6)	(7)	(8)	(9)
VERTICAL DEPTH TO GROUNDWATER FROM GROUND LEVEL (2) 22.30 m	0.00	220	22.44			45.58
	0.00	440	44.88			68.02
HEIGHT OF PRESSURE GAUGE ABOVE GROUND LEVEL (3) 0.84 m	0.00	660	67.32			90.46
	0.00	440	44.88			68.02
	0.00	220	22.44			45.58



FROM GRAPH : $\frac{q}{h} = \frac{(\ 0.00\ -\ 0.00\ )}{(\ 68.02\ -\ 45.58\ )}$

$L = \frac{100q}{lh} = 0.00$ lugeon units

where l = length of test section in meters

Note : If ground water level unknown or below test section, use depth to centre of test section.

Date calculated	Date checked
15/03/2010	16/03/2010
Calculated by	**Checked by**
C.K. Lai	James Lu

Remark :

PRESSURE CONVERSION TABLE

PRESSURE :	1 lb / in^2	1 kg / cm^2	1 MN / m^2	1 kN / m^2	1 bar
EQUIVALENT HEAD OF WATER	0.7m	10m	100m (101.972m)	0.1m (0.1020m)	10m

Geotechnics & Concrete Engineering (HK) Ltd.		Drillhole No. : 11202/SCL/DH041(P)
WATER ABSORPTION (PACKER) TEST	Contract No: 11202	Test No. : 1
Project : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link		Job No. GCE1001SI

Date of test :	15/03/2010	Test section from 46.00 m to 49.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test :	74.18 m
Flowmeter ID No. :	M008-31	Depth of casing at time of test :	20.52 m
Dip Meter ID No. :	M009-55	Rock Type :	M.D. GRANITE
Stop Watch ID No. :	M024-15	Gauge height above ground level :	0.84 m
Pressure Gauge ID No. :	M007-10	Packer pressure :	2000 kPa

Depth to centre of test section (measured down line of drillhole) : 47.50 m

Depth to ground water level (measured down line of drillhole) : 26.16 m

FIRST PERIOD GAUGE PRESSURE 300 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15335.00	15336.60	15338.30	15340.00				
Water intake (litres)	1.60	1.70	1.70					0.33

SECOND PERIOD GAUGE PRESSURE 600 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15342.00	15344.50	15347.10	15349.70				
Water intake (litres)	2.50	2.60	2.60					0.51

THIRD PERIOD GAUGE PRESSURE 900 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15352.00	15356.60	15361.20	15365.80				
Water intake (litres)	4.60	4.60	4.60					0.92

FOURTH PERIOD GAUGE PRESSURE 600 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15366.70	15369.30	15371.90	15374.40				
Water intake (litres)	2.60	2.60	2.50					0.51

FIFTH PERIOD GAUGE PRESSURE 300 kPa

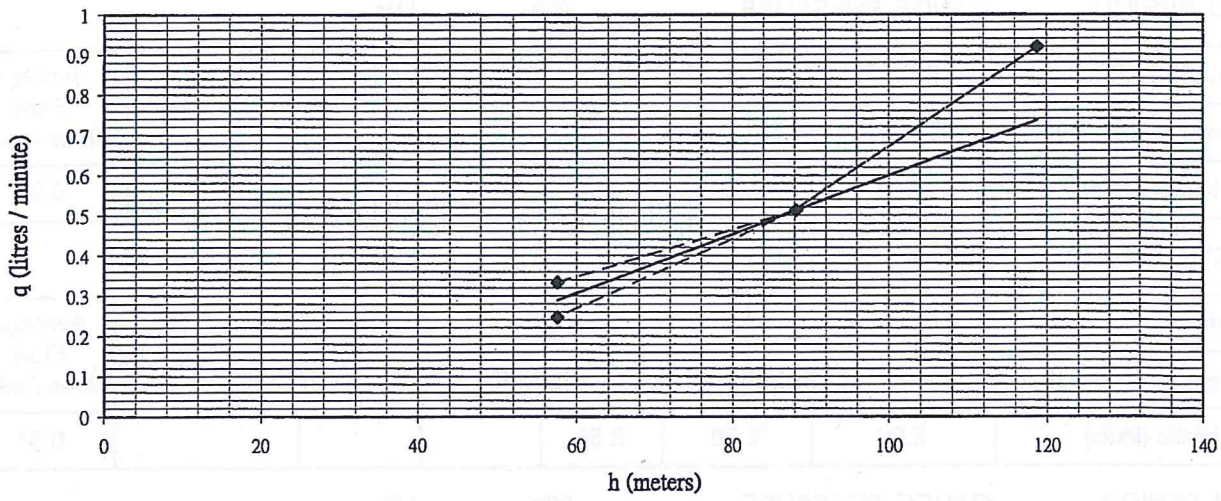
Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15390.00	15391.30	15392.50	15393.70				
Water intake (litres)	1.30	1.20	1.20					0.25

Tested by :	C.K. Lai	Date :	15/03/2010	Remark :
Checked by :	James Lu	Date :	16/03/2010	

Geotechnics & Concrete Engg. (HK) Ltd.	Contract No. : 11202	Job No. : GCE1001SI
WATER ABSORPTION (PACKER) TEST	Drillhole No. : 11202/SCL/DH041(P)	Test No. : 1

Date of test :	15/03/2010	Test section from 46.00 m to 49.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test : 74.18 m	
Flowmeter ID No. :	M008-31	Diameter of hole in test section : m	
Dip Meter ID No. :	M009-55	Rock Type : M.D. GRANITE	
Stop Watch ID No. :	M024-15	Casing details	
Pressure Gauge ID No. :	M007-10	Orientation : Vertical	Packer pressure 2000 kPa

LENGTH OF TEST SECTION (1) 3.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD
	q (litres / min.)	Units (kPa)	Head of Water (m)	in Basic Pipework (m)	in Extra Rods / Pipes (m)	h (2)+(3)+(6)-(7)-(8) (m)
	(4)	(5)	(6)	(7)	(8)	(9)
VERTICAL DEPTH TO GROUNDWATER FROM GROUND LEVEL (2) 26.16 m	0.33	300	30.60			57.60
	0.51	600	61.20			88.20
HEIGHT OF PRESSURE GAUGE ABOVE GROUND LEVEL (3) 0.84 m	0.92	900	91.80			118.80
	0.51	600	61.20			88.20
	0.25	300	30.60			57.60



FROM GRAPH : $\frac{q}{h} = \frac{(\ 0.51 - 0.29\ )}{(\ 88.20 - 57.60\ )}$

$L = \frac{100q}{lh} = 0.24$ lugeon units

where l = length of test section in meters

Note : If ground water level unknown or below test section, use depth to centre of test section.

Date calculated	Date checked
15/03/2010	16/03/2010
Calculated by	**Checked by**
C.K. Lai	James Lu

Remark :

PRESSURE CONVERSION TABLE

PRESSURE :	1 lb / in^2	1 kg / cm^2	1 MN / m^2	1 kN / m^2	1 bar
EQUIVALENT HEAD OF WATER	0.7m	10m	100m (101.972m)	0.1m (0.1020m)	10m

Geotechnics & Concrete Engineering (HK) Ltd.		Drillhole No. : 11202/SCL/DH041(P)
WATER ABSORPTION (PACKER) TEST	Contract No: 11202	Test No. : 1
Project : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link		Job No. GCE1001SI

Date of test :	13/03/2010	Test section from 49.00 m to 52.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test :	74.18 m
Flowmeter ID No. :	M008-31	Depth of casing at time of test :	20.52 m
Dip Meter ID No. :	M009-55	Rock Type :	M.D. GRANITE
Stop Watch ID No. :	M024-15	Gauge height above ground level :	0.84 m
Pressure Gauge ID No. :	M007-10	Packer pressure :	2400 kPa

Depth to centre of test section (measured down line of drillhole) : 50.50 m

Depth to ground water level (measured down line of drillhole) : 21.36 m

FIRST PERIOD GAUGE PRESSURE 300 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15237.00	15240.30	15243.50	15246.80				
Water intake (litres)	3.30	3.20	3.30					0.65

SECOND PERIOD GAUGE PRESSURE 600 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15248.00	15252.50	15256.90	15261.30				
Water intake (litres)	4.50	4.40	4.40					0.89

THIRD PERIOD GAUGE PRESSURE 900 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15263.00	15270.50	15278.00	15285.50				
Water intake (litres)	7.50	7.50	7.50					1.50

FOURTH PERIOD GAUGE PRESSURE 600 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15286.50	15290.90	15295.20	15299.50				
Water intake (litres)	4.40	4.30	4.30					0.87

FIFTH PERIOD GAUGE PRESSURE 300 kPa

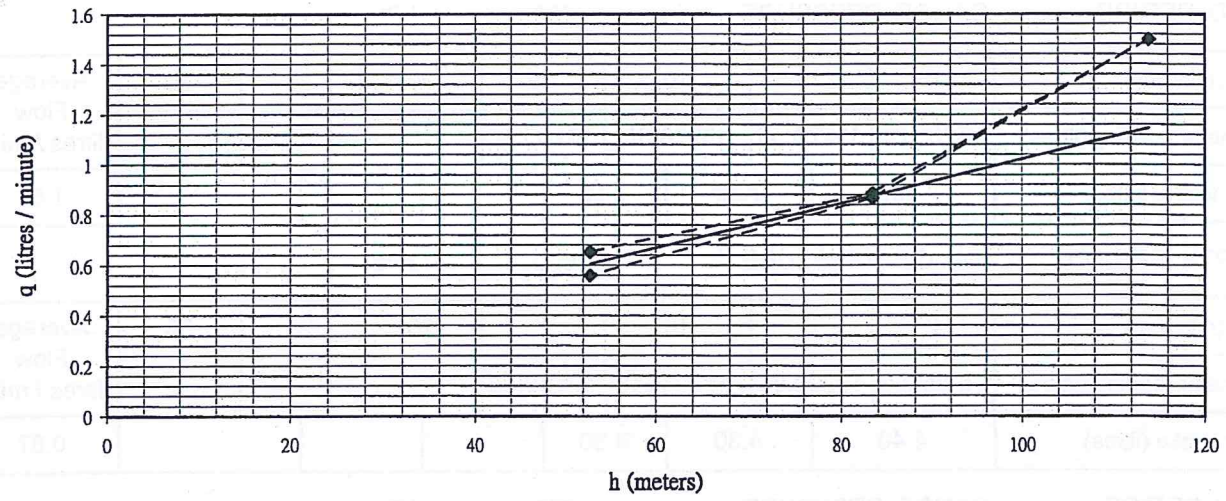
Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15301.00	15303.80	15306.60	15309.40				
Water intake (litres)	2.80	2.80	2.80					0.56

