



# **APPENDIX F**

## **Packer Test Assessment**

<b>WATER PRESSURE TEST (5 Stage)</b>		Revision N° : 18
Job N° : 0978110-562	Hole N° : TT001	Drilling Method : HQ
Client : OceanaGold NZ Ltd	Dip (Deg) : -90	Hole Diameter (m) : 0.096
Project : Macraes Flat Expansion	DH Interval Top (m) : 14.23	DH Tested Length (m) : 6.00
Location : Macraes Gold Project	DH Interval Base (m) : 20.23	Packer Type : Pneumatic Wireline - Single
Tested By : McNeill Drilling	Computed By : P. Mangeya	Rock tested : Otago Schist
Date : 25/06/2010	Date : 19/07/2010	Water Meter Reading in Litres
		Checked By : B. Sinclair
		Date : 19/07/2010

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume (L)	Discharge (L/min)	Meter discharge - Leakage (L/min)	Discharge/m (L/min/m)	Remarks	
			Time (h:m:s)	Intervals (min)	Reading (Litres)							
P1	50	0	0:00:00	0	111.0		0.00	0.00	0.00	0.00	c : Start Date/Time: 1	
		1	0:05:00	05:00	218.0		107.00	21.40	21.40	3.57		
		2	0:10:00	05:00	318.0		100.00	20.00	20.00	3.33		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
		10										
Total :								41.40	41.40	6.90		
Average:								20.700	20.700	3.450	Leak Flow Rate = 0	
P2	100	0	0:15:00	0	370.0		0.00	0.00	0.00	0.00	c : 1	
		1	0:20:00	05:00	520.0		150.00	30.00	30.00	5.00		
		2	0:25:00	05:00	670.0		150.00	30.00	30.00	5.00		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
		10										
Total :								60.00	60.00	10.00		
Average:								30.000	30.000	5.000	Leak Flow Rate = 0	
P3	150	0	0:30:00	0	720.0		0.00	0.00	0.00	0.00	c : 1	
		1	0:35:00	05:00	920.0		200.00	40.00	40.00	6.67		
		2	0:40:00	05:00	1100.0		180.00	36.00	36.00	6.00		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
		10										
Total :								76.00	76.00	12.67		
Average:								38.000	38.000	6.333	Leak Flow Rate = 0	
P4	100	0	0:45:00	0	220.0		0.00	0.00	0.00	0.00	c : 1	
		1	0:50:00	05:00	390.0		170.00	34.00	34.00	5.67		
		2	0:55:00	05:00	560.0		170.00	34.00	34.00	5.67		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
		10										
Total :								68.00	68.00	11.33		
Average:								34.000	34.000	5.667	Leak Flow Rate = 0	
P5	50	0	0:55:00	0	600.0		0.00	0.00	0.00	0.00	c : Finish Date/Time: 1	
		1	1:00:00	05:00	733.0		133.00	26.60	26.60	4.43		
		2	1:05:00	05:00	865.0		132.00	26.40	26.40	4.40		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
		10										
Total :								53.00	53.00	8.83		
Average:								26.500	26.500	4.417	Leak Flow Rate = 0	

TEST RESULTS											
Stage No.	Lugeon (1933) Value	Lugeon Value Curve			Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity				
P1	31.7				108.8		H <sub>LOSS</sub> 7.12 kPa	Stage No. Average	Gauge Pressure 90 kPa	Q 30 L/min	H 15 m
P2	32.2				155.2		Interpreted Result 35 uL	Reported k at Stage Average			
P3	31.5				201.0		Analytical Method 1: (ref = Golder geotechnical field notes draft 1997) $k = \frac{Q}{H \times 6.10889 \times 10^6 \times (\log(2L/D))L}$				
P4	37.0				153.2		k = 4.3E-06 m/s				
P5	41.4				106.7		Analytical Method 2: (ref = Sharp, J.C. 1975 Pit Slope Manual, CANMET report, k = 1/(2Lx3.14) x (QH) ln(R/r)) m/s (convert L/min to m/s). Assume R = radius of influence of 100m & r = radius of borehole.				
Flow Type:	LAMINAR FLOW	COMMENTS:					k = 6.8E-06 m/s				

<b>Golder Associates</b>		<b>WATER PRESSURE TEST (5 Stage)</b>				Revision N° : 18	
Job N° : 0978110-562	Hole N° : TT001	Drilling Method : HQ	Vertical depth to Groundwater	Immediately prior to test (m bgl) : 9.17		Used in analysis (m bgl) : 9.17	
Client : OceanaGold NZ Ltd	Dip (Deg) : -90	Hole Diameter (m) : 0.096		Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 5	
Project : Macraes Flat Expansion	DH Interval Top (m) : 44.23	DH Tested Length (m) : 5.90	Packer Type : Pneumatic - Wireline - Single	Casing Inner Diameter (mm) : 77.80			
Location : Macraes Gold Project	DH Interval Base (m) : 50.13	Rock tested : Otago Schist	Computed By : P. Mangeya	Checked By : B. Sinclair		Date : 19/07/2010	
Tested By : McNeill Drilling	Date : 25/06/2010	Date : 19/07/2010	Water Meter Reading in Litres				

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Meter discharge - Leakage	Discharge/m	Remarks	
			Time (h:m:s)	Intervals (min)	Reading (Litres)		(L)	(L/min)	(L/min)	(L/min/m)		
P1	100	0	0:00:00	0	935.5		0.00	0.00	0.00	0.00	Start Date/Time: c : 1	
		1	0:05:00	05:00	958.2		22.70	4.54	4.54	0.77		
		2	0:10:00	05:00	980.5		22.30	4.46	4.46	0.76		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
								Total :	9.00	9.00	1.53	
								Average :	4.500	4.500	0.763	Leak Flow Rate = 0
P2	200	0	0:15:00	0	986.0		0.00	0.00	0.00	0.00	c : 1	
		1	0:20:00	05:00	1012.5		26.50	5.30	5.30	0.90		
		2	0:25:00	05:00	1047.6		35.10	7.02	7.02	1.19		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
								Total :	12.32	12.32	2.09	
								Average :	6.160	6.160	1.044	Leak Flow Rate = 0
P3	300	0	0:30:00	0	54.0		0.00	0.00	0.00	0.00	c : 1	
		1	0:35:00	05:00	88.4		34.40	6.88	6.88	1.17		
		2	0:40:00	05:00	123.0		34.60	6.92	6.92	1.17		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
								Total :	13.80	13.80	2.34	
								Average :	6.900	6.900	1.169	Leak Flow Rate = 0
P4	200	0	0:45:00	0	133.2		0.00	0.00	0.00	0.00	c : 1	
		1	0:50:00	05:00	160.0		26.80	5.36	5.36	0.91		
		2	0:55:00	05:00	188.5		28.50	5.70	5.70	0.97		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
								Total :	11.06	11.06	1.87	
								Average :	5.530	5.530	0.937	Leak Flow Rate = 0
P5	100	0	0:55:00	0	194.5		0.00	0.00	0.00	0.00	c : 1	
		1	1:00:00	05:00	218.6		24.10	4.82	4.82	0.82		
		2	1:05:00	05:00	242.9		24.30	4.86	4.86	0.82		
		3										
		4										
		5										
		6										
		7										
		8										
		9										
								Total :	9.68	9.68	1.64	
								Average :	4.840	4.840	0.820	Leak Flow Rate = 0

**TEST RESULTS**

Stage No.	Lugeon (1933) Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	3.9		197.6		$H_{LOSS}$ 0.25 kPa Stage No. Average Gauge Pressure 180 kPa Q 6 L/min H 28 m Interpreted Result 4 uL
P2	3.5		297.5		Reported k at Stage Average
P3	2.9		397.4		Analytical Method 1: (ref = Golder geotechnical field notes draft 1997) $k = \frac{Q}{H \times 6.10889 \times 10^6 \times ((\log(2L/D))^2/L)}$
P4	3.2		297.5		k = 4.3E-07 m/s
P5	4.2		197.6		Analytical Method 2: (ref = Sharp, J.C 1975 Pt Slope Manual, CANMET report). $k = \frac{1}{2(L \times 3.14) \times (Q/H) \ln(R/r)}$ m/s (convert L/min to m/s). Assume R = radius of influence of 100m & r = radius of borehole. k = 6.8E-07 m/s
<b>Flow Type:</b> TURBULENT FLOW		<b>COMMENTS:</b>			

