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LUGEON WATER TEST

Hole ID
V-BH uL 1

CLIENT	: Lab 1	POSITION	: Area 1	INTERVAL	: **12.00 - 14.00 m**
CONTRACTOR	: Contractor 1	EASTING	: 236.2 m	TEST No.	: 2
PROJECT	: Construction Project	NORTHING	: 57.9 m	STATUS	: Final
LOCATION	: Somewhere, World	COORD. SYS.	: SVY21	TEST DATE	: 01/09/2016
PROJECT No.	: 1.00.1	GROUND RL	: 5 m MSL		

1. Field Record

Borehole size	: HQ3	Top of test section	: 10.4 mbgl
Borehole Diameter	: 96 mm	Bottom of test section	: 12.1 mbgl
Packer type	: Double	Centre of test section	: 11.3 mbgl
Packer Inflation Pressure	: 0 kPa N/A	Length of test section	: 2.0 m
Packer seal condition	: Good	Pressure gauge height	: 1.5 m
Friction losses	: 1.00 kPa	Initial depth of GW	: 2.6 mbgl
Inclination of Borehole	: -60°	Correction to gauge pressure	: 39.2 kPa

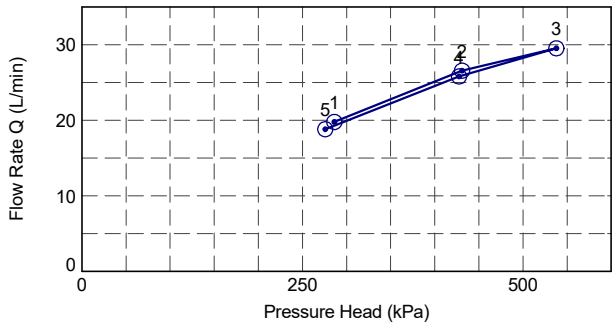
2. Gauge Record

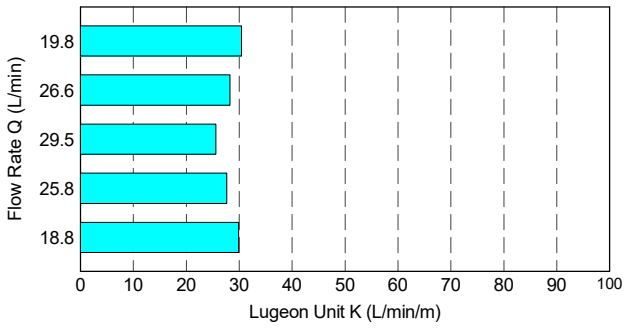
Pressure Stage (kPa)	Time for 100L Water Loss (mm:ss)				Flow Rate (L/min)
	100	100	100		Typical Value
286	4:50	5:09	5:12		19.78
431	3:40	3:45	3:53		26.56
538	3:21	3:29	3:20		29.52
427	3:59	3:50	3:49		25.80
276	5:10	5:30	5:17		18.82

3. Calculation

Pressure Stage (kPa)	Effective Head (kPa)	Volume Loss (L)	Flow Rate Q (L/min)	Flow Rate per m (L/min/m)	Lugeon Value (L/min/m)	Hydraulic Conductivity K (m/sec)	Hydraulic Conductivity K (m/day)
286	325.3	300.0	19.8	9.9	30.4	2.95E-6	2.55E-1
431	470.1	300.0	26.6	13.3	28.3	2.74E-6	2.37E-1
538	577.0	300.0	29.5	14.8	25.6	2.48E-6	2.14E-1
427	466.7	300.0	25.8	12.9	27.6	2.68E-6	2.32E-1
276	315.0	300.0	18.8	9.4	29.9	2.90E-6	2.51E-1
Average					28	2.7E-6	2.4E-1
Interpreted Lugeon Value - laminar flow (Houlsby:1976)					**28**		

4. Graphic Presentation





5. Core Description

Typical Description:
Strong Dark grey GRANITE moderately weathered, slightly fractured.