Tested by :	C.K. Lai	Date : 13/03/2010	Remark :
Checked by :	James Lu	Date : 15/03/2010	

Geotechnics & Concrete Engg. (HK) Ltd.	Contract No. : 11202	Job No. : GCE1001SI
WATER ABSORPTION (PACKER) TEST	Drillhole No. : 11202/SCL/DH041(P)	Test No. : 1

Date of test :	13/03/2010	Test section from 49.00 m to 52.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test : 74.18 m	
Flowmeter ID No. :	M008-31	Diameter of hole in test section : m	
Dip Meter ID No. :	M009-55	Rock Type : M.D. GRANITE	
Stop Watch ID No. :	M024-15	Casing details	
Pressure Gauge ID No. :	M007-10	Orientation : Vertical	Packer pressure 2400 kPa

LENGTH OF TEST SECTION	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD
	q (litres / min.)	Units (kPa)	Head of Water (m)	in Basic Pipework (m)	in Extra Rods / Pipes (m)	h (2)+(3)+(6)-(7)-(8) (m)
(1) 3.00 m	(4)	(5)	(6)	(7)	(8)	(9)
VERTICAL DEPTH TO GROUNDWATER FROM GROUND LEVEL	0.65	300	30.60			52.80
	0.89	600	61.20			83.40
(2) 21.36 m	1.50	900	91.80			114.00
HEIGHT OF PRESSURE GAUGE ABOVE GROUND LEVEL	0.87	600	61.20			83.40
(3) 0.84 m	0.56	300	30.60			52.80



FROM GRAPH : $\frac{q}{h} = \frac{(\ 0.88 - 0.61\ )}{(\ 83.40 - 52.80\ )}$

$L = \frac{100q}{lh} = 0.29$ lugeon units

where l = length of test section in meters

Note : If ground water level unknown or below test section, use depth to centre of test section.

Date calculated	Date checked
13/03/2010	15/03/2010
Calculated by	**Checked by**
C.K. Lai	James Lu

Remark :

PRESSURE CONVERSION TABLE

PRESSURE :	1 lb / in^2	1 kg / cm^2	1 MN / m^2	1 kN / m^2	1 bar
EQUIVALENT HEAD OF WATER	0.7m	10m	100m (101.972m)	0.1m (0.1020m)	10m

Geotechnics & Concrete Engineering (HK) Ltd.		Drillhole No. : 11202/SCL/DH041(P)
WATER ABSORPTION (PACKER) TEST	Contract No: 11202	Test No. : 1
Project : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link		Job No. GCE1001SI

Date of test :	13/03/2010	Test section from 52.00 m to 55.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test :	74.18 m
Flowmeter ID No. :	M008-31	Depth of casing at time of test :	20.52 m
Dip Meter ID No. :	M009-55	Rock Type :	M.D. GRANITE
Stop Watch ID No. :	M024-15	Gauge height above ground level :	0.85 m
Pressure Gauge ID No. :	M007-10	Packer pressure :	2400 kPa

Depth to centre of test section (measured down line of drillhole) : 53.50 m

Depth to ground water level (measured down line of drillhole) : 21.36 m

FIRST PERIOD GAUGE PRESSURE 320 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15145.50	15147.80	15150.10	15152.50				
Water intake (litres)	2.30	2.30	2.40					0.47

SECOND PERIOD GAUGE PRESSURE 640 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15154.00	15157.00	15160.00	15163.00				
Water intake (litres)	3.00	3.00	3.00					0.60

THIRD PERIOD GAUGE PRESSURE 960 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15164.50	15168.30	15172.10	15175.90				
Water intake (litres)	3.80	3.80	3.80					0.76

FOURTH PERIOD GAUGE PRESSURE 640 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15177.00	15179.50	15182.00	15184.50				
Water intake (litres)	2.50	2.50	2.50					0.50

FIFTH PERIOD GAUGE PRESSURE 320 kPa

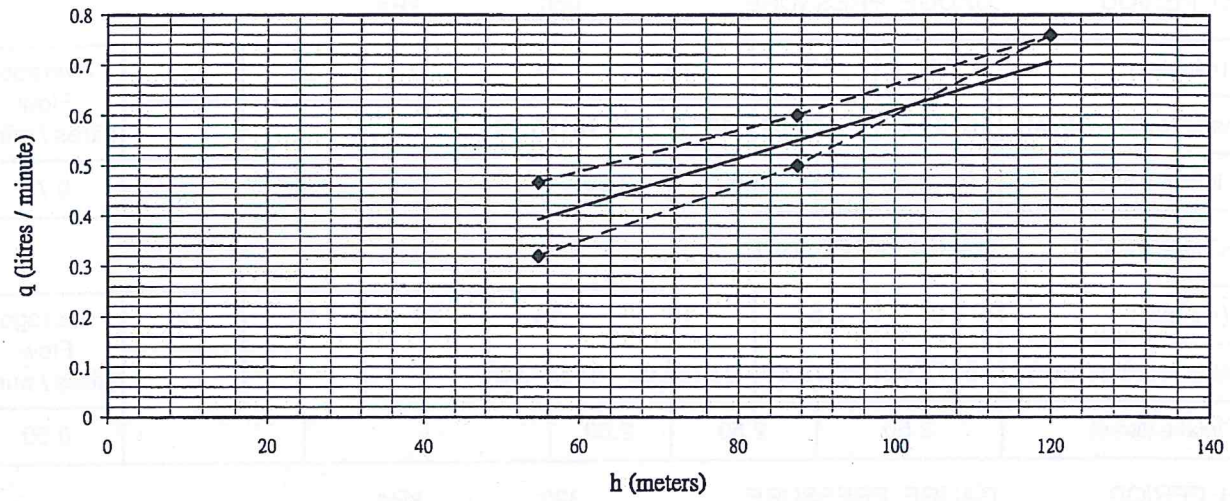
Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	15185.00	15186.60	15188.20	15189.80				
Water intake (litres)	1.60	1.60	1.60					0.32

Tested by :	C.K. Lai	Date : 13/03/2010	Remark :
Checked by :	James Lu	Date : 15/03/2010	

Geotechnics & Concrete Engg. (HK) Ltd.	Contract No. : 11202	Job No. : GCE1001SI
WATER ABSORPTION (PACKER) TEST	Drillhole No. : 11202/SCL/DH041(P)	Test No. : 1

Date of test :	13/03/2010	Test section from 52.00 m to 55.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test : 74.18 m	
Flowmeter ID No. :	M008-31	Diameter of hole in test section : m	
Dip Meter ID No. :	M009-55	Rock Type : M.D. GRANITE	
Stop Watch ID No. :	M024-15	Casing details	
Pressure Gauge ID No. :	M007-10	Orientation : Vertical	Packer pressure 2400 kPa

LENGTH OF TEST SECTION (1) 3.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD
	q (litres / min.)	Units (kPa)	Head of Water (m)	in Basic Pipework (m)	in Extra Rods / Pipes (m)	h (2)+(3)+(6)-(7)-(8) (m)
	(4)	(5)	(6)	(7)	(8)	(9)
VERTICAL DEPTH TO GROUNDWATER FROM GROUND LEVEL	0.47	320	32.64			54.85
(2) 21.36 m	0.60	640	65.28			87.49
HEIGHT OF PRESSURE GAUGE ABOVE GROUND LEVEL	0.76	960	97.92			120.13
	0.50	640	65.28			87.49
(3) 0.85 m	0.32	320	32.64			54.85



FROM GRAPH : $\frac{q}{h} = \frac{(\ 0.55\ -\ 0.39\ )}{(\ 87.49\ -\ 54.85\ )}$

$L = \frac{100q}{lh} = 0.16$ lugeon units

where l = length of test section in meters

Note : If ground water level unknown or below test section, use depth to centre of test section.