		<b>WATER PRESSURE TEST (5 Stage)</b>				Revision N <sup>o</sup> : 18	
Job N <sup>o</sup> : 0978110-562	Hole N <sup>o</sup> : TT003	Drilling Method : HQ	Vertical depth to Groundwater	Immediately prior to test (m bgl) : 0.77		Used in analysis (m bgl) : 0.77	
Client : OceanaGold NZ Ltd	Dip (Deg) : -90	Hole Diameter (m) : 0.096	DH Interval Top (m) : 5.31	DH Tested Length (m) : 6.00	Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 5
Project : Macraes Flat Expansion	DH Interval Base (m) : 11.31	Packer Type : Pneumatic - Wireline - Single	Rock tested : Otago Schist		Casing Inner Diameter (mm) : 77.80		Date : 20/07/2010
Location : Macraes Gold Project	Computed By : P. Mangeya	Water Meter Reading in Litres		Checked By : B. Sinclair	Date : 20/07/2010		
Tested By : McNeill Drilling	Date : 23/06/2010	Date : 20/07/2010					

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Meter discharge - Leakage	Discharge/m	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)	(L)	(L/min)	(L/min)	(L/min/m)		
P1	50	0	0:00:00	0	224.0	0.00	0.00	0.00	0.00	0.00	c : Start Date/Time: 1
		1	0:05:00	05:00	307.0	83.00	16.60	16.60	2.77		
		2	0:10:00	05:00	383.0	76.00	15.20	15.20	2.53		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	31.80	31.80	5.30	
							Average:	15.900	15.900	2.650	Leak Flow Rate = 0
P2	100	0	0:15:00	0	417.0	0.00	0.00	0.00	0.00	0.00	c : 1
		1	0:20:00	05:00	530.0	113.00	22.60	22.60	3.77		
		2	0:25:00	05:00	650.0	120.00	24.00	24.00	4.00		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	46.60	46.60	7.77	Leak Flow Rate = 0
							Average:	23.300	23.300	3.883	Leak Flow Rate = 0
P3	150	0	0:30:00	0	698.0	0.00	0.00	0.00	0.00	0.00	c : 1
		1	0:35:00	05:00	880.0	182.00	36.40	36.40	6.07		
		2	0:40:00	05:00	1061.0	181.00	36.20	36.20	6.03		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	72.60	72.60	12.10	Leak Flow Rate = 0
							Average:	36.300	36.300	6.050	Leak Flow Rate = 0
P4	100	0	0:45:00	0	124.0	0.00	0.00	0.00	0.00	0.00	c : 1
		1	0:50:00	05:00	251.0	127.00	25.40	25.40	4.23		
		2	0:55:00	05:00	378.0	127.00	25.40	25.40	4.23		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	50.80	50.80	8.47	Leak Flow Rate = 0
							Average:	25.400	25.400	4.233	Leak Flow Rate = 0
P5	50	0	0:55:00	0	404.0	0.00	0.00	0.00	0.00	0.00	c : Finish Date/Time: 1
		1	1:00:00	05:00	502.0	98.00	19.60	19.60	3.27		
		2	1:05:00	05:00	599.0	97.00	19.40	19.40	3.23		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	39.00	39.00	6.50	Leak Flow Rate = 0
							Average:	19.500	19.500	3.250	Leak Flow Rate = 0

TEST RESULTS					
Stage No.	Lugeon (1933) Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	41.8		63.5		H <sub>LOSS</sub> 4.81 kPa Stage No. Average Gauge Pressure 90 kPa Q 24 L/min H 10 m Interpreted Result 41 uL Reported k at Stage Average Analytical Method 1: (ref = Golder geotechnical field notes draft: 1997) $k = \frac{1}{(2L \times 3.14) \times (QH) \ln(R/r)}$ m/s (convert L/min to m/s). Assume R = radius of influence of 100m & r = radius of borehole. k = 5.0E-06 m/s
P2	34.9		111.2		
P3	39.0		155.3		
P4	38.3		110.5		
P5	52.0		62.5		
Lugeon (1933) method includes nett pressure in calculation that is Hp (gauge pressure) + Hg (height gauges above watertable) - Hf (head losses).					
Flow Type:	LAMINAR FLOW	COMMENTS:			k = 7.9E-06 m/s

<b>Golder Associates</b>		<b>WATER PRESSURE TEST (5 Stage)</b>				Revision N° : 18	
Job N° : 0978110-562	Hole N° : TT003	Drilling Method : HQ	Vertical depth to Groundwater		Immediately prior to test (m bgl) : 0.77		
Client : OceanaGold NZ Ltd	Dip (Deg) : -90	Hole Diameter (m) : 0.096			Used in analysis (m bgl) : 0.77		
Project : Macraes Flat Expansion	DH Interval Top (m) : 25.36	DH Tested Length (m) : 6.00			Pressure Gauge Height (m agl) : 0.80		
Location : Macraes Gold Project	DH Interval Base (m) : 31.36	Packer Type : Pneumatic - Wireline - Single			Presumed Water Temperature : 5		
Tested By : McNeill Drilling	Computed By : P. Mangeya	Rock tested : Otago Schist			Casing Inner Diameter (mm) : 77.80		
Date : 23/06/2010	Date : 20/07/2010	Water Meter Reading in Litres	Checked By : B. Sinclair		Date : 20/07/2010		

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Meter discharge - Leakage	Discharge/m	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)	(L)	(L/min)	(L/min)	(L/min/m)		
P1	100	0	0:00:00	0	637.0	0.00	0.00	0.00	0.00	c : Start Date/Time: Leak Flow Rate = 0	
		1	0:05:00	05:00	665.0	28.00	5.60	5.60	0.93		
		2	0:10:00	05:00	686.5	21.50	4.30	4.30	0.72		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	9.90	9.90	1.65	
							Average:	4.950	4.950	0.825	
P2	200	0	0:15:00	0	694.0	0.00	0.00	0.00	0.00	c : Leak Flow Rate = 0	
		1	0:20:00	05:00	731.0	37.00	7.40	7.40	1.23		
		2	0:25:00	05:00	766.0	35.00	7.00	7.00	1.17		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	14.40	14.40	2.40	
							Average:	7.200	7.200	1.200	
P3	300	0	0:30:00	0	780.0	0.00	0.00	0.00	0.00	c : Leak Flow Rate = 0	
		1	0:35:00	05:00	874.0	94.00	18.80	18.80	3.13		
		2	0:40:00	05:00	969.0	95.00	19.00	19.00	3.17		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	37.80	37.80	6.30	
							Average:	18.900	18.900	3.150	
P4	200	0	0:45:00	0	977.0	0.00	0.00	0.00	0.00	c : Leak Flow Rate = 0	
		1	0:50:00	05:00	990.0	13.00	2.60	2.60	0.43		
		2	0:55:00	05:00	1104.5	114.50	22.90	22.90	3.82		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	25.50	25.50	4.25	
							Average:	12.750	12.750	2.125	
P5	100	0				0.00	0.00	0.00	0.00	c : Finish Date/Time: Leak Flow Rate = 0	
		1									
		2									
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :				
							Average:				

TEST RESULTS

Stage No.	Lugeon (1933) Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	7.2		115.2		$H_{LOSS} = 2.76 \text{ kPa}$ Stage No. <b>P3</b> Gauge Pressure 300 kPa Q 19 L/min H 32 m Interpreted Result 10 uL Reported k at Stage <b>P3</b>
P2	5.6		215.0		Analytical Method 1: (ref = Golder geotechnical field notes draft 1997) $Q/H \times 6.10889 \times 10^{-6} \times ((\log(2L/D))/L)$ k =
P3	10.1		312.6		k = 1.3E-06 m/s
P4	9.9		214.1		Analytical Method 2: (ref = Sharp, J.C. 1975 P8 Slope Manual, CANMET report). k = $1/(2 \times 3.14) \times (Q/H) \ln(R/r)$ m/s (convert L/min to m/s). Assume R = radius of influence of 100m & r = radius of borehole.
P5	#VALUE!		#VALUE!		k = 2.0E-06 m/s
Flow Type: <b>LAMINAR FLOW</b>		COMMENTS:			

