Photo: *TIA access road with Pad and road to Quarry 3, looking west– Sampling location 16-QR-05*

Photo: *TIA access road looking southeast – Sampling location 16-QR-04*

Attachment C – Quarry 2 Rock Laboratory Data

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Client: SRK CONSULTING

Table 1: ABA Test Results for project TMAC RESOURCES - QUARRY ROCK MONITORING

Maxxam Sample No	Sample ID	Paste pH	CO2	CaCO3 Equiv.	Total S	HCl Extractable Sulphur	Sulphide Sulphur (by diff.)	Acid Generation Potential	Mod. ABA Neutralization Potential	Fizz Rating	Net Neutralization Potential	Neutralization Potential Ratio
	Units	pH Units	wt%	Kg CaCO3/T	wt%	wt%	wt%	Kg CaCO3/T	Kg CaCO3/T	N/A	Kg CaCO3/T	N/A
QM3244	Q22016a < 1cm	8.67	4.39	99.8	0.16	0.04	0.12	3.8	115	MODERATE	112	30.3
QM3245	Q22016a < 2mm	8.87	5.72	130.0	0.18	0.03	0.15	4.7	151	MODERATE	146	32.1
QM3338	Q22016b < 1cm	9.16	3.40	77.3	0.15	0.02	0.13	4.1	96.5	MODERATE	92.4	23.5
QM3339	Q22016b < 2mm	8.88	5.97	135.7	0.18	0.02	0.16	5.0	156	MODERATE	151	31.2
Detection Limits		*N/A*	*0.02*	*0.5*	*0.02*	*0.01*	*0.02*	*0.6*	*0.1*	*N/A*	*0.1*	*0.1*
Maxxam SOP #		*Y0SOP-00*	*LECO*	*BBY WI-00033*	*LECO*	*BBY0SOP-00010*	*BBY WI-00033*	*BBY WI-00033*	*BBY0SOP-00020*	*BBY0SOP-00*	*BBY WI-00033*	*BBY WI-00033*

Notes:

Lawrence, R.W. 1991. Acid Rock Drainage Prediction Manual

References:

Acid Generation Potential = Sulphide Sulphur (by diff.)*31.25

CaCO3 Equivalency = Carbonate Carbon (CO2)*(100/44)*10

Carbonate carbon (CO2; HCl direct method) by Leco.

Fizz Rating - Reference method used is based on NP method.

Net Neutralization Potential = (Modified ABA Neutralization Potential)-(Acid Generation Potential (S-S by diff))

Mod. ABA Neutralization Potential - MEND Acid Rock Drainage Prediction Manual, MEND Project 1.16.1b (pages 6.2-11 to 17), March 1991.

Neutralization Potential Ratio = (Neutralization Potential)/(Acid Generation Potential)

Paste pH - Field and Laboratory Methods Applicable to Overburdens and Minesoils, (EPA 600 / 2-78-054, March 1978).

HCl Extractable Sulphur is based on a modified version of ASTM Method D 2492-02

Sulphide Sulphur = (Total Sulphur)-(Sulphate Sulphur)

Total sulphur, total carbon & carbonate carbon (CO2; HCl direct method) by Leco.

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Client: SRK CONSULTING

Table 2: ABA QAQC Test Results for project TMAC RESOURCES - QUARRY ROCK MONITORING

	Duplicate QC										
Maxxam Sample No	**Sample ID**	Paste pH Reported	**Paste pH Dup**			HCl Extractable Sulphur Reported	**HCl Extractable Sulphur Dup**	Mod. ABA Neutralization Potential Reported	**Mod. ABA Neutralization Potential Reported Dup**	Fizz Rating Reported	**Fizz Rating Dup**
	Units	pH Units	pH Units			wt%	wt%	Kg CaCO3/T	Kg CaCO3/T	N/A	N/A
QM3244 Dup	Q22016a < 1cm	8.67	8.68			0.04	0.04	115	117	MODERATE	MODERATE

Reference Material QC										
	Paste pH		CO2	Total S	HCl Extractable Sulphur		Mod. ABA Neutralization Potential Reported			
Units	pH Units		wt%	wt%	wt%		Kg CaCO3/T			
Reference Material										
ARD REF MAT GS311-1 (8549182) (2.32 wt%)				2.45						
ARD Spike C02 (8559431) (1.55 wt%)			1.30							
ARD-Paste pH 8.29 (8569604) (8.29 pH Units)	8.37									
KZK-1ModS Slight (8569605) (58.9 Kg CaCO3/T)							57.3			
ARD SPIKE GS910-4 CS (8549182) (8.27 wt%)				8.22						
ARD Spike C02 (8559431) (1.55 wt%)			1.36							
RS10 STD (0.06 % S)					0.06					
ARD Ref Mat DBOHC (0.27 wt%)					0.26					
Blank QC										
Method Blank				<0.02						
Method Blank			<0.02							
Method Blank					<0.01		0.3			

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Client: SRK CONSULTING

Table 3: MEND SFE Test Results for project TMAC RESOURCES - QUARRY ROCK MONITORING