Date calculated	Date checked
13/03/2010	15/03/2010
Calculated by	**Checked by**
C.K. Lai	James Lu

Remark :

PRESSURE CONVERSION TABLE

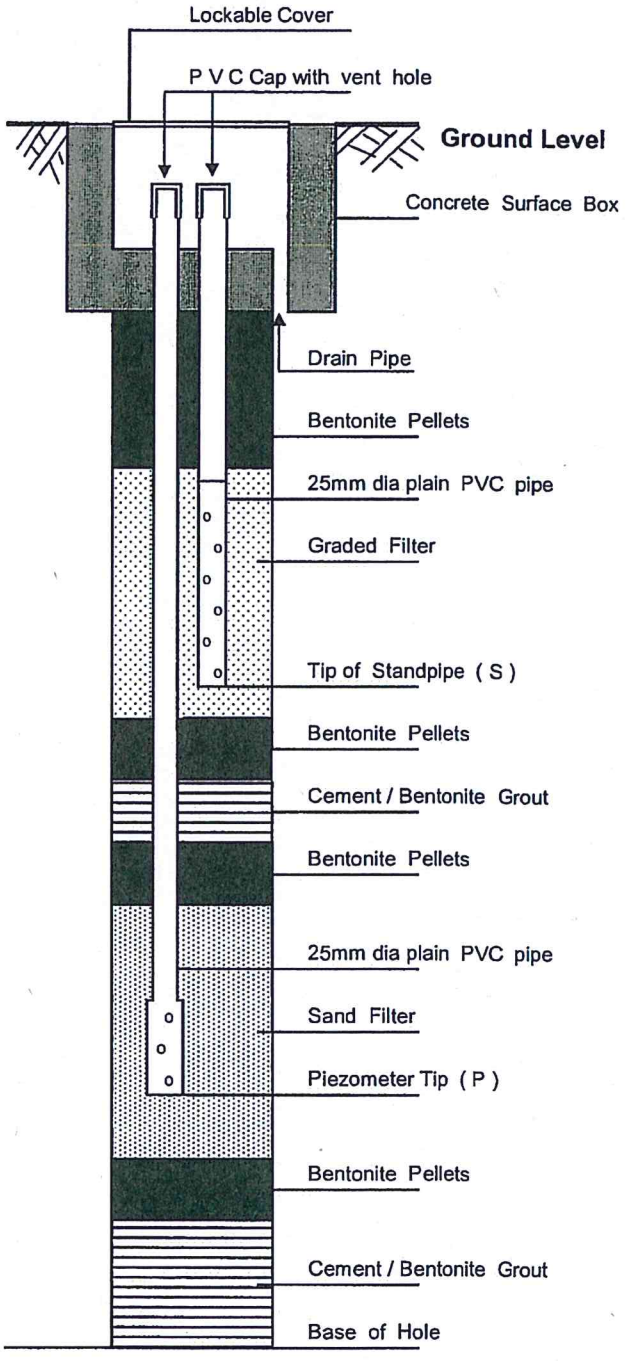
PRESSURE :	1 lb / in^2	1 kg / cm^2	1 MN / m^2	1 kN / m^2	1 bar
EQUIVALENT HEAD OF WATER	0.7m	10m	100m (101.972m)	0.1m (0.1020m)	10m

	Geotechnics & Concrete Engg. (HK) Ltd.	Hole No. : 11202/SCL/DH041(P)
	GROUND INVESTIGATION DEPARTMENT	Piezometer ID. : **DH041(P)**
	Installation Details of Piezometer and Standpipe and Groundwater Records	Standpipe ID. : **DH041(S)**
Contract No. : **11202**	Job No. : **GCE1001SI**	Date Installed : **18/03/2010**
Project : **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**		Installed by : **S.H. Wong**
Co-ordinates : E **836862.29** N **818937.34**	Ground Level : **40.40** mPD	Supervised by : **K.H. Cheung**
Response Zone of Piezometer : **-6.30** mPD to **-7.60** mPD	Piezometer (P) Tip Level : **-7.10** mPD	Checked by : **James Lu**
Response Zone of Standpipe : **38.40** mPD to **19.40** mPD	Standpipe (S) Tip Level : **19.90** mPD	Date checked : **19/03/2010**
Remarks :		

INSTALLATION DETAILS OF PIEZOMETER AND STANDPIPE

Date		Depth of G.W.L. (m)
	S	Dry
20/03/2010	P	24.16
	S	18.98
22/03/2010	P	23.87
	S	19.45
23/03/2010	P	24.06
	S	Dry
24/03/2010	P	24.27
	S	19.27
25/03/2010	P	23.92
	S	Dry
26/03/2010	P	24.00
	S	Dry
27/03/2010	P	24.10

Reduced Level (mPD)	Depth (m)
40.40	0.00
40.30	0.10
40.20	0.20
40.10	0.30
38.40	2.00
19.90	20.50
19.40	21.00
18.40	22.00
-5.30	45.70
-6.30	46.70
-7.10	47.50
-7.60	48.00
-8.60	49.00
-33.78	74.18

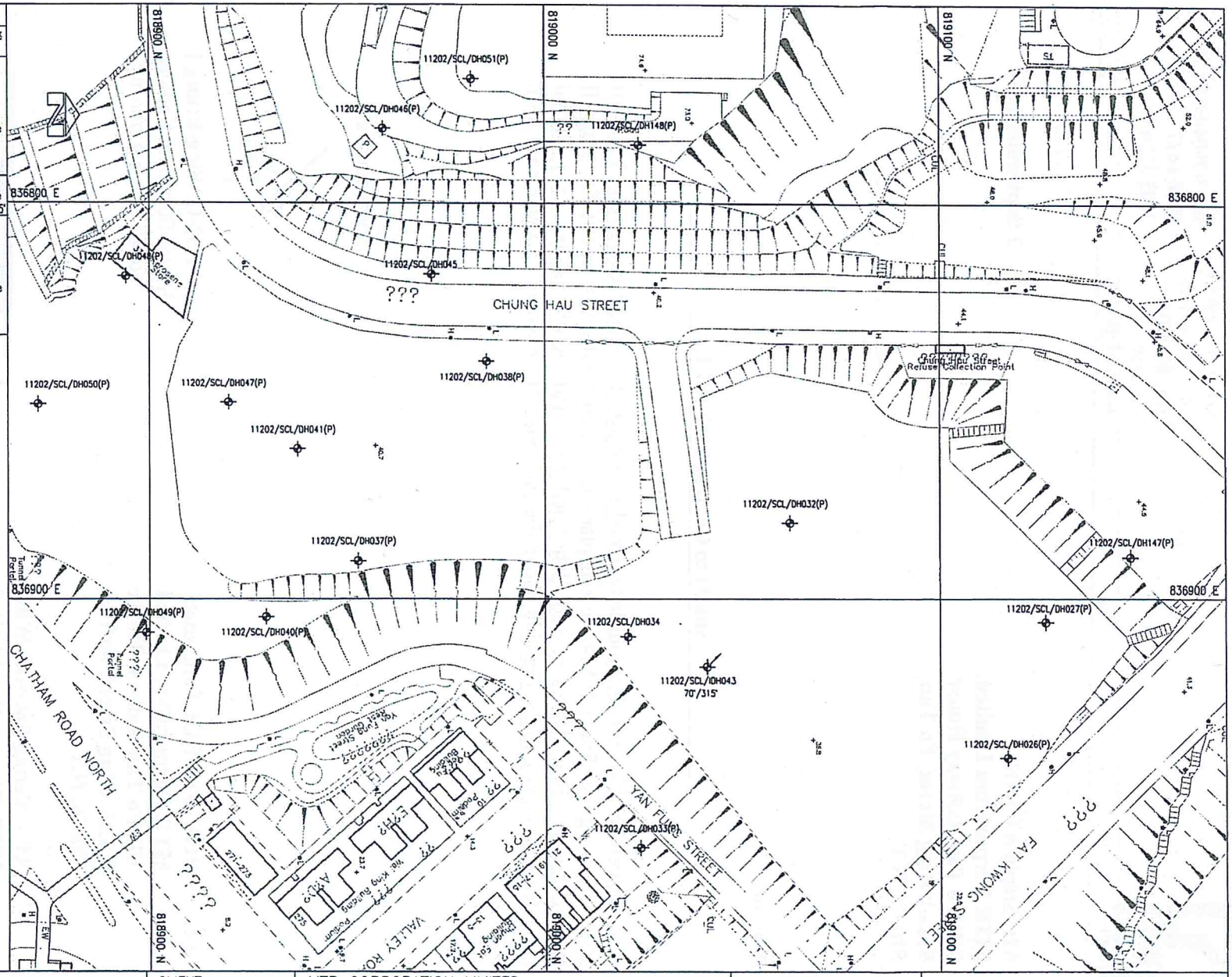


(Not to Scale)

PS-mmbc

NOTES:

Borehole No.	Northing	Easting	Ground LEVEL(mPD)	Termination LEVEL(mPD)	Remark
11202/SCL/DH026(P)	819116.75	836940.30	36.76	-20.21	Top of Vertical Drillhole
11202/SCL/DH027(P)	819126.41	836905.94	36.95	-18.97	
11202/SCL/DH032(P)	819061.88	836881.12	36.90	-25.53	
11202/SCL/DH033(P)	819023.98	836963.06	23.29	-10.41	
11202/SCL/DH034	819020.96	836909.53	36.89	-51.56	
11202/SCL/DH037(P)	818952.59	836890.62	40.36	-33.93	
11202/SCL/DH038(P)	818985.28	836839.30	39.91	-33.46	
11202/SCL/DH040(P)	818929.35	836904.57	35.49	-33.45	
11202/SCL/DH041(P)	818937.34	836862.29	40.40	-33.78	
11202/SCL/IDH043	819040.96	836917.10	36.89	-28.79	Inclined Drillhole 70°/315°
11202/SCL/DH045	818971.34	836817.85	39.00	-34.10	Top of Vertical Drillhole
11202/SCL/DH046(P)	818959.05	836781.27	63.75	-33.47	
11202/SCL/DH047(P)	818919.91	836850.42	40.34	-33.55	
11202/SCL/DH048(P)	818894.02	836818.45	31.58	-33.75	
11202/SCL/DH049(P)	818899.11	836908.43	22.42	-33.31	
11202/SCL/DH050(P)	818871.82	836850.83	25.44	-33.29	
11202/SCL/DH051(P)	818981.52	836768.69	74.74	-33.66	
11202/SCL/DH147(P)	819147.92	836889.72	44.08	-21.62	
11202/SCL/DH148(P)	819023.91	836785.26	71.31	31.21	