WATER PRESSURE TEST (5 Stage)										Revision N <sup>o</sup> :	18
<b>Golder Associates</b> Job N <sup>o</sup> : 0978110-562 Client : OceanaGold NZ Ltd Project : Macraes Flat Expansion Location : Macraes Gold Project Tested By : McNeill Drilling Date : 3/06/2010		Hole N <sup>o</sup> : TT004 Dip (Deg) : -70 DH Interval Top (m) : 5.00 DH Interval Base (m) : 11.00 Computed By : P. Mangeya Date : 24/06/2010		Drilling Method : HQ Hole Diameter (m) : 0.096 DH Tested Length (m) : 6.00 Packer Type : Pneumatic - Wireline - Single Rock tested : Otago Schist		Vertical depth to Groundwater : Immediately prior to test (m bgl) : 0.00 Used in analysis (m bgl) : 0.00 Pressure Gauge Height (m agl) : 0.80 Presumed Water Temperature : 5 Casing Inner Diameter (mm) : 77.80		Water Meter Reading in Litres : Checked By : B. Sinclair Date : 24/06/2010			
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Meter discharge - Leakage	Discharge/m	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)	(L)	(L/min)	(L/min)	(L/min/m)		
P1	50	0	0:00:00	0	796.2	0.00	0.00	0.00	0.00	0.00	c : Start Date/Time: 24/06/2010
		1	0:05:00	05:00	801.1	4.90	0.98	0.98	0.16		
		2	0:10:00	05:00	806.0	4.90	0.98	0.98	0.16		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	1.96	1.96	0.33	
							Average:	0.980	0.980	0.163	Leak Flow Rate = 0
P2	100	0	0:15:00	0	815.0	0.00	0.00	0.00	0.00	0.00	c : Start Date/Time: 24/06/2010
		1	0:20:00	05:00	844.5	29.50	5.90	5.90	0.98		
		2	0:25:00	05:00	870.5	26.00	5.20	5.20	0.87		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	11.10	11.10	1.85	
							Average:	5.550	5.550	0.925	Leak Flow Rate = 0
P3	150	0	0:30:00	0	882.0	0.00	0.00	0.00	0.00	0.00	c : Start Date/Time: 24/06/2010
		1	0:35:00	05:00	915.4	33.40	6.68	6.68	1.11		
		2	0:40:00	05:00	945.6	30.20	6.04	6.04	1.01		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	12.72	12.72	2.12	
							Average:	6.360	6.360	1.060	Leak Flow Rate = 0
P4	100	0	0:45:00	0	951.0	0.00	0.00	0.00	0.00	0.00	c : Start Date/Time: 24/06/2010
		1	0:50:00	05:00	977.1	26.10	5.22	5.22	0.87		
		2	0:55:00	05:00	1004.0	26.90	5.38	5.38	0.90		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	10.60	10.60	1.77	
							Average:	5.300	5.300	0.883	Leak Flow Rate = 0
P5	50	0	0:55:00	0	1012.0	0.00	0.00	0.00	0.00	0.00	c : Finish Date/Time: 24/06/2010
		1	1:00:00	05:00	1041.0	29.00	5.80	5.80	0.97		
		2	1:05:00	05:00	1073.2	32.20	6.44	6.44	1.07		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
							Total :	12.24	12.24	2.04	
							Average:	6.120	6.120	1.020	Leak Flow Rate = 0

TEST RESULTS

Stage No.	Lugeon (1933) Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	2.8		57.8		H <sub>Loss</sub> 0.22 kPa Stage No. P4 Gauge Pressure 100 kPa Q 5 L/min H 11 m Interpreted Result 8 uL Reported k at Stage P4 Analytical Method 1: (ref = Golder geotechnical field notes draft 1997) $k = \frac{1}{(2L \times 3.14) \times (QH)}$ $Q/H \times 6.10889 \times 10^{-6} \times (\log(2L/D))/L$
P2	8.6		107.6		k = 1.0E-06 m/s
P3	6.7		157.5		
P4	8.2		107.6		
P5	17.7		57.6		
Lugeon (1933) method includes nett pressure in calculation that is Hp (gauge pressure) + Hg (height gauges above watertable) - Hf (head losses). COMMENTS: P4 stage taken as being representative for permeability assessment.					
Flow Type:	WASH-OUT				k = 1.6E-06 m/s

WATER PRESSURE TEST (5 Stage)											
<b>Golder Associates</b> Job N° : 0978110-562 Client : OceagaGold NZ Ltd Project : Macraes Flat Expansion Location : Macraes Gold Project Tested By : McNeill Drilling Date : 3/06/2010		Hole N° : TT004 Dip (Deg) : -70 DH Interval Top (m) : 23.00 DH Interval Base (m) : 30.50 Computed By : P. Mangeya Date : 24/06/2010		Drilling Method : HQ Hole Diameter (m) : 0.096 DH Tested Length (m) : 7.50 Packer Type : Pneumatic - Wireline - Single Rock tested : Otago Schist		Vertical depth to Groundwater Revision N° : 18 Immediately prior to test (m bgl) : 0.25 Used in analysis (m bgl) : 0.25 Pressure Gauge Height (m agl) : 0.80 Presumed Water Temperature : 5 Casing Inner Diameter (mm) : 77.80		Water Meter Reading in Litres Checked By : B. Sinclair Date : 24/06/2010			
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Meter discharge - Leakage	Discharge/m	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)	(L)	(L/min)	(L/min)	(L/min/m)		
P1	100	0	0:00:00	0	5.0	0.00	0.00	0.00	0.00	0.00	c : Start Date/Time: 1
		1	0:05:00	05:00	20.4	15.40	3.08	3.08	0.41		
		2	0:10:00	05:00	35.2	14.80	2.96	2.96	0.39		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							6.04	6.04	0.81	Leak Flow Rate = 0	
Average :							3.020	3.020	0.403		
P2	200	0	0:15:00	0	131.5	0.00	0.00	0.00	0.00	c : 1	
		1	0:20:00	05:00	164.0	32.50	6.50	6.50	0.87		
		2	0:25:00	05:00	182.0	18.00	3.60	3.60	0.48		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							10.10	10.10	1.35	Leak Flow Rate = 0	
Average :							5.050	5.050	0.673		
P3	300	0	0:30:00	0	190.2	0.00	0.00	0.00	0.00	c : 1	
		1	0:35:00	05:00	212.0	21.80	4.36	4.36	0.58		
		2	0:40:00	05:00	235.0	23.00	4.60	4.60	0.61		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							8.96	8.96	1.19	Leak Flow Rate = 0	
Average :							4.480	4.480	0.597		
P4	200	0	0:45:00	0	240.0	0.00	0.00	0.00	0.00	c : 1	
		1	0:50:00	05:00	249.7	9.70	1.94	1.94	0.26		
		2	0:55:00	05:00	259.0	9.30	1.86	1.86	0.25		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							3.80	3.80	0.51	Leak Flow Rate = 0	
Average :							1.900	1.900	0.253		
P5	100	0	0:55:00	0	251.1	0.00	0.00	0.00	0.00	c : 1	
		1	1:00:00	05:00	265.7	14.60	2.92	2.92	0.39		
		2	1:05:00	05:00	270.6	4.90	0.98	0.98	0.13		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							3.90	3.90	0.52	Leak Flow Rate = 0	
Average :							1.950	1.950	0.260		

TEST RESULTS

Stage No.	Lugeon (1933) Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	3.7		110.2		H <sub>LOSS</sub> 0.03 kPa Stage No. <b>P5</b> Gauge Pressure 100 kPa Q 2 L/min H 11 m Interpreted Result 2 uL Reported k at Stage <b>P5</b> Analytical Method 1: (ref = Golder geotechnical field notes draft 1997) $k = \frac{Q}{H \times 6.10889 \times 10^{-5} \times (\log(2L/D))L}$ $k =$ <b>3.1E-07 m/s</b> Analytical Method 2: (ref = Sharp, J.C 1975 P8 Slope Manual, CANMET report). $k = \frac{1}{2} \times (3.14) \times (Q/H) \ln(R/r)$ m/s (convert L/min to m/s). Assume R = radius of influence of 100m & r = radius of borehole. <b>4.7E-07 m/s</b>
P2	3.2		210.1		
P3	1.9		310.1		
P4	1.2		210.3		
P5	2.4		110.3		

Lugeon (1933) method includes nett pressure in calculation that is Hp (gauge pressure) + Hg (height gauges above watertable) - Hf (head losses).