Fracture Spacing	: 10-100 mm
RQD	: 90 %
Weathering Condition	: I-II
Is(50)	: 2.5 MPa

6. Other Observations

Any leakages, unstable pressure, hole stability or other test issues?
None

Analysed By : PB Date: 02/09/2016
Checked By : CB Date: 03/09/2016

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LUGEON WATER TEST

Hole ID
V-BH uL 2

CLIENT	: Lab 1	POSITION	: Area 2	INTERVAL	: **12.20 - 18.20 m**
CONTRACTOR	: Contractor 1	EASTING	: 263140.6 m	TEST No.	: 2
PROJECT	: Construction Project	NORTHING	: 6266161.1 m	STATUS	: Final
LOCATION	: Somewhere, World	COORD. SYS.	: SVY21	TEST DATE	: 01/09/2016
PROJECT No.	: 1.00.1	GROUND RL	: 1 m MSL		

1. Field Record

Borehole size	: HQ3	Top of test section	: 12.2 mbgl
Borehole Diameter	: 96 mm	Bottom of test section	: 18.2 mbgl
Packer type	: Double	Centre of test section	: 15.2 mbgl
Packer Inflation Pressure	: N/A	Length of test section	: 6.0 m
Packer seal condition	: Good	Pressure gauge height	: 1.0 m
Friction losses	:	Initial depth of GW	: 3.0 mbgl
Inclination of Borehole	: -90°	Correction to gauge pressure	: 39.2 kPa

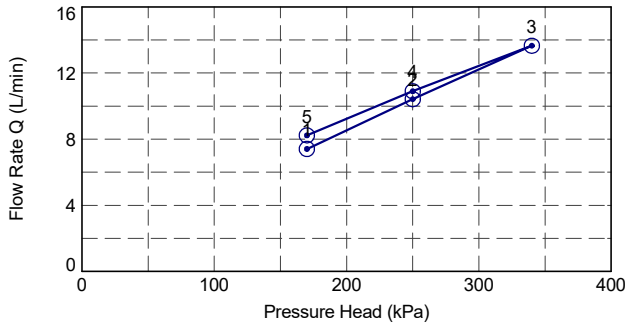
2. Gauge Record

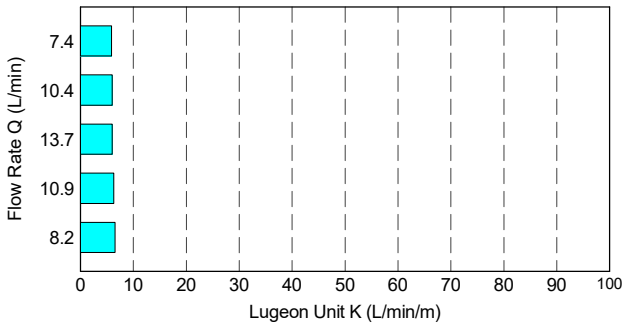
Pressure Stage (kPa)	Flow Meter Readings (L)											Water Taken Over Time Period (L)									
	Start	1 min	2 min	3 min	4 min	5 min	6 min	7 min	8 min	9 min	10 min	0-1 min	1-2 min	2-3 min	3-4 min	4-5 min	5-6 min	6-7 min	7-8 min	8-9 min	9-10 min
170	13779	13787	13794	13801	13809	13816	13824	13831	13839	13846	13853	8	7	7	7	7	8	8	8	7	7
250	13859	13870	13880	13891	13902	13912	13923	13933	13943	13953	13963	11	10	11	11	11	11	10	10	10	10
340	13972	13986	14000	14014	14027	14041	14054	14068	14081	14095	14109	14	14	14	13	14	14	14	13	14	14
250	14115	14126	14137	14148	14159	14170	14181	14191	14202	14213	14224	11	11	11	11	11	11	11	11	11	11
170	14229	14237	14245	14254	14262	14270	14278	14287	14295	14303	14311	8	8	8	8	8	8	8	8	8	8

3. Calculation

Pressure Stage (kPa)	Effective Head (kPa)	Volume Loss (L)	Flow Rate Q (L/min)	Flow Rate per m (L/min/m)	Lugeon Value (L/min/m)	Hydraulic Conductivity K (m/sec)	Hydraulic Conductivity K (m/day)
170	209.2	7.4	7.4	1.2	5.9	7.41E-7	6.40E-2
250	289.2	10.4	10.4	1.7	6.0	7.54E-7	6.51E-2
340	379.2	13.7	13.7	2.3	6.0	7.53E-7	6.51E-2
250	289.2	10.9	10.9	1.8	6.3	7.88E-7	6.81E-2
170	209.2	8.2	8.2	1.4	6.6	8.23E-7	7.11E-2
Average					6	7.7E-7	6.7E-2
Interpreted Lugeon Value - wash-out (Houlsby:1976)					**7**		

4. Graphic Presentation





5. Core Description

Typical Description:
Moderately strong to strong Light grey GRANITE weathered, fractured

Fracture Spacing	: 30-100 mm
RQD	: 45-79 %
Weathering Condition	: VI
Is(50)	: 5.0 MPa