SYMBOLS :-

11202/SCL/DH026(P) BOREHOLE/DRILLHOLE

11202/SCL/DH026(P) 60°/270° INCLINED BOREHOLE (DIP/BEARING)

11202/SCL/DH026(P) TRIAL PIT/TRENCH

SS001A SURFACE STRIPPING

MTR PROTECTION ZONE

SEWAGE TUNNEL PROTECTION ZONE

CLIENT	MTR CORPORATION LIMITED
PROJECT	Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
MAIN CONTRACTOR	GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
TITLE	VOLUME 2 – HOMANTIN

JOB NO. GCE1001SI

SCALE 1 : 1000 (A3)

DRAWN BY: P.M. WONG

SURVEYED BY: FONG WAI YIN

PLAN NO. 3265/02/01

REVISION NO.	DESCRIPTIONS	DATE
1		4-NOV-2010
2		12-NOV-2010

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號：
OUR REF 本署檔號： **BD 3/7004/08 Pt.II**
FAX 圖文傳真： **2718 1477**
TEL 電話： **3105 3216**
www.bd.gov.hk

Mr. Stephen CHIK
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

2 September 2011

Dear Sir,

Shatin to Central Link (SCL)

I herewith acknowledge your letter dated 17 August 2011 and received on 19 August 2011 enclosing the Form BA14, record plans and final fieldworks reports for Stage II Ground Investigation Works in both Scheduled Area and Non-Scheduled Area (Partial Completion as shown in the drawing list) at the captioned, the contents of which have been noted.

Yours sincerely,

(WONG Wing-keung)
Senior Structural Engineer
for Building Authority

c.c. **RGE- Mr. HUI Tung-man**
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

AP - Yeung Sze-wai Wilfred
MTR Corporation Limited,
6/F, Fo Tan Railway House,
9 Lok King Street, Fo Tan,
Shatin, N.T.

S.L. 4 (1/92)

PE-CIVIL & PLANNING DEPT.					
CIVIL ENGINEERING SECTION					
SP#					
Doc Classification: UC ☐ / R ☐ / G ☐ / S ☐			File No.		
Rec'd 7 SEP 2011			Encl ☑		
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G S Harris			Sam Choy		
C K Ho			Corey Ho		
Edward Ngai			C H Tse		
Linda Young			Charles Pang		
Evan Tsui					
Jack Lai					
Raymond Yu					

pasting (2 pages)

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO. **11202/SCL/DH047(P)**

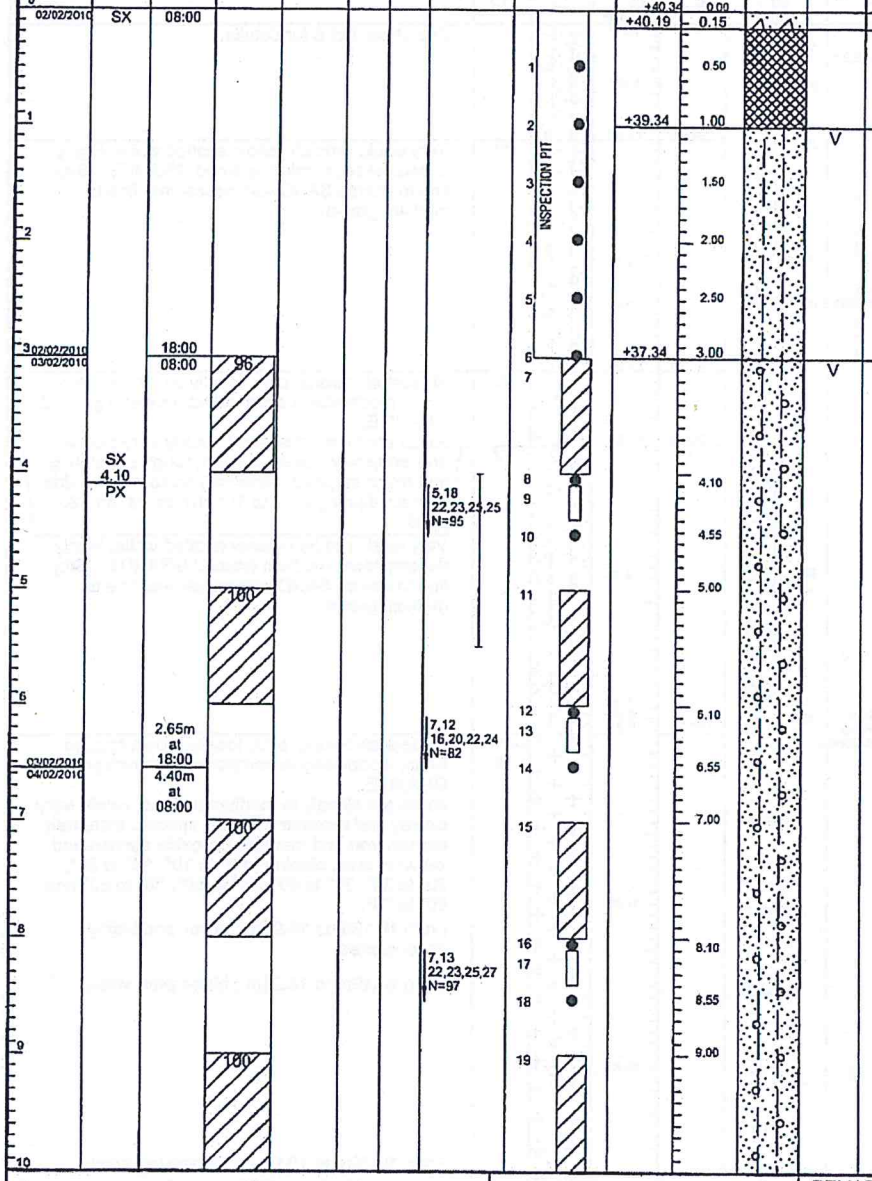
SHEET 1 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836850.42 N 818919.91	JOB NO. GCE1001SI
MACHINE & NO.	DR96		DATE FROM 02/02/2010 TO 11/02/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.34 mPD



Grey, CONCRETE.

Reddish brown, silty fine to coarse SAND with some subangular to subrounded fine to medium gravel sized highly decomposed granite and concrete fragments. (FILL)

Extremely weak, brown spotted white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND)

Extremely weak, reddish yellow spotted white, completely decomposed, medium grained GRANITE. (Silty fine to coarse SAND with occasional fine to coarse gravel)

- SMALL DISTURBED SAMPLE
- LARGE DISTURBED SAMPLE
- SPT LINER SAMPLE
- U76 UNDISTURBED SAMPLE
- U100 UNDISTURBED SAMPLE
- MAZIER SAMPLE
- PISTON SAMPLE
- WATER SAMPLE
- PIEZOMETER TIP
- STANDPIPE
- STANDARD PENETRATION TEST
- PERMEABILITY TEST
- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/02/2010

CHECKED James Lu

DATE 17/02/2010

REMARKS
1. Constant head permeability tests were carried out from the depths of 4.00m to 5.50m and 11.50m to 13.00m.
2. Piezometer tip was installed at a depth of 15.50m.
3. Standpipe was installed at a depth of 12.50m.
4. Packer tests were carried out from the depths of 19.00m to 22.00m and 26.50m to 29.50m.
5. Acoustic televiewer survey was carried out from the depths of 16.50m to 41.50m.
6. Water sample (2L) was taken.

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. **11202/SCL/DH047(P)**

SHEET 2 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836850.42 N 818919.91	JOB NO. GCE1001SI
MACHINE & NO.	DR96		DATE FROM 02/02/2010 TO 11/02/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.34 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
10	PX						9,15 19,21,26,29 N=95	20 21 22		10.00 10.10 10.55			See sheet 1 of 8 for details.
11			100					23	+29.34	11.00		IV	Very weak, reddish yellow spotted white, highly decomposed, medium grained GRANITE. (Silty fine to coarse SAND with occasional fine to medium gravel)
12		18:00 04/02/2010 11.70m 05/02/2010 at 08:00					8,16 23,29,48/70mm (100blS/220mm)	24 25 26		12.10 12.47			
13	PX 13.00 HX		92	86	80	>20 1.8		T2I01	+27.34	13.00		III	Moderately strong, pink, locally brown spotted white, moderately decomposed, medium grained GRANITE. Joints are medium spaced, locally very closely and extremely closely spaced, rough undulating and rough stepped, extremely narrow, iron oxide stained, dipping at 0° to 10°, 10° to 20° and 20° to 30°.
14			43					27	+26.69	13.65		IV	Very weak, reddish yellow spotted white, highly decomposed, medium grained GRANITE. (Silty fine to coarse SAND with occasional fine to medium gravel)
15			90					28 29		14.80			
16	HX 16.13						50/45mm 100/55mm (100blS/55mm)	30 31	+24.21	15.90 16.00 16.13		IV III	Moderately strong, pink, locally brown spotted white, moderately decomposed, medium grained GRANITE. Joints are closely to medium spaced, locally very closely and extremely closely spaced, extremely narrow, iron and manganese oxide stained and kaolin coated, dipping at 0° to 10°, 10° to 20°, 20° to 30°, 30° to 40°, 40° to 50°, 50° to 60° and 60° to 70°. From 16.13m to 16.23m : Weak and highly decomposed.
17			100	95	92	>20 2.6 >20 6.1		T2I01					
18			100	94	88	2.9 >20 6.1		T2I01		17.83			From 18.19m to 18.24m : Moderately weak.
19			100	93	62	13.3		T2I01		19.04			
20						>20							From 19.73m to 19.92m : Moderately weak.