COMMENTS: Stage P5 flow applied to hydraulic conductivity calculation returns result little different from that resulting from the mean of the results for all five stages.

WATER PRESSURE TEST (5 Stage)										Revision N° : 18		
Job N° : 0978110-562		Hole N° : TT005		Drilling Method : HQ		Vertical depth to Groundwater		Immediately prior to test (m bgl) : 1.91		Used in analysis (m bgl) : 1.91		
Client : OceanaGold NZ Ltd		Dip (Deg) : -90		Hole Diameter (m) : 0.096				Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 5		
Project : Macraes Flat Expansion		DH Interval Top (m) : 20.11		DH Tested Length (m) : 5.72				Casing Inner Diameter (mm) : 77.80		Date : 24/06/2010		
Location : Macraes Gold Project		DH Interval Base (m) : 25.83		Packer Type : Pneumatic - Wireline - Single								
Tested By : McNeill Drilling		Computed By : P. Mangeya		Rock tested : Otago Schist								
Date : 17/06/2010		Date : 24/06/2010		Water Meter Reading in Litres		Checked By : B. Sinclair						
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Meter discharge - Leakage	Discharge/m	Remarks	
			Time (h:m:s)	Intervals (min)	Reading (Litres)	(L)	(L/min)	(L/min)	(L/min/m)			
P1	100	0	0:00:00	0	590.0	0.00	0.00	0.00	0.00	0.00	c : Start Date/Time: 1	
		1	0:05:00	05:00	617.0	27.00	5.40	5.40	0.94			
		2	0:10:00	05:00	634.5	17.50	3.50	3.50	0.61			
		3										
		4										
		5										
		6										
		7										
		8										
		9										
							Total :	8.90	8.90	1.56		
							Average:	4.450	4.450	0.778	Leak Flow Rate = 0	
P2	150	0	0:15:00	0	640.0	0.00	0.00	0.00	0.00	0.00	c : 1	
		1	0:20:00	05:00	656.0	16.00	3.20	3.20	0.56			
		2	0:25:00	05:00	670.5	14.50	2.90	2.90	0.51			
		3										
		4										
		5										
		6										
		7										
		8										
		9										
							Total :	6.10	6.10	1.07		
							Average:	3.050	3.050	0.533	Leak Flow Rate = 0	
P3	250	0	0:30:00	0	680.0	0.00	0.00	0.00	0.00	0.00	c : 1	
		1	0:35:00	05:00	702.0	22.00	4.40	4.40	0.77			
		2	0:40:00	05:00	723.7	21.70	4.34	4.34	0.76			
		3										
		4										
		5										
		6										
		7										
		8										
		9										
							Total :	8.74	8.74	1.53		
							Average:	4.370	4.370	0.784	Leak Flow Rate = 0	
P4	150	0	0:45:00	0	730.0	0.00	0.00	0.00	0.00	0.00	c : 1	
		1	0:50:00	05:00	742.1	12.10	2.42	2.42	0.42			
		2	0:55:00	05:00	752.4	10.30	2.06	2.06	0.36			
		3										
		4										
		5										
		6										
		7										
		8										
		9										
							Total :	4.48	4.48	0.78		
							Average:	2.240	2.240	0.392	Leak Flow Rate = 0	
P5	100	0	0:55:00	0	753.1	0.00	0.00	0.00	0.00	0.00	c : 1	
		1	1:00:00	05:00	763.7	10.60	2.12	2.12	0.37			
		2	1:05:00	05:00	773.8	10.10	2.02	2.02	0.35			
		3										
		4										
		5										
		6										
		7										
		8										
		9										
							Total :	4.14	4.14	0.72		
							Average:	2.070	2.070	0.362	Leak Flow Rate = 0	

TEST RESULTS					
Stage No.	Lugeon (1933) Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	6.2		126.4		H <sub>LOSS</sub> 0.15 kPa Stage No. P3 Gauge Pressure 250 kPa Q 4 L/min H 28 m Interpreted Result 3 uL Reported k at Stage P3
P2	3.0		176.5		Analytical Method 1: (ref = Golder geotechnical field notes draft 1997) k = $\frac{1}{(2L \times 3.14) \times (QH) \ln(R/r)}$ m/s (convert L/min to m/s). Assume R = radius of influence of 100m & r = radius of borehole.
P3	2.8		276.4		k = 3.4E-07 m/s
P4	2.2		176.5		Analytical Method 2: (ref = Sharp, J.C 1975 Pit Slope Manual, CANMET report) k = $\frac{1}{(2L \times 3.14) \times (QH) \ln(R/r)}$ m/s (convert L/min to m/s). Assume R = radius of influence of 100m & r = radius of borehole.
P5	2.9		126.5		k = 5.5E-07 m/s



<b>Golder Associates</b>		<b>WATER PRESSURE TEST (5 Stage)</b>				Revision N <sup>o</sup> : 18	
Job N <sup>o</sup> : 0978110-562	Hole N <sup>o</sup> : TT007	Drilling Method : HQ	Vertical depth to Groundwater	Immediately prior to test (m bgl) : 0.81		Used in analysis (m bgl) : 0.81	
Client : OceanaGold NZ Ltd	Dip (Deg) : -90	Hole Diameter (m) : 0.096	DH Tested Length (m) : 6.90	Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 5	
Project : Macraes Flat Expansion	DH Interval Top (m) : 23.22	Packer Type : Pneumatic - Wireline - Single	Rock tested : Otago Schist	Casing Inner Diameter (mm) : 77.80		Date : 20/07/2010	
Location : Macraes Gold Project	DH Interval Base (m) : 30.12	Computed By : P. Mangeya	Water Meter Reading in Litres	Checked By : B. Sinclair			
Tested By : McNeill Drilling	Date : 13/06/2010	Date : 24/06/2010					

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Meter discharge - Leakage	Discharge/m	Remarks
			(h:m:s)	(min)	Reading (Litres)	(L)	(L/min)	(L/min)	(L/min/m)		
P1	50	0	0:00:00	0	964.5	0.00	0.00	0.00	0.00	Start Date/Time: 1	
		1	0:05:00	05:00	990.3	25.80	5.16	5.16	0.75		
		2	0:10:00	05:00	1014.0	23.70	4.74	4.74	0.69		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
		10									
Total :							9.90	9.90	1.43	Leak Flow Rate = 0	
Average:							4.950	4.950	0.717		
P2	200	0	0:15:00	0	1021.8	0.00	0.00	0.00	0.00	Leak Flow Rate = 0	
		1	0:20:00	05:00	1037.7	15.90	3.18	3.18	0.46		
		2	0:25:00	05:00	1054.0	16.30	3.26	3.26	0.47		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
		10									
Total :							6.44	6.44	0.93	Leak Flow Rate = 0	
Average:							3.220	3.220	0.467		
P3	300	0	0:30:00	0	1060.0	0.00	0.00	0.00	0.00	Leak Flow Rate = 0	
		1	0:35:00	05:00	1082.0	22.00	4.40	4.40	0.64		
		2	0:40:00	05:00	1102.0	20.00	4.00	4.00	0.58		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
		10									
Total :							8.40	8.40	1.22	Leak Flow Rate = 0	
Average:							4.200	4.200	0.609		
P4	200	0	0:45:00	0	1106.5	0.00	0.00	0.00	0.00	Leak Flow Rate = 0	
		1	0:50:00	05:00	1121.0	14.50	2.90	2.90	0.42		
		2	0:55:00	05:00	1137.6	16.60	3.32	3.32	0.48		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
		10									
Total :							6.22	6.22	0.90	Leak Flow Rate = 0	
Average:							3.110	3.110	0.451		
P5	50	0		0		0.00	0.00	0.00	0.00	Leak Flow Rate = 0	
		1									
		2									
		3									
		4									
		5									
		6									
		7									
		8									
		9									
		10									
Total :										Leak Flow Rate = 0	
Average:											