Maxxam Sample No	Sample ID	Sample Weight	Volume Used	pH	EC	SO4	Acidity to pH4.5	Acidity to pH8.3	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Dissolved Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Total Dissolved Solids	Hardness CaCO3	Dissolved Aluminum (Al)	Dissolved Antimony (Sb)	Dissolved Arsenic (As)	Dissolved Barium (Ba)	Dissolved Beryllium (Be)	Dissolved Bismuth (Bi)	Dissolved Boron (B)
Units		g	ml	pH Units	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QM3245	Q22016A < 2MM	125	275	8.88	225.0	28.3	<0.5	<0.5	36	44	<0.5	<0.5	23.2	1.7	<0.05	0.012	120	26.1	0.318	0.00139	0.00166	0.00199	<0.000010	<0.0000050	0.136
QAQC																									
Duplicates																									
QO7376	Q22016A < 2MM SFE SPLIT DUP	125	275	8.95	219.0	26.7	<0.5	<0.5	36	44	<0.5	<0.5	21.8	1.5	<0.05	0.011	110	26.0	0.322	0.00136	0.00164	0.00174	<0.000010	<0.0000050	0.133
QO7376 Dup	Q22016A < 2MM SFE SPLIT DUP																110								
Blanks																									
Method Blank		0	275	5.63	1.0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	<0.005	<10	<0.50	<0.00050	<0.000020	<0.000020	<0.000020	<0.000010	<0.0000050	<0.050
Method Blank						<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5			<0.005									
Method Blank																			<0.00050	<0.000020	<0.000020	<0.000020	<0.000010	<0.0000050	<0.050
Method Blank																	<10								
Method Blank									<0.5	<0.5	<0.5	<0.5													
Method Blank															<0.005										
Method Blank																<0.005									
Method Blank							<0.5	<0.5																	
Method Blank													<0.5												
Method Blank						<0.5																			
Method Blank													<0.5												
Method Blank						0.8																			
Reference Material																									
CRC ICPMS H2O 10 ppb (8565804) % Recovery																			107.72300	97.10000	99.65000	97.22000	96.86000	98.20000	93.50600
True Values CRC ICPMS H2O 10 ppb																			**100**	**1**	**10**	**10**	**10**	**1**	**100**
Reference Material																									
TDS 100 -Van (8567171) % Recovery																	100.00000								
True Values TDS 100 -Van																	**100**								
Reference Material																									
Alkalinity W Soln' B (8568716) % Recovery									95.3																
True Values Alkalinity W Soln' B									**47.6**																
Reference Material																									
Nitrite Water-Van (8568934) % Recovery															99.80000										
True Values Nitrite Water-Van															**0.1**										
Reference Material																									
Ammonia-Van (8569420) % Recovery																99.399									
True Values Ammonia-Van																**0.1**									
Reference Material																									
Acidity 8.3 W-Van (8569927) % Recovery								105.6																	
True Values Acidity 8.3 W-Van								**100**																	
Reference Material																									
Chloride W K-Van (8570432) % Recovery													92.7												
True Values Chloride W K-Van													**20**												
Reference Material																									
Sulphate W K-Van (8570433) % Recovery						95.66																			
True Values Sulphate W K-Van						**20**																			

Maxxam Sample No	Sample ID	Sample Weight	Volume Used	pH	EC	SO4	Acidity to pH4.5	Acidity to pH8.3	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Dissolved Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Total Dissolved Solids	Hardness CaCO3	Dissolved Aluminum (Al)	Dissolved Antimony (Sb)	Dissolved Arsenic (As)	Dissolved Barium (Ba)	Dissolved Beryllium (Be)	Dissolved Bismuth (Bi)	Dissolved Boron (B)
Chloride W K-Van (8570443) % Recovery													95.58500												
True Values Chloride W K-Van													**20**												
Reference Material																									
Sulphate W K-Van (8570445) % Recovery						96.40500																			
True Values Sulphate W K-Van						**20**																			
Detection Limits				N/A	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.02	0.005	0.005	10	0.50	0.00050	0.000020	0.000020	0.000020	0.000010	0.0000050	0.050
Maxxam SOP #		BBY0SOP-000	BY0SOP-000	BY0SOP-000	BBY0SOP-00006	Y6SOP-000	BBY6SOP-0003	BBY6SOP-00037	BBY6SOP-00026	BY6SOP-0002	BY6SOP-0002	BY6SOP-0002	BY6SOP-0001	BY6SOP-0001	BBY6SOP-00010	Y6SOP-000	Y6SOP-000	BBY WI-00033	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002

Notes:
Calculated parameter based on the concentration of Nitrate plus Nitrite(NO2+NO3) minus Nitrite(NO2)

References:
Hardness = (Calcium*2.497) + (Magnesium*4.118)

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Table 3: MEND SFE Test Results for project TMAC RESOURCES - QUARRY ROCK MONIT