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- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/02/2010

CHECKED James Lu

DATE 17/02/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO. 11202/SCL/DH047(P)

SHEET 3 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836850.42 N 818919.91	JOB NO. GCE1001SI
MACHINE & NO.	DR96		DATE FROM 02/02/2010 TO 11/02/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.34 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
20						7.7 2.7		T2IOI		20.00			
05/02/2010 06/02/2010		5.60m at 18:00								20.54			
21		18.10m at 08:00	100	100	86	18.5 5.3 1.4		T2IOI				II	From 21.24m to 21.82m : Strong and slightly decomposed.
22			100	86	73	10.0 >20 5.1 >20 2.2		T2IOI		22.06		III	
23			100	97	97	5.3		T2IOI		23.53		II III	From 22.75m to 23.10m : Strong and slightly decomposed.
24						>20 4.2		T2IOI					
25			100	100	100	>20 9.4		T2IOI		25.05			
26						2.6		T2IOI					
27			100	89	89	7.5		T2IOI		26.52			
28			100	79	61	>20 3.8 >20 10.0 >20		T2IOI		28.05			
29						11.6 4.0		T2IOI					
30			100	77	54	>20 6.7 16.0		T2IOI		29.52			From 29.52m to 29.62m : Moderately weak.

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- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED	Y.K. Lee
DATE	12/02/2010
CHECKED	James Lu
DATE	17/02/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. 11202/SCL/DH047(P)

SHEET 4 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836850.42 N 818919.91	JOB NO. GCE1001SI
MACHINE & NO.	DR96		DATE FROM 02/02/2010 TO 11/02/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.34 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
30										30.00			
31						5.4		T2I01					From 30.70m to 30.85m : Moderately weak.
						>20				31.03			
						15.4		T2I01					
			100	70	65	3.3							
32						12.5		T2I01		32.03			
			100	90	75	>20							
						3.4		T2I01					
		7.80m at 18:00								33.00			
33	06/02/2010												
	08/02/2010	17.50m at 08:00	100	100	88	8.7		T2I01					
						1.4							
34						5.2				34.06		II	From 33.98m to 34.56m : Strong and slightly decomposed.
			100	100	81			T2I01				III	
35												II	From 34.66m to 36.38m : Strong and slightly decomposed. From 34.84m to 35.08m : Pegmatite.
						1.7				35.55			
			100	100	100			T2I01					
36													
			100	100	64			T2I01		36.45		III	From 36.38m to 37.15m : Pegmatite.
37						3.6							
						9.8		T2I01					
38			100	72	59					37.88			From 37.88m to 38.63m : Pegmatite.
						5.3							
						10.2		T2I01					
39						>20							
						10.7				39.33			
			100	89	49	>20							
						12.9		T2I01					
40						3.8							

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- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/02/2010

CHECKED James Lu

DATE 17/02/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO. 11202/SCL/DH047(P)

SHEET 5 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836850.42 N 818919.91	JOB NO. GCE1001SI
MACHINE & NO.	DR96		DATE FROM 02/02/2010 TO 11/02/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.34 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
40						≥20		T2I01		40.00			
			100	100	100	4.2				40.25			At 40.14m : 1mm kaolin infilling.
41			100	100	100	1.0		T2I01		41.07		II	From 41.14m to 43.22m : Strong and slightly decomposed.
42			100	100	100			T2I01		42.53			From 42.48m to 42.65m : Pegmatite.
43												III	
44			100	100	88	2.7		T2I01		43.88			From 43.78m to 45.09m : Fine grained granite.
45		6.80m at 18:00				20.0							
						7.7							
	08/02/2010 09/02/2010	18.60m at 08:00	100	100	100	4.7		T2I01		45.31			
46			100	100	86			T2I01		46.75			
47						0.3							
48			100	100	100			T2I01		48.23			
49			100	100	100			T2I01		49.63			
50													

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LOGGED Y.K. Lee

DATE 12/02/2010

CHECKED James Lu

DATE 17/02/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. **11202/SCL/DH047(P)**

SHEET 6 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836850.42 N 818919.91	JOB NO. GCE1001SI
MACHINE & NO.	DR96		DATE FROM 02/02/2010 TO 11/02/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.34 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
50										50.00			
51			100	100	100	20.0 2.8 1.2		T2101		51.04		II	From 51.43m to 51.29m : With a subvertical joint. From 51.96m to 52.95m : Strong and slightly decomposed.
52			100	100	100	0.3		T2101		52.38		III	
53								T2101					
54			100	100	100			T2101		53.87			
55		7.90m at 16:00				4.8		T2101					
56	08/02/2010 10/02/2010	18.30m at 08:00	100	100	95	1.1		T2101		55.27			
57			100	100	100	0.6		T2101	-16.63	56.78 56.97		II	Strong, pink spotted black, slightly decomposed, fine to medium grained GRANITE. Joints are medium to widely spaced, locally very widely spaced, very closely to closely spaced, rough undulating, rough planar and rough stepped, locally spaced, extremely narrow, iron and manganese oxide stained, kaolin coated, dipping at 0° to 10°, 10° to 20°, 20° to 30°, 30° to 40°, 40° to 50°, 50° to 60°, 60° to 70° and subvertical. From 57.68m to 60.67m : Fine grained granite.
58			100	100	95	12.0 2.4		T2101		58.25			
59								T2101		59.69			
60			100	100	100	20.0 2.5		T2101					

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LOGGED	Y.K. Lee
DATE	12/02/2010
CHECKED	James Lu
DATE	17/02/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.
GROUND INVESTIGATION DEPARTMENT

HOLE NO. **11202/SCL/DH047(P)**

SHEET 7 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836850.42 N 818919.91	JOB NO. GCE1001SI
MACHINE & NO.	DR96		DATE FROM 02/02/2010 TO 11/02/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.34 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
60										60.00			
61			100	100	100			T2101		61.05			
62						1.5		T2101		62.38			
63			100	97	91	1.5		T2101		63.87		III	From 63.69m to 63.87m : Moderately strong, moderately decomposed.
64						3.3						II	
65		9.70m at 18:00	100	94	91	≥20 10.0 17.6 1.4		T2101		65.38			
66	10/02/2010 11/02/2010	17.40m at 08:00	100	100	100	≥20 5.4 14.3 3.2		T2101		66.80			
67			100	100	100	6.7 0.3		T2101		68.28			
68			100	100	100			T2101		69.64		III	From 69.42m to 71.16m : Moderately strong, moderately decomposed.
69			100	82	72			T2101					
70													

- SMALL DISTURBED SAMPLE
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- PACKER TEST

LOGGED Y.K. Lee

DATE 12/02/2010

CHECKED James Lu

DATE 17/02/2010

REMARKS

GEOTECHNICS & CONCRETE ENGG. (H.K.) LTD.

GROUND INVESTIGATION DEPARTMENT

HOLE NO. **11202/SCL/DH047(P)**

SHEET 8 OF 8

DRILLHOLE RECORD

CONTRACT NO. 11202

PROJECT Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link

METHOD	Rotary Cored	CO-ORDINATES E 836850.42 N 818919.91	JOB NO. GCE1001SI
MACHINE & NO.	DR96		DATE FROM 02/02/2010 TO 11/02/2010
FLUSHING MEDIUM	Water	ORIENTATION Vertical	GROUND LEVEL +40.34 mPD

Drilling Progress	Casing size	Water level (m) & Time	Total core Recovery %	Solid core Recovery %	R.Q.D.	Fracture Index	Tests	Samples	Reduced Level	Depth (m)	Legend	Grade	Description
70										70.00			
71						8.2		T2I01					
						3.4							
						>20				71.16		II	
			100	100	91	4.5							
72								T2I01					
						20.0				72.59		III	From 72.49m to 72.59m : Moderately strong, moderately decomposed.
			100	100	100	4.6						II	
73								T2I01					
		7.10m at 18:00											
		11/02/2010							-33.55	73.89			Hole completed at 73.89m.
74													
75													
76													
77													
78													
79													
80													

- SMALL DISTURBED SAMPLE
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- IMPRESSION PACKER TEST
- IN-SITU VANE SHEAR TEST
- PACKER TEST

LOGGED Y.K. Lee

DATE 12/02/2010

CHECKED James Lu

DATE 17/02/2010

REMARKS


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 0.00 M TO 17.63 M
BOX : 1 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
0.00
13.00
13.65
16.13
17.63


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 17.63 M TO 21.05 M
BOX : 2 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
17.63
19.04
20.54
(21.05)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 21.05 M TO 24.24 M
BOX : 3 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
(21.05)
22.06
23.53
(24.24)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 24.24 M TO 27.82 M
BOX : 4 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
(24.24)
25.05
26.52
(27.82)