**TEST RESULTS**

Stage No.	Lugeon (1933) Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	10.9		65.6		H <sub>loss</sub> 0.14 kPa Stage No. <b>P3</b> Gauge Pressure 300 kPa Q 4 L/min H 32 m Interpreted Result 2 uL Reported k at Stage <b>P3</b> Analytical Method 1: (ref = Golder geotechnical field notes draft 1997) $k = \frac{Q}{H \times 6.10889 \times 10^{-5} \times ((\log(2L/D))^2) \times L}$ $k =$ <b>2.5E-07 m/s</b> Analytical Method 2: (ref = Sharp, J.C 1975 Pit Slope Manual, CANMET report). $k = 1/(2 \times 3.14) \times (Q/H) \ln(R/r)$ m/s (convert L/min to m/s). Assume R = radius of influence of 100m & r = radius of borehole. <b>3.8E-07 m/s</b>
P2	2.2		215.7		
P3	1.9		315.7		
P4	2.1		215.7		
P5	#VALUE!		#VALUE!		
Lugeon (1933) method includes nett pressure in calculation that is Hp (gauge pressure) + Hg (height gauges above watertable) - Hf (head losses). COMMENTS Stage P1 data excluded as anomalous. Stage P5 data indicated water flowing in reverse direction through gauge and also excluded. Remaining data indicates laminar flow.					
Flow Type:	<b>LAMINAR FLOW</b>				

WATER PRESSURE TEST (5 Stage)										Revision N° : 18	
Job N° : 0978110-562		Hole N° : TT008		Drilling Method : HQ		Vertical depth to Groundwater		Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Client : OceanaGold NZ Ltd		Dip (Deg) : -90		Hole Diameter (m) : 0.096		DH Interval Top (m) : 11.00		DH Tested Length (m) : 6.00		Pressure Gauge Height (m agl) : 0.80	
Project : Macraes Flat Expansion		DH Interval Base (m) : 17.00		Packer Type : Pneumatic - Wireline - Single		Packer tested : Otago Schist		Presumed Water Temperature : 5		Casing Inner Diameter (mm) : 77.80	
Location : Macraes Gold Project		Computed By : P. Mangeya		Water Meter Reading in Litres		Checked By : B. Sinclair		Date : 10/06/2010		Date : 24/06/2010	
Tested By : McNeill Drilling		Date : 24/06/2010		Date : 24/06/2010		Date : 24/06/2010		Date : 24/06/2010		Date : 24/06/2010	
Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Meter discharge - Leakage	Discharge/m	Remarks
			Time (h:m:s)	Intervals (min)	Reading (Litres)	(L)	(L/min)	(L/min)	(L/min/m)		
P1	50	0	0:00:00	0	350.0	0.00	0.00	0.00	0.00	0.00	c : Start Date/Time: 1
		1	0:05:00	05:00	375.2	25.20	5.04	5.04	0.84		
		2	0:10:00	05:00	380.8	5.60	1.12	1.12	0.19		
		3	0:15:00	05:00	393.0	12.20	2.44	2.44	0.41		
		4									
		5									
		6									
		7									
		8									
		9									
Total :							8.60	8.60	1.43		
Average:							2.867	2.867	0.478	Leak Flow Rate = 0	
P2	100	0	0:15:00	0	397.5	0.00	0.00	0.00	0.00	c : 1	
		1	0:20:00	05:00	415.6	18.10	3.62	3.62	0.60		
		2	0:25:00	05:00	434.5	18.90	3.78	3.78	0.63		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							7.40	7.40	1.23	Leak Flow Rate = 0	
Average:							3.700	3.700	0.617	c : 1	
P3	200	0	0:30:00	0	439.2	0.00	0.00	0.00	0.00	c : 1	
		1	0:35:00	05:00	459.1	19.90	3.98	3.98	0.66		
		2	0:40:00	05:00	478.0	18.90	3.78	3.78	0.63		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							7.76	7.76	1.29	Leak Flow Rate = 0	
Average:							3.880	3.880	0.647	c : 1	
P4	100	0	0:45:00	0	483.0	0.00	0.00	0.00	0.00	c : 1	
		1	0:50:00	05:00	498.8	15.80	3.16	3.16	0.53		
		2	0:55:00	05:00	514.9	16.10	3.22	3.22	0.54		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							6.38	6.38	1.06	Leak Flow Rate = 0	
Average:							3.190	3.190	0.532	c : 1	
P5	50	0	0:55:00	0	520.0	0.00	0.00	0.00	0.00	c : 1	
		1	1:00:00	05:00	539.8	19.80	3.96	3.96	0.66		
		2	1:05:00	05:00	559.0	19.20	3.84	3.84	0.64		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							7.80	7.80	1.30	Leak Flow Rate = 0	
Average:							3.900	3.900	0.650	c : 1	

TEST RESULTS

Stage No.	Lugeon (1933) Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	8.3		57.8		<p>H<sub>LOSS</sub> 0.12 kPa</p> <p>Stage No. <b>P3</b></p> <p>Gauge Pressure 200 kPa</p> <p>Q 4 L/min</p> <p>H 21 m</p> <p>Interpreted Result 3 uL</p> <p>Reported k at Stage <b>P3</b></p> <p>Analytical Method 1: (ref = Sharp, J.C. 1975 Pit Slope Manual, CMMET report). k = 1/(2L(3.14) * (Q/H) ln(R/r)) m/s (convert L/min to m/s). Assume R = radius of influence of 100m &amp; r = radius of borehole.</p> <p>k = <b>3.9E-07</b> m/s</p>
P2	5.7		107.7		
P3	3.1		207.7		
P4	4.9		107.8		
P5	11.3		57.7		
<p>Lugeon (1933) method includes nett pressure in calculation that is Hp (gauge pressure) + Hg (height gauges above watertable) - Hf (head losses).</p> <p>Flow Type: <b>TURBULENT FLOW</b></p> <p>COMMENTS: Hydraulic conductivity may be slightly higher than calculated due to turbulence losses close to drillhole wall. Artesian flows from drillhole prior to start of test.</p> <p>k = <b>6.2E-07</b> m/s</p>					

<b>Golder Associates</b>		<b>WATER PRESSURE TEST (5 Stage)</b>				Revision N° : 18	
Job N° : 0978110-562	Hole N° : TT008	Drilling Method : HQ	Verical depth to Groundwater	Immediately prior to test (m bgl) : 0.00		Used in analysis (m bgl) : 0.00	
Client : OceanaGold NZ Ltd	Dip (Deg) : -90	Hole Diameter (m) : 0.096	DH Interval Top (m) : 23.12	DH Tested Length (m) : 7.50	Pressure Gauge Height (m agl) : 0.80		Presumed Water Temperature : 5
Project : Macraes Flat Expansion	DH Interval Base (m) : 30.62	Packer Type : Pneumatic - Wireline - Single	Rock tested : Otago Schist		Casing Inner Diameter (mm) : 77.80		
Location : Macraes Gold Project	Tested By : McNeill Drilling	Computed By : P. Mangeya	Water Meter Reading in Litres		Checked By : B. Sinclair	Date : 24/06/2010	