Maxxam Sample No	Sample ID	Dissolved Cesium (Cs)	Dissolved Cadmium (Cd)	Dissolved Calcium (Ca)	Dissolved Chromium (Cr)	Dissolved Cobalt (Co)	Dissolved Copper (Cu)	Dissolved Lanthanum (La)	Dissolved Iron (Fe)	Dissolved Lead (Pb)	Dissolved Lithium (Li)	Dissolved Magnesium (Mg)	Dissolved Manganese (Mn)	Dissolved Phosphorus (P)	Dissolved Molybdenum (Mo)	Dissolved Nickel (Ni)	Dissolved Potassium (K)	Dissolved Rubidium (Rb)	Dissolved Selenium (Se)	Dissolved Silicon (Si)	Dissolved Silver (Ag)	Dissolved Sodium (Na)
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
QM3245	Q22016A < 2MM	<0.000050	<0.0000050	7.72	0.00011	0.0000310	0.00146	<0.000050	0.0088	0.0000370	0.00146	1.66	0.00162	0.0115	0.00299	0.000085	2.59	0.00165	0.00122	1.27	<0.0000050	32.6
QAQC																						
Duplicates																						
QO7376	Q22016A < 2MM SFE SPLIT DUP	<0.000050	0.0000130	7.82	0.00014	0.0000360	0.00137	<0.000050	0.0208	0.0000340	0.00154	1.56	0.00200	0.0092	0.00291	0.000087	2.44	0.00166	0.00121	1.20	<0.0000050	30.3
QO7376 Dup	Q22016A < 2MM SFE SPLIT DUP																					
Blanks																						
Method Blank		<0.000050	<0.0000050	<0.050	<0.00010	<0.0000050	<0.000050	<0.000050	<0.0010	<0.0000050	<0.00050	<0.050	<0.000050	<0.0020	<0.000050	<0.000020	<0.050	<0.000050	<0.000040	<0.10	<0.0000050	<0.050
Method Blank																						
Method Blank		<0.000050	<0.0000050	<0.050	<0.00010	<0.0000050	<0.000050	<0.000050	<0.0010	<0.0000050	<0.00050	<0.050	<0.000050	<0.0020	<0.000050	<0.000020	<0.050	<0.000050	<0.000040	<0.10	<0.0000050	<0.050
Method Blank																						
Method Blank																						
Method Blank																						
Method Blank																						
Method Blank																						
Method Blank																						
Method Blank																						
Method Blank																						
Reference Material																						
CRC ICPMS H2O 10 ppb (8565804) % Recovery		91.20000	97.52000		99.82000	100.53000	101.25000	91.70000	104.62300	99.77000	98.95000		99.84000		100.90000	102.89000			104.29000		97.30000	
True Values CRC ICPMS H2O 10 ppb		**1**	**10**		**10**	**10**	**10**	**1**	**100**	**10**	**10**		**10**		**1**	**10**			**10**		**1**	
Reference Material																						
TDS 100 -Van (8567171) % Recovery																						
True Values TDS 100 -Van																						
Reference Material																						
Alkalinity W Soln' B (8568716) % Recovery																						
True Values Alkalinity W Soln' B																						
Reference Material																						
Nitrite Water-Van (8568934) % Recovery																						
True Values Nitrite Water-Van																						
Reference Material																						
Ammonia-Van (8569420) % Recovery																						
True Values Ammonia-Van																						
Reference Material																						
Acidity 8.3 W-Van (8569927) % Recovery																						
True Values Acidity 8.3 W-Van																						
Reference Material																						
Chloride W K-Van (8570432) % Recovery																						
True Values Chloride W K-Van																						
Reference Material																						
Sulphate W K-Van (8570433) % Recovery																						
True Values Sulphate W K-Van																						
Chloride W K-Van (8570443) % Recovery																						
True Values Chloride W K-Van																						
Reference Material																						
Sulphate W K-Van (8570445) % Recovery																						
True Values Sulphate W K-Van																						
Detection Limits		0.000050	0.0000050	0.050	0.00010	0.0000050	0.000050	0.000050	0.0010	0.0000050	0.00050	0.050	0.000050	0.0020	0.000050	0.000020	0.050	0.000050	0.000040	0.10	0.0000050	0.050
Maxxam SOP #	BB	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002

Notes:
Calculated parameter based on the concentration of Nitrate plus Nitrite(NO2+NO3) minus Nitrite(NO2)

References:
Hardness = (Calcium*2.497) + (Magnesium*4.118)

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Table 3: MEND SFE Test Results for project TMAC RESOURCES - QUARRY ROCK MONIT