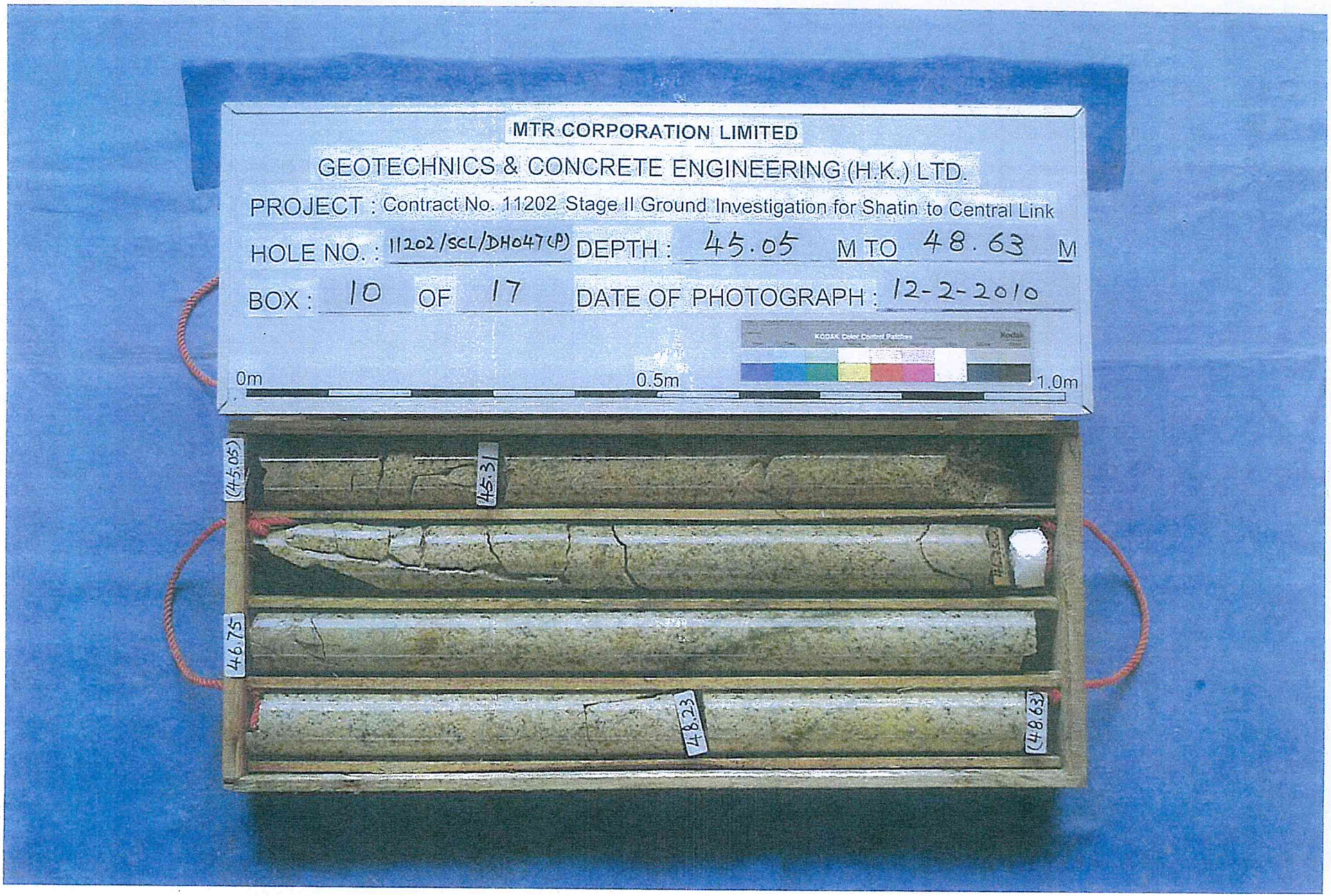

MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 27.82 M TO 31.03 M
BOX : 5 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
(27.82)
28.05
29.52
31.03


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 31.03 M TO 34.66 M
BOX : 6 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
31.03
32.03
33.00
34.06
(34.66)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 34.66 M TO 37.88 M
BOX : 7 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
(34.66)
35.55
36.45
37.88


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 37.88 M TO 41.33 M
BOX : 8 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
37.88
39.33
40.25
41.07
(41.33)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 41.33 M TO 45.05 M
BOX : 9 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
(41.33)
42.53
43.88
(45.05)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 45.05 M TO 48.63 M
BOX : 10 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
(45.05)
45.31
46.75
48.23
(48.63)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 48.63 M TO 52.38 M
BOX : 11 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
(48.63)
49.63
51.04
52.38


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 52.38 M TO 56.07 M
BOX : 12 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
52.38
53.87
55.27
(56.07)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 56.07 M TO 59.69 M
BOX : 13 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
56.07
56.78
58.25
59.69


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 59.69 M TO 63.29 M
BOX : 14 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
59.69
61.05
62.38
(63.29)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 63.29 M TO 66.80 M
BOX : 15 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
(63.29)
63.87
65.38
66.80


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 66.80 M TO 70.34 M
BOX : 16 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
66.80
68.28
69.64
(70.34)


MTR CORPORATION LIMITED
GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
PROJECT : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
HOLE NO. : 11202/SCL/DH047(P) DEPTH : 70.34 M TO 73.89 M
BOX : 17 OF 17 DATE OF PHOTOGRAPH : 12-2-2010
0m
0.5m
1.0m
(70.34)
71.16
72.59
73.89
END

Geotechnics & Concrete Engineering (HK) Ltd.		Drillhole No. : 11202/SCL/DH047(P)
WATER ABSORPTION (PACKER) TEST	Contract No: 11202	Test No. : 1
Project : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link		Job No. GCE1001SI

Date of test :	23/02/2010	Test section from 19.00 m to 22.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test :	73.89 m
Flowmeter ID No. :	M008-31	Depth of casing at time of test :	16.15 m
Dip Meter ID No. :	M009-55	Rock Type :	S.D. / M.D. GRANITE
Stop Watch ID No. :	M024-13	Gauge height above ground level :	0.98 m
Pressure Gauge ID No. :	M007-10	Packer pressure :	2000 kPa
Depth to centre of test section (measured down line of drillhole) :		20.50	m
Depth to ground water level (measured down line of drillhole) :		15.54	m

FIRST PERIOD GAUGE PRESSURE 123 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11403.90	11403.90	11403.90	11403.90				
Water intake (litres)	0.00	0.00	0.00					0.00

SECOND PERIOD GAUGE PRESSURE 246 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11405.10	11405.10	11405.10	11405.10				
Water intake (litres)	0.00	0.00	0.00					0.00

THIRD PERIOD GAUGE PRESSURE 369 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11406.60	11406.60	11406.60	11406.60				
Water intake (litres)	0.00	0.00	0.00					0.00

FOURTH PERIOD GAUGE PRESSURE 246 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11406.60	11406.60	11406.60	11406.60				
Water intake (litres)	0.00	0.00	0.00					0.00

FIFTH PERIOD GAUGE PRESSURE 123 kPa

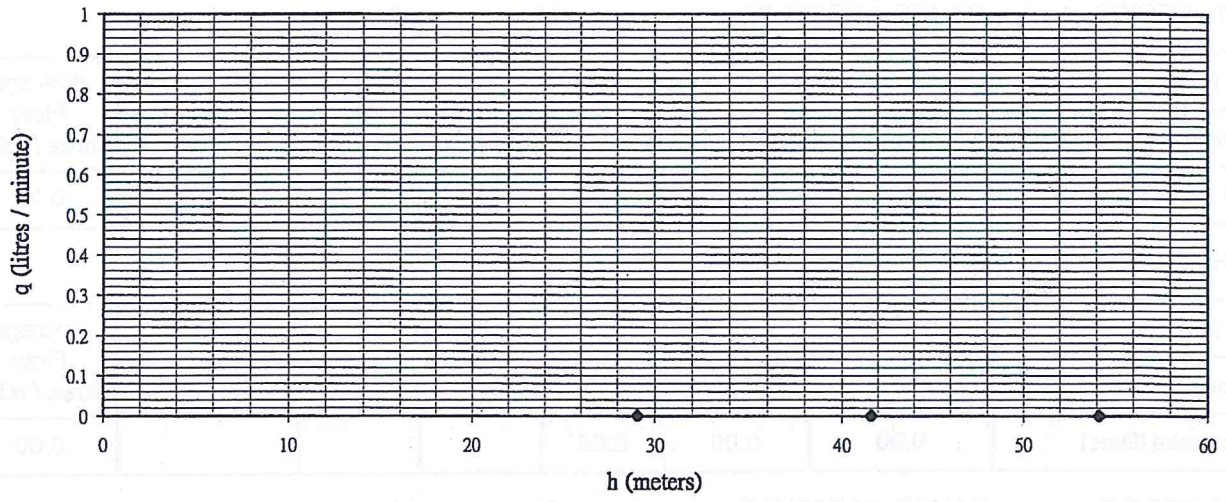
Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11406.60	11406.60	11406.60	11406.60				
Water intake (litres)	0.00	0.00	0.00					0.00

Tested by :	C.K. Lai	Date : 23/02/2010	Remark :
Checked by :	James Lu	Date : 24/02/2010	

Geotechnics & Concrete Engg. (HK) Ltd.	Contract No. : 11202	Job No. : GCE1001SI
WATER ABSORPTION (PACKER) TEST	Drillhole No. : 11202/SCL/DH047(P)	Test No. : 1

Date of test :	23/02/2010	Test section from 19.00 m to 22.00 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test : 73.89 m	
Flowmeter ID No. :	M008-31	Diameter of hole in test section : m	
Dip Meter ID No. :	M009-55	Rock Type : S.D. / M.D. GRANITE	
Stop Watch ID No. :	M024-13	Casing details	
Pressure Gauge ID No. :	M007-10	Orientation : Vertical	Packer pressure 2000 kPa

LENGTH OF TEST SECTION (1) 3.00 m	FLOW q (litres / min.)	GAUGE PRESSURE Units (kPa)	GAUGE PRESSURE Head of Water (m)	FRICTION HEAD LOSS in Basic Pipework (m)	FRICTION HEAD LOSS in Extra Rods / Pipes (m)	TOTAL HEAD h (2)+(3)+(6)-(7)-(8) (m)
	(4)	(5)	(6)	(7)	(8)	(9)
VERTICAL DEPTH TO GROUNDWATER FROM GROUND LEVEL (2) 15.54 m	0.00	123	12.55			29.07
	0.00	246	25.09			41.61
HEIGHT OF PRESSURE GAUGE ABOVE GROUND LEVEL (3) 0.98 m	0.00	369	37.64			54.16
	0.00	246	25.09			41.61
	0.00	123	12.55			29.07



FROM GRAPH : $\frac{q}{h} = \frac{(\ 0.00\ -\ 0.00\ )}{(\ 41.61\ -\ 29.07\ )}$

$L = \frac{100q}{lh} =$ 0.00 lugeon units

where l = length of test section in meters

Note : If ground water level unknown or below test section, use depth to centre of test section.