Pressure Stage	Gauge Pressure kPa	No	Actual	Time	Water Meter Readings		Volume	Discharge	Meter discharge - Leakage	Discharge/m	Remarks
			(h:m:s)	(min)	Reading (Litres)	(L)	(L/min)	(L/min)	(L/min/m)		
P1	100	0	0:00:00	0	588.0	0.00	0.00	0.00	0.00	Start Date/Time: <span style="background-color: yellow;"> </span>	
		1	0:05:00	05:00	623.0	35.00	7.00	7.00	0.93		
		2	0:10:00	05:00	657.0	34.00	6.80	6.80	0.91		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							13.80	13.80	1.84	Leak Flow Rate = <span style="background-color: orange;"> </span>	
Average :							6.900	6.900	0.920		
P2	200	0	0:15:00	0	665.5	0.00	0.00	0.00	0.00	Leak Flow Rate = <span style="background-color: orange;"> </span>	
		1	0:20:00	05:00	706.0	40.50	8.10	8.10	1.08		
		2	0:25:00	05:00	739.5	33.50	6.70	6.70	0.89		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							14.80	14.80	1.97	Leak Flow Rate = <span style="background-color: orange;"> </span>	
Average :							7.400	7.400	0.987		
P3	300	0	0:30:00	0	747.0	0.00	0.00	0.00	0.00	Leak Flow Rate = <span style="background-color: orange;"> </span>	
		1	0:35:00	05:00	778.7	31.70	6.34	6.34	0.85		
		2	0:40:00	05:00	810.0	31.30	6.26	6.26	0.83		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							12.60	12.60	1.68	Leak Flow Rate = <span style="background-color: orange;"> </span>	
Average :							6.300	6.300	0.840		
P4	200	0	0:45:00	0	817.0	0.00	0.00	0.00	0.00	Leak Flow Rate = <span style="background-color: orange;"> </span>	
		1	0:50:00	05:00	843.6	26.60	5.32	5.32	0.71		
		2	0:55:00	05:00	869.6	26.00	5.20	5.20	0.69		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							10.52	10.52	1.40	Leak Flow Rate = <span style="background-color: orange;"> </span>	
Average :							5.260	5.260	0.701		
P5	100	0	0:55:00	0	872.0	0.00	0.00	0.00	0.00	Leak Flow Rate = <span style="background-color: orange;"> </span>	
		1	1:00:00	05:00	876.0	4.00	0.80	0.80	0.11		
		2	1:05:00	05:00	879.3	3.30	0.66	0.66	0.09		
		3									
		4									
		5									
		6									
		7									
		8									
		9									
Total :							1.46	1.46	0.19	Leak Flow Rate = <span style="background-color: orange;"> </span>	
Average :							0.730	0.730	0.097		

TEST RESULTS					
Stage No.	Lugeon (1933) Value	Lugeon Value Curve	Nett Pressures	Pressure Vs Flow	Interpreted Result & Hydraulic Conductivity
P1	8.6		107.5		$H_{LOSS}$ 0.31 kPa Stage No. <b>P3</b> Gauge Pressure 300 kPa Q 6 L/min H 31 m Interpreted Result 3 uL Reported k at Stage <b>P3</b> Analytical Method 1: (ref = Golder geotechnical field notes draft 1997) $k = \frac{Q}{H \times 6.10889 \times 10^{-5} \times (\log(2L/D))L}$ <b>k = 3.6E-07 m/s</b> Analytical Method 2: (ref = Sharp, J.C 1975 Pit Slope Manual, CANMET report). $k = \frac{1}{2} \times (3.14) \times (QH) \times \ln(R/r)$ m/s (convert L/min to m/s). Assume R = radius of influence of 100m & r = radius of borehole. <b>k = 5.4E-07 m/s</b>
P2	4.8		207.4		
P3	2.7		307.5		
P4	3.4		207.6		
P5	0.9		107.8		
Lugeon (1933) method includes nett pressure in calculation that is $H_p$ (gauge pressure) + $H_g$ (height gauges above watertable) - $H_f$ (head losses). COMMENTS: Artesian flows from drillhole prior to start of test.					
Flow Type:	<b>VOID FILLING</b>				

Project 1078301051  
Oceana Gold

Top Tipperary TSF geotechnical investigations  
Macraes Gold Project

Date: 5-Nov-10

Test Name:

Perm Test 1

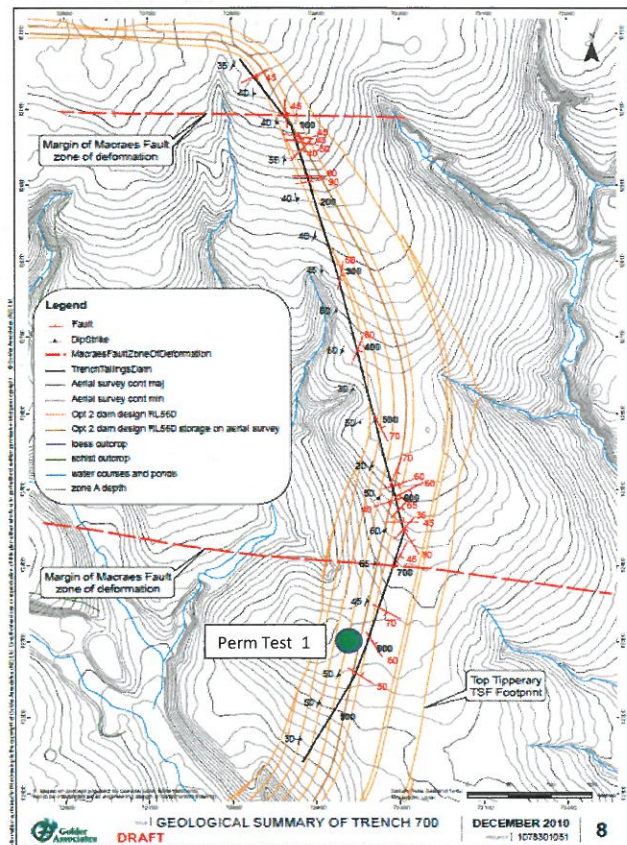
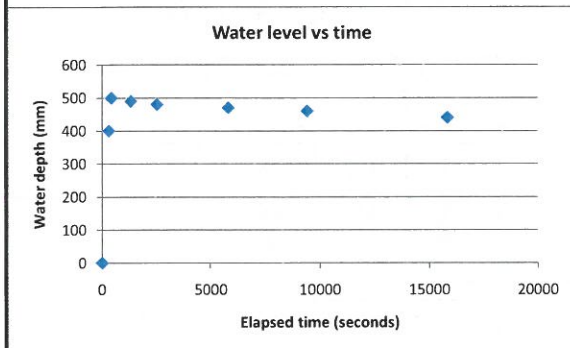
	Easting	Northing	Elevation
Location:	72945.69	12307.98	523.7
Description:	Moderately strong, moderately weathered brown schist, coarsely foliated		

Test pit dimensions		
Base measurements		
Length	Width	Depth
2.5 m	1.4 m	1.8 m
Side slopes 80 deg		
End slopes 30 deg		

Test results			
Water depth	Time	Elapsed time	
		Seconds	
0	0.35972	0.000000	0
400	0.36319	0.003472	300
500	0.36458	0.004861	420
490	0.37500	0.015278	1320
480	0.38889	0.029167	2520
470	0.42708	0.067361	5820
460	0.46875	0.109028	9420
440	0.54306	0.183333	15840



Perm Test 1 during test



Test undertaken by:  
Tim McMorran

Hydraulic conductivity estimated using SEEP/W

**<10<sup>-9</sup> m/s**

This represents the lowest hydraulic conductivity that can be confidently measured by the given method

Notes:

Project 1078301051  
Oceana Gold

Top Tipperary TSF geotechnical investigations  
Macraes Gold Project

Date: 5-Nov-10

Test Name:

Perm Test 2

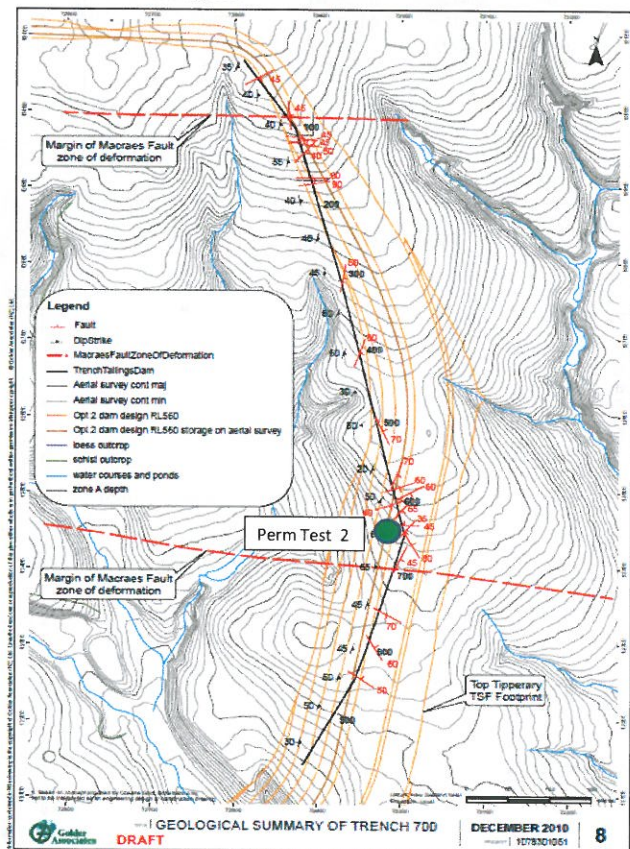
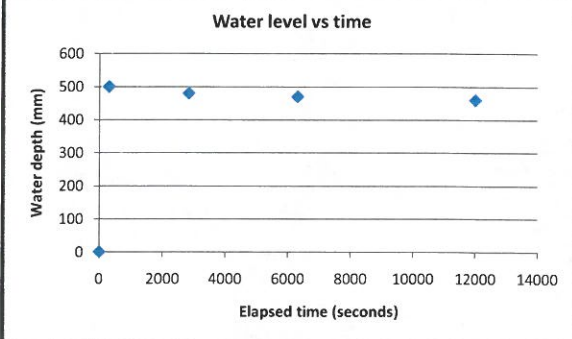
Location:	Easting	Northing	Elevation
	72994.2	12439.6	526.9
Description: Moderately strong, moderately weathered brown schist, coarsely foliated. Fe stained jts			

Test pit dimensions		
Base measurements		
Length	Width	Depth
2.5 m	1.6 m	1.1 m
Side slopes 80 deg		
End slopes 30 deg		

Test results			
Water depth	Time	Elapsed time	
		Seconds	
0	0.39583	0.000000	0
500	0.39931	0.003472	300
480	0.42847	0.032639	2820
470	0.46875	0.072917	6300
460	0.53472	0.138889	12000



Perm Test 2 during test



Test undertaken by:  
Tim McMorran

Hydraulic conductivity estimated using SEEP/W

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Notes:

Project 1078301051  
 Oceana Gold

Top Tipperary TSF geotechnical investigations  
 Macraes Gold Project

Date: 5-Nov-10

Test Name:

Perm Test 3

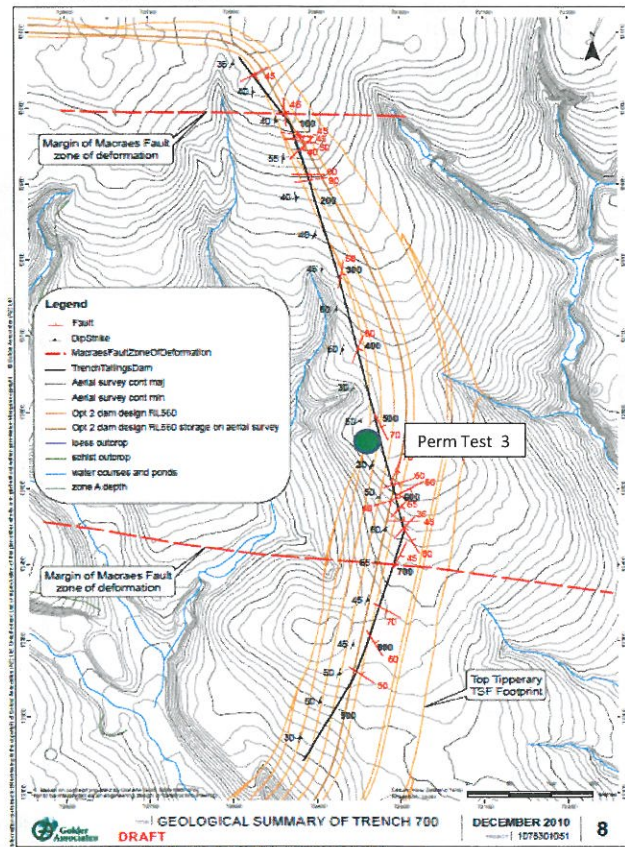
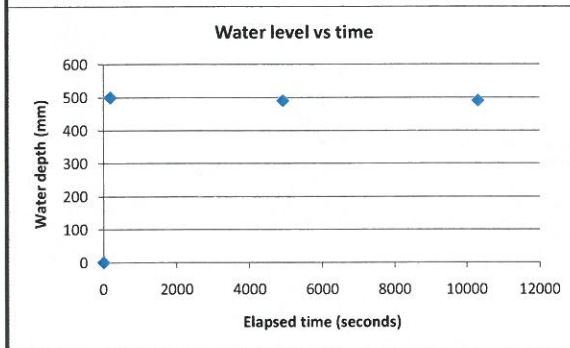
	Easting	Northing	Elevation
Location:	72972.7	12549.9	531.4
Description:	Moderately strong, moderately weathered brown schist, coarsely foliated. Fe stained jts		

Test pit dimensions		
Base measurements		
Length	Width	Depth
2.0 m	1.6 m	1.1 m
Side slopes 80 deg		
End slopes 30 deg		

Test results			
Water depth	Time	Elapsed time	
			Seconds
0	0.41528	0.000000	0
500	0.41736	0.002083	180
490	0.47222	0.056944	4920
490	0.53472	0.119444	10320



Perm Test 3 during test



Test undertaken by:  
 Tim McMorran

Hydraulic conductivity estimated using SEEP/W

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Notes:

Project 1078301051  
Oceana Gold

Top Tipperary TSF geotechnical investigations  
Macraes Gold Project

Date: 5-Nov-10

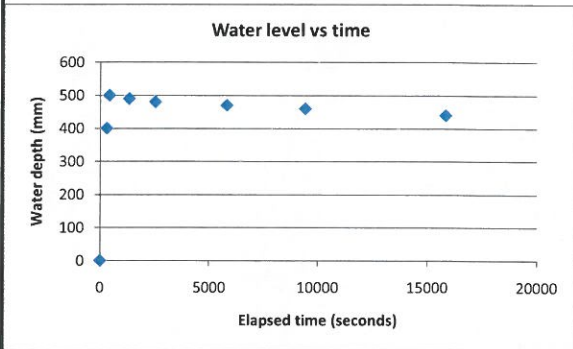
Test Name:

Perm Test 1

Location:	Easting	Northing	Elevation
	72945.69	12307.98	523.7
Description:	Moderately strong, moderately weathered brown schist, coarsely foliated		

Test pit dimensions		
Base measurements		
Length	Width	Depth
2.5 m	1.4 m	1.8 m
Side slopes 80 deg		
End slopes 30 deg		