Maxxam Sample No	Sample ID	Dissolved Strontium (Sr)	Dissolved Sulphur (S)	Dissolved Tellurium (Te)	Dissolved Thallium (Tl)	Dissolved Thorium (Th)	Dissolved Tin (Sn)	Dissolved Titanium (Ti)	Dissolved Tungsten (W)	Dissolved Uranium (U)	Dissolved Vanadium (V)	Dissolved Zinc (Zn)	Dissolved Zirconium (Zr)	Dissolved Mercury (Hg)	Anion Sum	Cation Sum	Balance %
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	N/A	N/A	N/A
QM3245	Q22016A < 2MM	0.0242	<10	0.000026	0.0000070	<0.0000050	<0.00020	0.00085	0.000179	0.0000040	0.00313	0.00019	<0.00010	<0.000050	2.08	2.04	0.900
QAQC																	
Duplicates																	
QO7376	Q22016A < 2MM SFE SPLIT DUP	0.0231	<10	0.000035	0.0000070	<0.0000050	<0.00020	0.00064	0.000181	0.0000030	0.00320	0.00022	<0.00010	<0.000050	1.99	1.94	1.50
QO7376 Dup	Q22016A < 2MM SFE SPLIT DUP																
Blanks																	
Method Blank		<0.000050	<10	<0.000020	<0.0000020	<0.0000050	<0.00020	<0.00050	<0.000010	<0.0000020	<0.00020	0.00016	<0.00010	<0.000050	0	0.002	-100
Method Blank																	
Method Blank		<0.000050	<10	<0.000020	<0.0000020	<0.0000050	<0.00020	<0.00050	<0.000010	<0.0000020	<0.00020	<0.00010	<0.00010	<0.000050			
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Method Blank																	
Reference Material																	
CRC ICPMS H2O 10 ppb (8565804) % Recovery		97.16000		106.80000	98.70000		101.50000	104.18000		99.83000	99.90000	103.29000		96.80000			
True Values CRC ICPMS H2O 10 ppb		**10**		**1**	**1**		**1**	**10**		**10**	**10**	**10**		**1**			
Reference Material																	
TDS 100 -Van (8567171) % Recovery																	
True Values TDS 100 -Van																	
Reference Material																	
Alkalinity W Soln' B (8568716) % Recovery																	
True Values Alkalinity W Soln' B																	
Reference Material																	
Nitrite Water-Van (8568934) % Recovery																	
True Values Nitrite Water-Van																	
Reference Material																	
Ammonia-Van (8569420) % Recovery																	
True Values Ammonia-Van																	
Reference Material																	
Acidity 8.3 W-Van (8569927) % Recovery																	
True Values Acidity 8.3 W-Van																	
Reference Material																	
Chloride W K-Van (8570432) % Recovery																	
True Values Chloride W K-Van																	
Reference Material																	
Sulphate W K-Van (8570433) % Recovery																	
True Values Sulphate W K-Van																	
Reference Material																	
Chloride W K-Van (8570443) % Recovery																	
True Values Chloride W K-Van																	
Reference Material																	
Sulphate W K-Van (8570445) % Recovery																	
True Values Sulphate W K-Van																	
Detection Limits		0.000050	10	0.000020	0.0000020	0.0000050	0.00020	0.00050	0.000010	0.0000020	0.00020	0.00010	0.00010	0.000050			
Maxxam SOP #	BB	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY7SOP-00002	BBY WI-00033	BBY WI-00033	BBY WI-00033

Notes:
Calculated parameter based on the concentration of Nitrate plus Nitrite(NO2+NO3) minus Nitrite(NO2)

References:
Hardness = (Calcium*2.497) + (Magnesium*4.118)

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Table 4: Sample List for project TMAC RESOURCES - QUARRY ROCK MONITORING

Client: SRK CONSULTING

Maxxam Sample ID	Client Sample ID	Sample Form	Dry Weight After Seiving (kg)
QM3244	Q22016a < 1cm	Wet Coarse Rock/Basalt	0.123
QM3245	Q22016a < 2mm	Wet Coarse Rock/Basalt	0.340
QM3338	Q22016b < 1cm	Wet Coarse Rock/Basalt	0.079
QM3339	Q22016b < 2mm	Wet Coarse Rock/Basalt	0.138
		Total Weight	5.929
		Total Samples Received	2

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Table 5: Sample Summary for project TMAC RESOURCES - QUARRY ROCK MONITORING

SRK CONSULTING, TMAC RESOURCES - QUARRY ROCK MONITORING
Page 5 of 5

Date Samples Rec'd by Maxxam:	6 samples were rec'd on 16-Feb-2017.
Sample Prep Conducted by Maxxam:	YES
Date of Analysis:	February 2017

Client:	SRK CONSULTING
Client Project Name:	TMAC RESOURCES - QUARRY ROCK MONITORING
Client Project No:	1CT022.009.730
ARD Project #:	
Maxxam Job No:	B707401
Contact Person:	Kyle Conway, Sarah Warnock
E-mail Address:	eviro@tmacresources.com

Data Validated by:	SAID ZEINAB
Position:	Senior Manager, Acid Rock Drainage

Sample Storage

Sample rejects (and selected test residues where applicable) have been archived
Standard archive protocol is archiving for samples for 3 months after testing is complete.
If archiving is required past 3 months a fee will be required.

Attachment D –Construction Rock Field Notes, Field Measurements and Laboratory Data