Date calculated	Date checked
23/02/2010	24/02/2010
Calculated by	**Checked by**
C.K. Lai	James Lu

Remark :

PRESSURE CONVERSION TABLE

PRESSURE :	1 lb / in^2	1 kg / cm^2	1 MN / m^2	1 kN / m^2	1 bar
EQUIVALENT HEAD OF WATER	0.7m	10m	100m (101.972m)	0.1m (0.1020m)	10m

Geotechnics & Concrete Engineering (HK) Ltd.		Drillhole No. : 11202/SCL/DH047(P)
WATER ABSORPTION (PACKER) TEST	Contract No: 11202	Test No. : 1
Project : Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link		Job No. GCE1001SI

Date of test :	23/02/2010	Test section from 26.50 m to 29.50 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test :	73.89 m
Flowmeter ID No. :	M008-31	Depth of casing at time of test :	16.15 m
Dip Meter ID No. :	M009-55	Rock Type :	M.D. GRANITE
Stop Watch ID No. :	M024-13	Gauge height above ground level :	0.83 m
Pressure Gauge ID No. :	M007-10	Packer pressure :	2000 kPa
Depth to centre of test section (measured down line of drillhole) :		28.00	m
Depth to ground water level (measured down line of drillhole) :		15.54	m

FIRST PERIOD GAUGE PRESSURE 168 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11362.80	11362.80	11362.80	11362.80				
Water intake (litres)	0.00	0.00	0.00					0.00

SECOND PERIOD GAUGE PRESSURE 336 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11381.90	11381.90	11381.90	11381.90				
Water intake (litres)	0.00	0.00	0.00					0.00

THIRD PERIOD GAUGE PRESSURE 504 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11406.10	11406.90	11407.70	11408.50				
Water intake (litres)	0.80	0.80	0.80					0.16

FOURTH PERIOD GAUGE PRESSURE 336 kPa

Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11409.00	11409.00	11409.00	11409.00				
Water intake (litres)	0.00	0.00	0.00					0.00

FIFTH PERIOD GAUGE PRESSURE 168 kPa

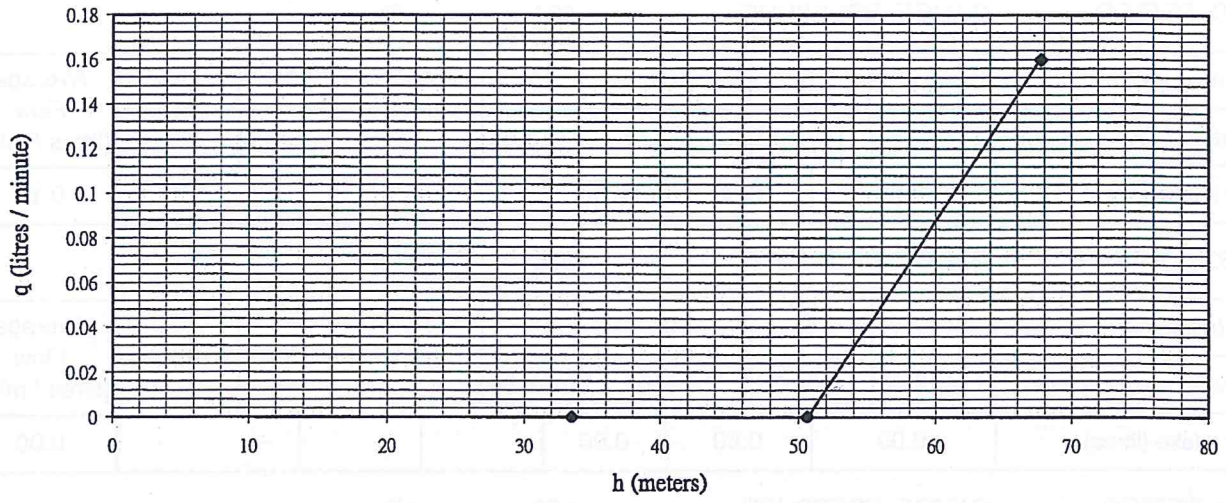
Time (minutes)	0	5	10	15	20	25	30	Average Flow (litres / min.)
Flowmeter reading (litres)	11409.00	11409.00	11409.00	11409.00				
Water intake (litres)	0.00	0.00	0.00					0.00

Tested by :	C.K. Lai	Date : 23/02/2010	Remark :
Checked by :	James Lu	Date : 24/02/2010	

Geotechnics & Concrete Engg. (HK) Ltd.	Contract No. : 11202	Job No. : GCE1001SI
WATER ABSORPTION (PACKER) TEST	Drillhole No. : 11202/SCL/DH047(P)	Test No. : 1

Date of test :	23/02/2010	Test section from 26.50 m to 29.50 m	
Packer type :	Pneumatic - Double	Depth of hole at time of test : 73.89 m	
Flowmeter ID No. :	M008-31	Diameter of hole in test section : m	
Dip Meter ID No. :	M009-55	Rock Type : M.D. GRANITE	
Stop Watch ID No. :	M024-13	Casing details	
Pressure Gauge ID No. :	M007-10	Orientation : Vertical	Packer pressure 2000 kPa

LENGTH OF TEST SECTION (1) 3.00 m	FLOW	GAUGE PRESSURE		FRICTION HEAD LOSS		TOTAL HEAD
	q (litres / min.)	Units (kPa)	Head of Water (m)	in Basic Pipework (m)	in Extra Rods / Pipes (m)	h (2)+(3)+(6)-(7)-(8) (m)
	(4)	(5)	(6)	(7)	(8)	(9)
VERTICAL DEPTH TO GROUNDWATER FROM GROUND LEVEL (2) 15.54 m	0.00	168	17.14			33.51
	0.00	336	34.27			50.64
HEIGHT OF PRESSURE GAUGE ABOVE GROUND LEVEL (3) 0.83 m	0.16	504	51.41			67.78
	0.00	336	34.27			50.64
	0.00	168	17.14			33.51



FROM GRAPH : $\frac{q}{h} = \frac{(\ 0.00\ -\ 0.00\ )}{(\ 50.64\ -\ 33.51\ )}$

$L = \frac{100q}{lh} = 0.00$ lugeon units

where l = length of test section in meters

Note : If ground water level unknown or below test section, use depth to centre of test section.

Date calculated	Date checked
23/02/2010	24/02/2010
Calculated by	**Checked by**
C.K. Lai	James Lu

Remark :

PRESSURE CONVERSION TABLE

PRESSURE :	1 lb / in^2	1 kg / cm^2	1 MN / m^2	1 kN / m^2	1 bar
EQUIVALENT HEAD OF WATER	0.7m	10m	100m (101.972m)	0.1m (0.1020m)	10m

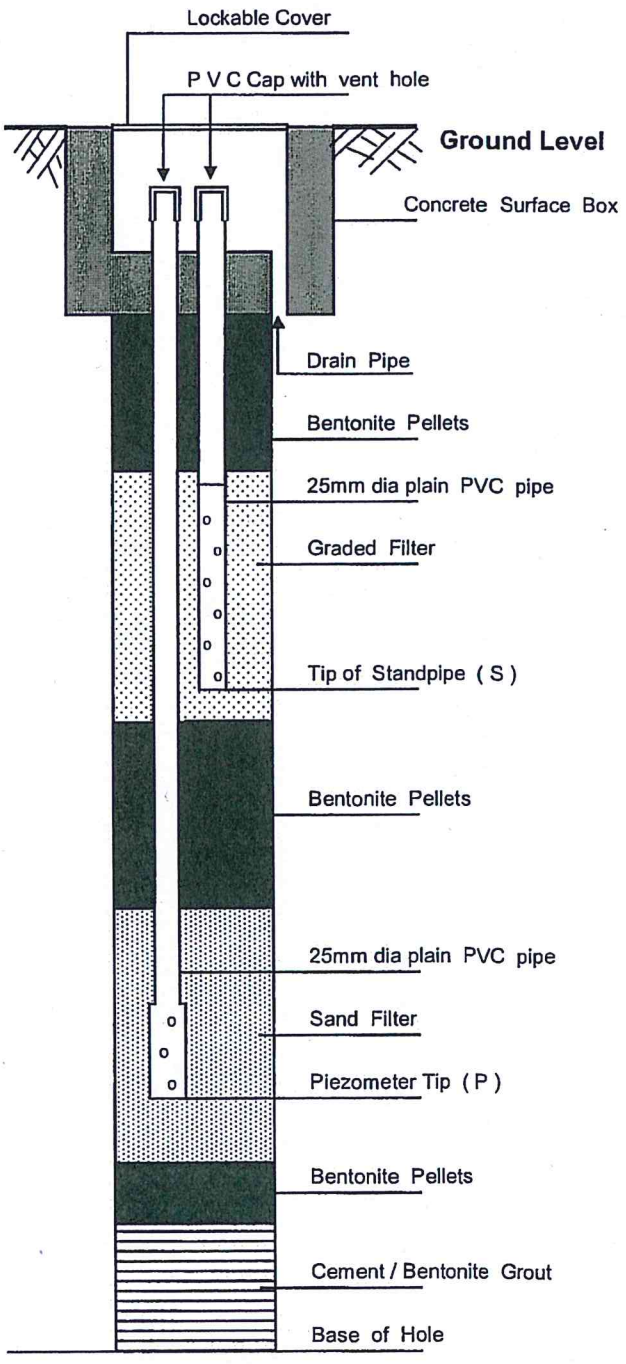
	Geotechnics & Concrete Engg. (HK) Ltd.	Hole No. : 11202/SCL/DH047(P)
	GROUND INVESTIGATION DEPARTMENT	Piezometer ID. : **DH047(P)**
	Installation Details of Piezometer and Standpipe and Groundwater Records	Standpipe ID. : **DH047(S)**