6. Other Observations

Any leakages, unstable pressure, hole stability or other test issues?
None

Analysed By : PB Date: 02/09/2016
Checked By : CB Date: 03/09/2016

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LUGEON WATER TEST

Hole ID
V-BH uL 3

CLIENT	: Lab 1	POSITION	:	INTERVAL	: **39.80 - 45.80 m**
CONTRACTOR	: Contractor 1	EASTING	: 236.2 m	TEST No.	: 1
PROJECT	: Construction Project	NORTHING	: 57.9 m	STATUS	: Final
LOCATION	: Somewhere, World	COORD. SYS.	: SVY21	TEST DATE	: 01/09/2016
PROJECT No.	: 1.00.1	GROUND RL	: 12 m MSL		

1. Field Record

Borehole size	: HQ3	Top of test section	: 34.5 mbgl
Borehole Diameter	: 96 mm	Bottom of test section	: 39.7 mbgl
Packer type	: Single	Centre of test section	: 37.1 mbgl
Packer Inflation Pressure	: 1 kPa N/A	Length of test section	: 6.0 m
Packer seal condition	: Good	Pressure gauge height	: 1.5 m
Friction losses	: 0.00 kPa	Initial depth of GW	: 2.0 mbgl
Inclination of Borehole	: -60°	Correction to gauge pressure	: 34.3 kPa

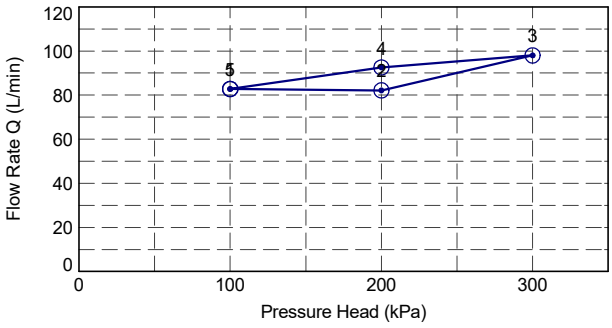
2. Gauge Record

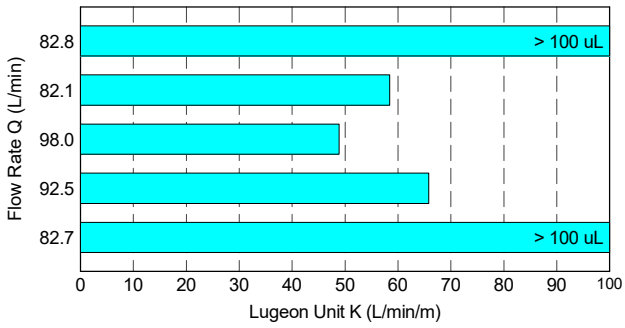
Pressure Stage (kPa)	Flow Meter Readings (L)				Water Taken Over Time Period (L)		
	Start	5 min	10 min	15 min	0-5 min	5-10 min	10-15 min
100	260	440	894	1502	180	454	608
200	280	485	897	1512	205	412	615
300	80	390	987	1550	310	597	563
200	470	720	1132	1858	250	412	726
100	260	440	894	1501	180	454	607

3. Calculation

Pressure Stage (kPa)	Effective Head (kPa)	Volume Loss (L)	Flow Rate Q (L/min)	Flow Rate per m (L/min/m)	Lugeon Value (L/min/m)	Hydraulic Conductivity K (m/sec)	Hydraulic Conductivity K (m/day)
100	134.3	414.0	82.8	13.8	102.7	1.29E-5	1.11E+0
200	234.3	410.7	82.1	13.7	58.4	7.33E-6	6.33E-1
300	334.3	490.0	98.0	16.3	48.9	6.13E-6	5.30E-1
200	234.3	462.7	92.5	15.4	65.8	8.26E-6	7.14E-1
100	134.3	413.7	82.7	13.8	102.6	1.29E-5	1.11E+0
Average					76	9.5E-6	8.2E-1
Interpreted Lugeon Value - turbulent flow (Houlsby:1976)					**49**		

4. Graphic Presentation





5. Core Description

Typical Description:
Strong Dark grey GRANITE slightly weathered, moderated fractured.

Fracture Spacing	: 30-100 mm
RQD	: 92 %
Weathering Condition	: I
Is(50)	: 6.5 MPa

6. Other Observations

Any leakages, unstable pressure, hole stability or other test issues?
None

Analysed By : PB Date: 02/09/2016
Checked By : CB Date: 03/09/2016