Attachment D: Construction Rock Field Notes, Measurements and Laboratory Data

									Percent distrbution		Percent distribution					Rinse of <2mm fraction	
Sample ID	UTM Quadrant	Easting	Northing	Location	Description of sample point	Date	Time	Sampler	>1cm	<1cm	2mm-1cm	<2mm	Description of rock samples	Visible sulphides	Colour of fines	Rinse pH	Rinse Sp_Cond (uS/cm)
16-QR-01	13W	434580	7559234	Temp explosives berm by N dam	NE corner of outside edge of berm adjacent to TIA road	6/12/2016	10:30	KYK	37%	63%	60%	40%	Pale grey, fine grained, mafic metavolcanic.	none	pale grey	8.1	165
16-QR-02	13W	435078	7558834	TIA road	W side of TIA road (north end)	6/12/2016	11:30	KYK	43%	57%	89%	11%	Grey/green, fine grained, mafic metavolcanic with carbonate veining.	none	pale grey	8.4	293
16-QR-03	13W	435448	7558362	TIA road	W side of TIA road (central)	6/12/2016	12:50	KYK	51%	49%	71%	29%	Mid-grey, fine grained, mafic metavolcanic with carbonate veins.	none	pale grey	8.6	468
16-QR-04	13W	435381	7557765	TIA road	W side of TIA road (south end)	6/12/2016	14:00	KYK	25%	75%	53%	47%	Pale grey, fine grained, mafic metavolcanic with carbonate veins. Rare schistose fabric.	none	pale grey	8.0	1531
16-QR-05	13W	435532	7557917	Quarry 3 pad	NE corner of pad at edge of road to quarry 3 (off east side of TIA road)	6/12/2016	15:05	KYK	45%	55%	72%	28%	Mid-grey, fine grained, mafic metavolcanic with carbonate veins, rare epidote veins, rare quartz veins and numerous rusty brown weathered surfaces. Rare disseminated sulphides. Suspected waste rock.	trace	pale brownish-grey	8.4	255
16-QR-06	13W	433097	7559138	Mill pad	SW corner of mill, just inside building	6/12/2016	16:50	KYK	24%	76%	63%	37%	Pale grey, fine grained, mafic metavolcanic with abundant carbonate veins.	none	pale grey	8.4	1042
16-QR-07	13W	433200	7559118	Mill pad	Near SE corner of mill, outside of building.	6/12/2016	17:05	KYK	37%	63%	56%	44%	Pale grey, fine grained, mafic metavolcanic with abundant carbonate veins.	none	pale grey	8.4	959
16-QR-08	13W	433330	7559177	Pad T	SE tip of Pad T near portal and edge of WR stockpile.	6/12/2016	17:40	KYK	43%	57%	66%	34%	Pale grey, fine grained, mafic metavolcanic with carbonate veins and chunks of vein quartz. 0.5% fine grained pyrite on one surface of +1cm chunk. Suspected waste rock.	trace	pale grey	8.2	568
16-QR-09	13W	433214	7559220	Pad T	S edge of Pad T above east end of mill	6/12/2016	18:05	KYK	27%	73%	64%	36%	Pale grey, fine grained, mafic metavolcanic with rare carbonate veins.	none	pale grey	7.7	902
16-QR-10	13W	433062	7562356	Airstrip	West edge of airstrip (north end)	6/13/2016	9:15	KYK	30%	70%	71%	29%	Mid-grey, fine grained, mafic metavolcanic with abundant carbonate veins.	none	pale grey	8.2	154
16-QR-11	13W	432916	7561704	Airstrip	West edge of airstrip (centre)	6/13/2016	9:50	KYK	25%	75%	62%	38%	Pale to mid-grey, fine grained, mafic metavolcanic with carbonate veins and rare chunks of vein quartz.	none	pale grey	8.3	91.8
16-QR-12	13W	432846	7561382	Airstrip	West edge of airstrip (south end)	6/13/2016	10:20	KYK	38%	62%	78%	22%	Pale grey, fine grained, mafic metavolcanic. Carbonate veins present and rare K-feldpar veining and rare chunks of vein quartz.	none	pale grey	8.4	434
16-QR-13	13W	433272	7559310	Pad T	N side of Pad T, west of the western extent of the waste rock stockpile	6/13/2016	12:35	KYK	42%	58%	69%	31%	Mid-grey, fine grained, mafic metavolcanic with abundant carbonate veins and epidote stringers. Rare rusty brown weathered surfaces. Chunks of vein quartz. One bleb of fine grained pyrite on a +1cm chunk. Suspected waste rock.	trace	pale grey	8.0	2720
16-QR-14	13W	433184	7559257	Pad T	Centre of west side of Pad T, a few meters to the west of the ore stockpiles	6/13/2016	13:05	KYK	33%	67%	70%	30%	Mid-grey, fine grained, mafic metavolcanic with quartz vein material, epidote veins, rusty brown weathered surfaces and abundant calcite veins. Suspected waste rock.	none	pale grey	8.62	401
16-QR-15	13W				Duplicate of 16-QR-14	6/13/2016	13:15	KYK	40%	60%	73%	27%				8.61	424
16-QR-16	13W	433229	7559239	Pad T	Centre of Pad T	6/13/2016	13:45	KYK	26%	74%	57%	43%	Pale to mid-grey, fine grained, mafic metavolcanic with carbonate veins, vein quartz, epidote stringers and rusty brown weathered surfaces. Suspected waste rock.	none	pale grey	7.7	4780
16-QR-17	13W	433423	7559282	Pad T	East edge of Pad T between diabase ridge and east edge of waste rock stockpile.	6/13/2016	14:20	KYK	36%	64%	61%	39%	Pale to mid-grey/green, mafic metavolcanic, chunks of vein quartz, brown weathered surfaces, abundant carbonate veins. Suspected waste rock.	none	grey/brown	8.2	236
BLANK						6/13/2016	17:00	KYK								5.3	7.0

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Table 1: ABA Test Results for project HOPE BAY NUNAVUT