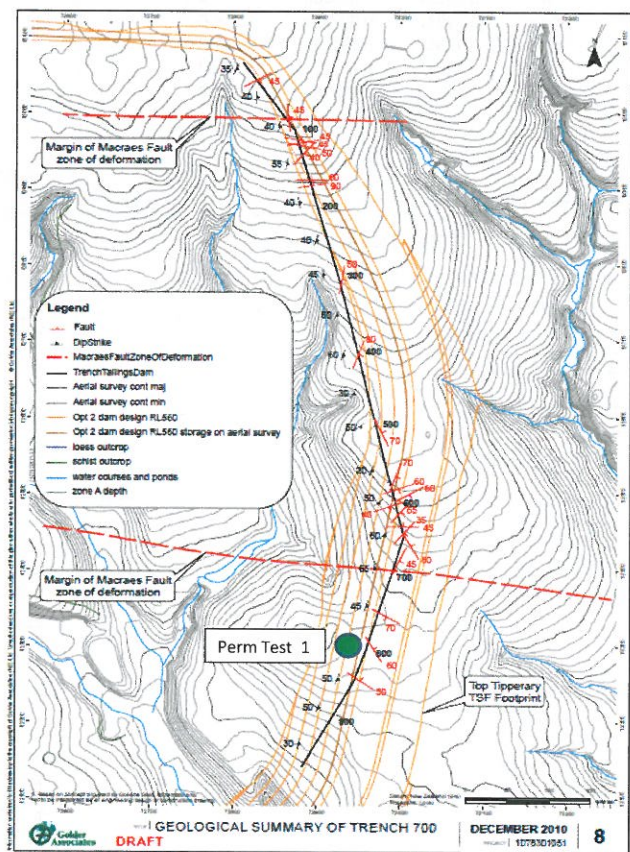
Test results			
Water depth	Time	Elapsed time	
		Seconds	
0	0.35972	0.000000	0
400	0.36319	0.003472	300
500	0.36458	0.004861	420
490	0.37500	0.015278	1320
480	0.38889	0.029167	2520
470	0.42708	0.067361	5820
460	0.46875	0.109028	9420
440	0.54306	0.183333	15840



Test undertaken by:  
Tim McMorran



Perm Test 1 during test



Hydraulic conductivity estimated using SEEP/W

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Notes:

Project 1078301051  
Oceana Gold

Top Tipperary TSF geotechnical investigations  
Macraes Gold Project

Date: 5-Nov-10

Test Name:

Perm Test 2

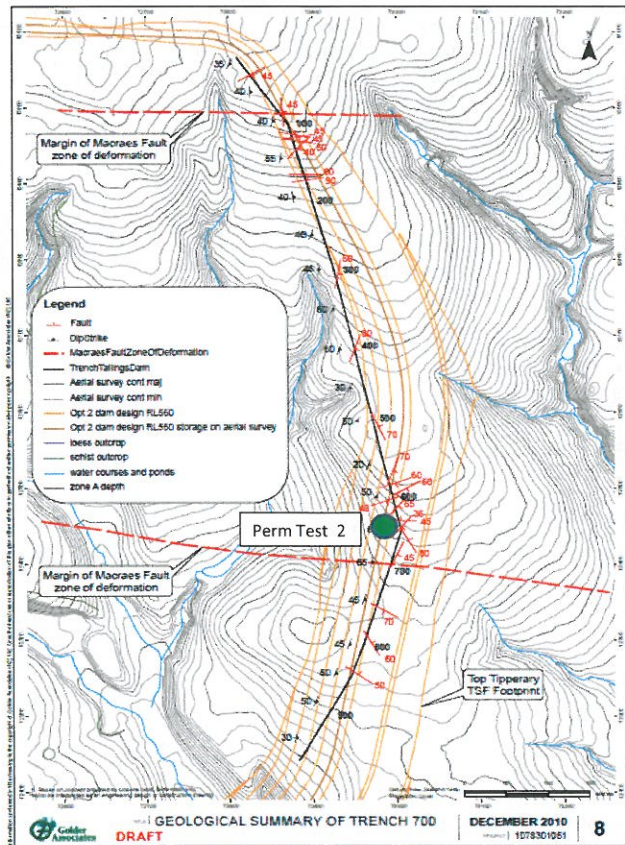
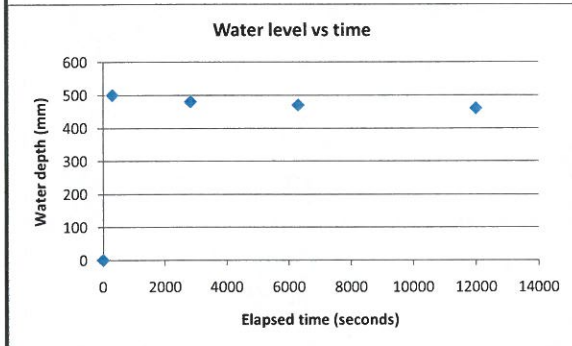
	Easting	Northing	Elevation
Location:	72994.2	12439.6	526.9
Description:	Moderately strong, moderately weathered brown schist, coarsely foliated. Fe stained jts		

Test pit dimensions		
Base measurements		
Length	Width	Depth
2.5 m	1.6 m	1.1 m
Side slopes 80 deg		
End slopes 30 deg		

Test results			
Water depth	Time	Elapsed time	
			Seconds
0	0.39583	0.000000	0
500	0.39931	0.003472	300
480	0.42847	0.032639	2820
470	0.46875	0.072917	6300
460	0.53472	0.138889	12000



Perm Test 2 during test



Test undertaken by:  
Tim McMorran

Hydraulic conductivity estimated using SEEP/W

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Notes:



Project 1078301051 Top Tipperary TSF geotechnical investigations  
 Oceana Gold Macraes Gold Project

Date: 5-Nov-10

Test Name:

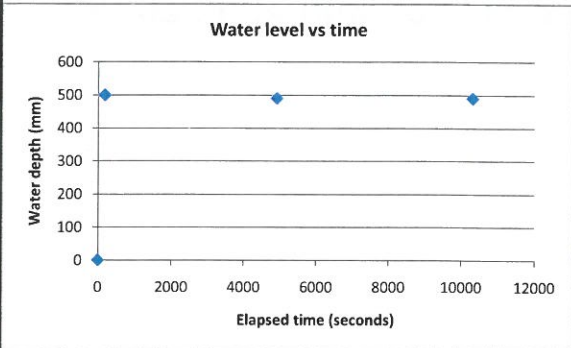
Perm Test 3

Location:	Easting	Northing	Elevation
	72972.7	12549.9	531.4
Description:	Moderately strong, moderately weathered brown schist, coarsely foliated. Fe stained jts		

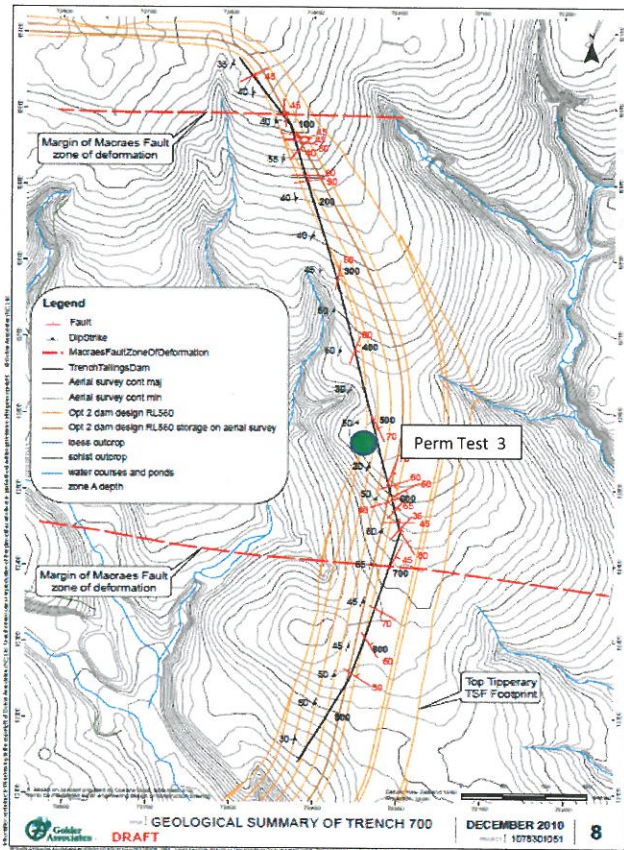
Test pit dimensions		
Base measurements		
Length	Width	Depth
2.0 m	1.6 m	1.1 m
Side slopes 80 deg		
End slopes 30 deg		



Test results			
Water depth	Time	Elapsed time	
		Seconds	
0	0.41528	0.000000	0
500	0.41736	0.002083	180
490	0.47222	0.056944	4920
490	0.53472	0.119444	10320



Perm Test 3 during test



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