Contract No. : **11202**	Job No. : **GCE1001SI**	Date Installed	: **25/02/2010**
Project : **Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link**		Installed by	: **S.H. Wong**
Co-ordinates : E **836850.42** N **818919.91**	Ground Level : **40.34** mPD	Supervised by	: **K.H. Cheung**
Response Zone of Piezometer : **25.64** mPD to **24.34** mPD	Piezometer (P) Tip Level : **24.84** mPD	Checked by	: **James Lu**
Response Zone of Standpipe : **38.34** mPD to **27.34** mPD	Standpipe (S) Tip Level : **27.84** mPD	Date checked	: **26/02/2010**
Remarks :			

INSTALLATION DETAILS OF PIEZOMETER AND STANDPIPE

Date		Depth of G.W.L. (m)
	S	Dry
27/02/2010	P	Dry
	S	Dry
01/03/2010	P	Dry
	S	Dry
02/03/2010	P	Dry
	S	Dry
03/03/2010	P	Dry
	S	Dry
04/03/2010	P	Dry
	S	Dry
05/03/2010	P	Dry
	S	Dry
06/03/2010	P	Dry

Reduced Level (mPD)	Depth (m)
40.34	0.00
40.24	0.10
40.19	0.15
40.04	0.30
38.34	2.00
27.84	12.50
27.34	13.00
25.64	14.70
24.84	15.50
24.34	16.00
23.34	17.00
-33.55	73.89

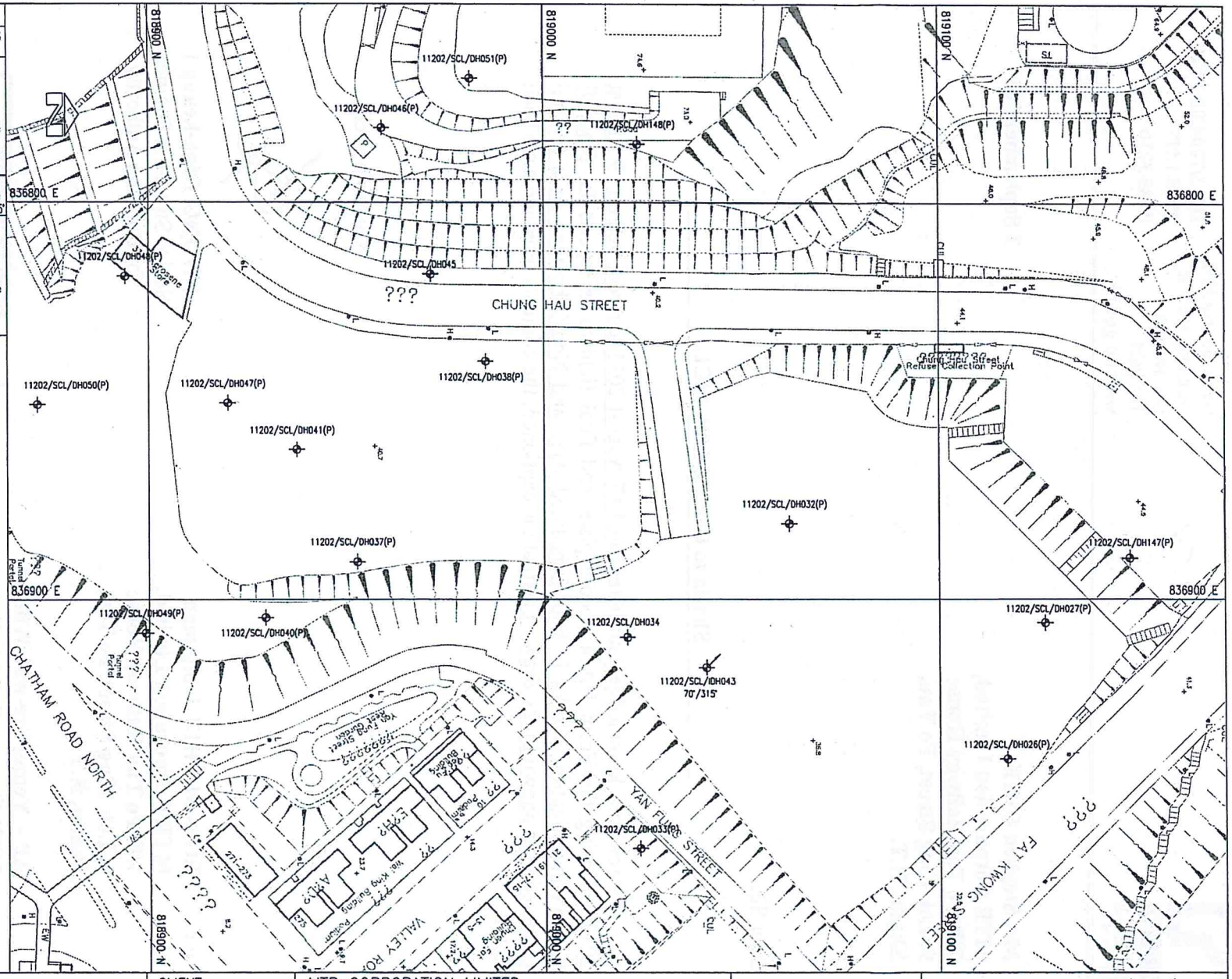


(Not to Scale)

PS-mmbc

NOTES:

Borehole No.	Northing	Easting	Ground LEVEL(mPD)	Termination LEVEL(mPD)	Remark
11202/SCL/DH026(P)	819116.75	836940.30	36.76	-20.21	
11202/SCL/DH027(P)	819126.41	836905.94	36.95	-18.97	
11202/SCL/DH032(P)	819061.88	836881.12	36.90	-25.53	
11202/SCL/DH033(P)	819023.98	836963.06	23.29	-10.41	Top of Vertical Drillhole
11202/SCL/DH034	819020.96	836909.53	36.89	-51.56	
11202/SCL/DH037(P)	818952.59	836890.62	40.36	-33.93	
11202/SCL/DH038(P)	818985.28	836839.30	39.91	-33.46	
11202/SCL/DH040(P)	818929.35	836904.57	35.49	-33.45	
11202/SCL/DH041(P)	818937.34	836862.29	40.40	-33.78	
11202/SCL/IDH043	819040.96	836917.10	36.89	-28.79	Inclined Drillhole 70°/315°
11202/SCL/DH045	818971.34	836817.85	39.00	-34.10	
11202/SCL/DH046(P)	818959.05	836781.27	63.75	-33.47	
11202/SCL/DH047(P)	818919.91	836850.42	40.34	-33.55	
11202/SCL/DH048(P)	818894.02	836818.45	31.58	-33.75	Top of Vertical Drillhole
11202/SCL/DH049(P)	818899.11	836908.43	22.42	-33.31	
11202/SCL/DH050(P)	818871.82	836850.83	25.44	-33.29	
11202/SCL/DH051(P)	818981.52	836768.69	74.74	-33.66	
11202/SCL/DH147(P)	819147.92	836889.72	44.08	-21.62	
11202/SCL/DH148(P)	819023.91	836785.26	71.31	31.21	



SYMBOLS :-

- 11202/SCL/DH026(P) — BOREHOLE/DRILLHOLE
- 11202/SCL/DH026(P) 60°/270° — INCLINED BOREHOLE (DIP/BEARING)
- 11202/SCL/DH026(P) — TRIAL PIT/TRENCH
- SS001A — SURFACE STRIPPING
- MTR PROTECTION ZONE
- SEWAGE TUNNEL PROTECTION ZONE

CLIENT	MTR CORPORATION LIMITED
PROJECT	Contract No. 11202 Stage II Ground Investigation for Shatin to Central Link
MAIN CONTRACTOR	GEOTECHNICS & CONCRETE ENGINEERING (H.K.) LTD.
TITLE	VOLUME 2 – HOMANTIN

JOB NO. GCE1001SI

SCALE 1 : 1000 (A3)

DRAWN BY: P.M. WONG

SURVEYED BY: FONG WAI YIN

PLAN NO. 3265/02/01

REVISION NO.	DESCRIPTIONS	DATE
1		4-NOV-2010
2		12-NOV-2010

屋宇署
BUILDINGS DEPARTMENT

YOUR REF 來函檔號：
OUR REF 本署檔號：
FAX 圖文傳真：
TEL 電話：
www.bd.gov.hk

BD 3/7004/08 Pt.II
2718 1477
3105 3216

Mr. Stephen CHIK
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

2 September 2011

Dear Sir,

Shatin to Central Link (SCL)

I herewith acknowledge your letter dated 17 August 2011 and received on 19 August 2011 enclosing the Form BA14, record plans and final fieldworks reports for Stage II Ground Investigation Works in both Scheduled Area and Non-Scheduled Area (Partial Completion as shown in the drawing list) at the captioned, the contents of which have been noted.

Yours sincerely,

(WONG Wing-keung)
Senior Structural Engineer
for Building Authority

c.c. **RGE- Mr. HUI Tung-man**
MTR Corporation Limited,
7/F, Fo Tan Railway House
9, Lok King Street, Fo Tan,
Shatin, N.T.

AP - Yeung Sze-wai Wilfred
MTR Corporation Limited,
6/F, Fo Tan Railway House,
9 Lok King Street, Fo Tan,
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S.L. 4 (1/92)

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