Maxxam Sample No	Sample ID	Paste pH	Rinse EC (on <2mm)	CO2	CaCO3 Equiv.	Total S	HCl Extractable Sulphur	Sulphide Sulphur (by diff.)	Acid Generation Potential	Mod. ABA Neutralization Potential	Fizz Rating	Net Neutralization Potential	Neutralization Potential Ratio
	Units	pH Units	uS/cm	wt%	Kg CaCO3/T	wt%	wt%	wt%	Kg CaCO3/T	Kg CaCO3/T	N/A	Kg CaCO3/T	N/A
OW5570	16QR 01 (1CM-2MM)	8.90		4.90	111.4	0.11	0.03	0.08	2.5	128	STRONG	125	51.1
PA2306	16QR 01 (1CM-2MM) SPLIT DUPLICATE	8.70		5.10	115.9	0.14	0.02	0.12	3.8	131	STRONG	127	34.5
		0.20		-4.0%	-4.0%	-24.0%	40.0%	-40.0%	-41.3%	-2.3%	#VALUE!	-1.6%	38.8%
OW5571	16QR 02 (1CM-2MM)	9.46		3.30	75.0	0.11	0.02	0.09	2.8	89.0	STRONG	86.2	31.8
OW5572	16QR 03 (1CM-2MM)					0.09							
OW5573	16QR 04 (1CM-2MM)	9.05		4.26	96.8	0.12	0.03	0.09	2.8	120	STRONG	117	42.7
OW5574	16QR 05 (1CM-2MM)	9.34		3.57	81.1	0.24	0.04	0.20	6.3	92.8	STRONG	86.5	14.7
OW5575	16QR 06 (1CM-2MM)					0.09							
OW5576	16QR 07 (1CM-2MM)	9.17		4.41	100.2	0.12	0.03	0.09	2.8	76.0	STRONG	73.2	27.1
OW5577	16QR 08 (1CM-2MM)					0.10							
OW5578	16QR 09 (1CM-2MM)					0.06							
OW5579	16QR 10 (1CM-2MM)					0.10							
OW5580	16QR 11 (1CM-2MM)					0.08							
OW5581	16QR 12 (1CM-2MM)	9.25		2.69	61.1	0.15	0.02	0.13	4.1	71.3	STRONG	67.2	17.4
OW5582	16QR 13 (1CM-2MM)	8.74		4.75	108.0	0.15	0.03	0.12	3.8	123	STRONG	119	32.4
OW5583	16QR 14 (1CM-2MM)	9.17		4.36	99.1	0.13	0.03	0.10	3.1	113	STRONG	110	36.5
PA2307	16QR 14(1CM-2MM) SPLIT DUPLICATE	8.97		4.14	94.1	0.15	0.02	0.13	4.1	109	STRONG	105	26.7
		0.20		5.2%	5.2%	-14.3%	40.0%	-26.1%	-27.8%	3.6%	#VALUE!	4.7%	31.0%
OW5584	16QR 15 (1CM-2MM)	9.08		3.81	86.6	0.15	0.02	0.13	4.1	111	STRONG	107	27.0
OW5585	16QR 16 (1CM-2MM)	8.31		5.67	128.9	0.12	0.03	0.09	2.8	147	STRONG	144	52.3
OW5586	16QR 17 (1CM-2MM)	8.93		4.93	112.1	0.16	0.04	0.12	3.8	129	STRONG	125	33.9
OW5590	16QR 04 <2MM		1270										
OW5592	16QR 06 <2MM		814										
OW5595	16QR 09 <2MM		1000										
OW5598	16QR 12 <2MM		467										
Detection Limits		*N/A*	*0.5*	*0.02*	*0.5*	*0.02*	*0.01*	*0.02*	*0.6*	*0.1*	*N/A*	*0.1*	*N/A*
Maxxam SOP #		*BBY0SOP-00016*	*BBY0SOP-00029*	*LECO*	*BBY WI-00033*	*LECO*	*BBY0SOP-00010*	*BBY WI-00033*	*BBY WI-00033*	*BBY0SOP-00020*	*BBY0SOP-00*	*BBY WI-00033*	*BBY WI-00033*

TIC

Notes:

Lawrence, R.W. 1991. Acid Rock Drainage Prediction Manual

References:

Acid Generation Potential = Sulphide Sulphur (by diff.)*31.25

CaCO3 Equivalency = Carbonate Carbon (CO2)*(100/44)*10

Carbonate carbon (CO2; HCl direct method) by Leco.

Fizz Rating - Reference method used is based on NP method.

Net Neutralization Potential = (Modified ABA Neutralization Potential)-(Acid Generation Potential (S-S by diff))

Mod. ABA Neutralization Potential - MEND Acid Rock Drainage Prediction Manual, MEND Project 1.16.1b (pages 6.2-11 to 17), March 1991.

Neutralization Potential Ratio = (Neutralization Potential)/(Acid Generation Potential)

Paste pH - Field and Laboratory Methods Applicable to Overburdens and Minesoils, (EPA 600 / 2-78-054, March 1978).

Rinse EC (on <2mm) - Based on Rince pH Procedure, MEND PREDICTION MANUAL, (MEND Report 1.20.1, December 2009).

HCl Extractable Sulphur is based on a modified version of ASTM Method D 2492-02

Sulphide Sulphur = (Total Sulphur)-(Sulphate Sulphur)

Total sulphur, total carbon & carbonate carbon (CO2; HCl direct method) by Leco.

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Table 2: ABA QAQC Test Results for project HOPE BAY NUNAVUT

	Duplicate QC	**Target**												
Maxxam Sample No	**Sample ID**		Paste pH Reported	**Paste pH Dup**	CO2 Reported	**CO2 Dup**	Total S Reported	**Total S Dup**	**HCl Extractable Sulphur Reported**	**HCl Extractable Sulphur Dup**	Mod. ABA Neutralization Potential Reported	**Mod. ABA Neutralization Potential Reported Dup**	Fizz Rating Reported	**Fizz Rating Dup**
	Units		pH Units	pH Units	wt%	wt%	wt%	wt%	wt%	wt%	Kg CaCO3/T	Kg CaCO3/T	N/A	N/A
OW5585 Dup	16QR 16 (1CM-2MM)		8.31	8.31							147	148	STRONG	STRONG
				0.00								-0.7%		
OW5586 Dup	16QR 17 (1CM-2MM)		8.93	9.01			0.16	0.15			129	133	STRONG	STRONG
				-0.08				6.5%				-3.1%		
PA2307 Dup	16QR 14(1CM-2MM)SPLIT DUP				4.14	3.95								

Reference Material QC													
		Paste pH		CO2		Total S				Mod. ABA Neutralization			
Units		pH Units		wt%		wt%				Kg CaCO3/T			
Reference Material													
ARD REF MAT GS311-1 (8320086) (2.32 wt%)	2.32					2.41							
KZK-1ModS Slight (8338543) (58.9 Kg CaCO3/T)	58.90									57.3			
ARD-Paste pH 8.29 (8338551) (8.29 pH Units)	8.29	8.32											
ARD REF MAT GS311-1 (8348745) (2.32 wt%)	2.32					2.41							
ARD Spike C02 (8348753) (1.55 wt%)	1.55			1.36									
ARD SPIKE GS910-4 CS (8320086) (8.27 wt%)	8.27					8.49							
ARD SPIKE GS910-4 CS (8348745) (8.27 wt%)	8.27					8.49							
ARD Spike C02 (8348753) (1.55 wt%)	1.55			1.42									
RS10 STD (0.06 % S)	0.06							0.05					
ARD Ref Mat DBOHC (0.27 wt%)	0.27							0.26					
Blank QC													
Method Blank						<0.02							
Method Blank								<0.01					
Method Blank						<0.02							
Method Blank				<0.02									

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Table 3: Aqua Regia Metals Test Results for project HOPE BAY NUNAVUT

Maxxam Sample No	Sample ID	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
Units		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
OW5570	16QR 01 (1CM-2MM)	0.2	126	1.2	88	-0.1	62.5	42.0	1440	7.06	3.7	-0.1	-0.5	0.1	17	-0.1	-0.1	-0.1	179	5.01	0.025	1	181	3.24	6	0.267	-20	3.87	0.013	0.03	-0.1	-0.01	11.9	-0.1	0.11	9	-0.5	-0.2
PA2306	16QR 01 (1CM-2MM) SPLIT DUPLICATE	-0.1	133	1.0	80	-0.1	66.3	39.4	1450	6.74	2.9	-0.1	-0.5	-0.1	17	-0.1	-0.1	-0.1	193	5.25	0.024	1	179	3.10	5	0.252	-20	3.65	0.015	0.02	-0.1	-0.01	11.8	-0.1	0.10	9	-0.5	-0.2
		66.7%	-5.4%	18.2%	9.5%	0.0%	-5.9%	6.4%	-0.7%	4.6%	24.2%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-7.5%	-4.7%	4.1%	0.0%	1.1%	4.4%	18.2%	5.8%	0.0%	5.9%	-14.3%	40.0%	0.0%	0.0%	0.8%	0.0%	9.5%	0.0%	0.0%	0.0%
		<10X DL									<10X DL																			<10X DL								
OW5571	16QR 02 (1CM-2MM)	0.1	127	0.6	67	-0.1	64.4	38.6	1140	5.31	0.8	-0.1	-0.5	-0.1	14	0.1	-0.1	-0.1	121	4.06	0.027	-1	175	2.23	3	0.338	-20	2.93	0.027	0.01	-0.1	-0.01	6.0	-0.1	0.11	6	-0.5	-0.2
OW5573	16QR 04 (1CM-2MM)	0.2	109	1.4	74	-0.1	58.6	37.3	1200	5.68	3.8	-0.1	-0.5	0.2	28	0.1	-0.1	-0.1	146	4.70	0.037	3	159	2.64	5	0.252	-20	3.09	0.040	0.04	-0.1	-0.01	10.9	-0.1	0.11	8	-0.5	-0.2
OW5574	16QR 05 (1CM-2MM)	0.1	174	14.4	80	-0.1	62.2	38.7	1150	6.07	5.3	-0.1	-0.5	-0.1	29	-0.1	-0.1	-0.1	153	3.78	0.031	2	173	2.81	4	0.245	-20	3.30	0.033	0.04	-0.1	-0.01	11.3	-0.1	0.22	9	-0.5	-0.2
OW5576	16QR 07 (1CM-2MM)	0.1	142	0.7	77	-0.1	62.8	38.2	1220	5.87	0.9	-0.1	-0.5	-0.1	15	-0.1	-0.1	-0.1	138	4.69	0.026	-1	174	2.53	3	0.297	24	3.23	0.032	0.02	-0.1	-0.01	7.5	-0.1	0.12	7	-0.5	-0.2
OW5581	16QR 12 (1CM-2MM)	0.2	129	0.5	67	-0.1	72.8	37.5	918	4.81	7.2	-0.1	0.6	0.2	18	-0.1	-0.1	-0.1	115	2.91	0.041	2	174	2.29	2	0.219	-20	2.58	0.033	0.02	-0.1	-0.01	6.9	-0.1	0.15	7	-0.5	-0.2
OW5582	16QR 13 (1CM-2MM)	0.1	122	0.6	66	-0.1	61.9	38.3	1220	5.85	1.4	-0.1	-0.5	-0.1	13	-0.1	-0.1	-0.1	142	4.97	0.025	-1	178	2.51	4	0.284	-20	3.27	0.036	0.02	-0.1	-0.01	8.7	-0.1	0.13	7	-0.5	-0.2
OW5583	16QR 14 (1CM-2MM)	0.1	204	1.1	75	-0.1	62.4	37.5	1100	5.20	3.1	-0.1	-0.5	-0.1	17	0.3	-0.1	-0.1	125	4.83	0.029	-1	167	2.22	2	0.268	75	2.88	0.036	0.02	-0.1	-0.01	7.0	-0.1	0.12	7	-0.5	-0.2
PA2307	16QR 14(1CM-2MM) SPLIT DUPLICATE	-0.1	138	0.9	87	-0.1	56.9	34.8	1040	4.90	3.5	-0.1	-0.5	-0.1	16	0.3	-0.1	-0.1	116	4.41	0.025	-1	143	2.09	7	0.266	-20	2.66	0.027	0.01	-0.1	-0.01	6.4	-0.1	0.14	6	-0.5	-0.2
		0.0%	38.6%	20.0%	-14.8%	0.0%	9.2%	7.5%	5.6%	5.9%	-12.1%	0.0%	0.0%	0.0%	6.1%	0.0%	0.0%	0.0%	7.5%	9.1%	14.8%	0.0%	15.5%	6.0%	-111.1%	0.7%	115.8%	7.9%	28.6%	66.7%	0.0%	0.0%	9.0%	0.0%	-15.4%	15.4%	0.0%	0.0%
		ok 10% of parameters failing																							<10X DL		<10X DL	ok 10% of paramete		<10X DL								
OW5584	16QR 15 (1CM-2MM)	0.2	167	0.7	62	-0.1	54.4	33.9	1050	4.73	2.9	-0.1	-0.5	-0.1	20	0.2	-0.1	-0.1	117	4.58	0.027	-1	153	2.06	2	0.288	-20	2.62	0.034	0.02	-0.1	-0.01	6.2	-0.1	0.14	6	-0.5	-0.2
OW5585	16QR 16 (1CM-2MM)	-0.1	138	0.4	62	-0.1	60.1	35.2	1190	5.46	-0.5	-0.1	1.1	-0.1	17	0.1	-0.1	-0.1	126	5.86	0.024	-1	163	2.39	3	0.274	-20	3.14	0.045	0.02	-0.1	-0.01	6.2	-0.1	0.11	6	-0.5	-0.2
OW5586	16QR 17 (1CM-2MM)	0.2	128	1.8	78	-0.1	67.1	40.6	1400	6.68	0.7	-0.1	-0.5	-0.1	19	0.1	-0.1	-0.1	160	5.31	0.027	1	180	2.93	11	0.310	-20	3.66	0.022	0.02	-0.1	-0.01	9.0	-0.1	0.13	8	0.7	-0.2
QA/QC																																						
Blanks																																						
Method Blank										-0.01										-0.01	-0.001			-0.01		-0.001		-0.01	-0.001	-0.01					-0.05			
Method Blank		-0.1	-0.1	-0.1	-1	-0.1	-0.1	-0.1	-1		-0.5	-0.1		-0.1	-1	-0.1	-0.1	-0.1	-2			-1	-1		-1		-20				-0.1	-0.01	-0.1	-0.1		-1	-0.5	*-0.2*
Method Blank													-0.5																									
Reference Material																																						
REF OREAS45EA (%) (8348756)										21.17										0.03	0.028			0.09		0.092		3.14	0.02	0.05					-0.05			
True Values REF OREAS45EA										**23.51**										**0.036**	**0.029**			**0.095**		**0.106**		**3.32**	**0.02**	**0.053**					**0.036**			
Percent Difference (8348756)										-10.0										-16.7	-3.4			-5.3		-13.2		-5.4	0.0	-5.7								
Reference Material																																						
REF OREAS45EA PPM (8348757)		1.5	670.2	13.4	29	0.2	377.6	49.1	390		10.3	1.7		9.8	4	<0.1	0.3	0.2	300			6	811		135		<20				<0.1	0.01	74.2	<0.1		12	1	*<0.2*
True Values REF OREAS45EA PPM		**1.39**	**709**	**14.3**	**28.9**	**0.26**	**381**	**52**	**400**		**9.1**	**1.73**		**10.7**	**3.5**	**0.02**	**0.2**	**0.26**	**303**			**6.57**	**849**		**148**							**0.34**	**78**	**0.072**		**11.7**	**0.63**	**0.07**
Percent Difference (8348757)		7.9	-5.5	-6.3	0.3	-23.1	-0.9	-5.6	-2.5		13.2	-1.7		-8.4	14.3		50.0	-23.1	-1.0			-8.7	-4.5		-8.8							-97.1	-4.9			2.6	58.7	
Reference Material																																						
REF OREAS45EA PPB (8348758)													52.6																									
True Values REF OREAS45EA PPB													**53**																									
Percent Difference (8348758)													-0.8																									
Reference Material																																						
DS10 % (8348756)										2.75										1.08	0.079			0.78		0.077		1.02	0.068	0.34					0.29			
True Values DS10 %										**2.719**										**1.09**	**0.079**			**0.81**		**0.077**		**1.06**	**0.066**	**0.35**					**0.3**			
Percent Difference (8348756)										1.1										-0.9	0.0			-3.7		0.0		-3.8	3.0	-2.9					-3.3			
Reference Material																																						
DS10 ppm (8348757)		14.1	152.3	155.4	370	1.7	75.4	12.7	896		45.3	2.7		7.0	70	2.6	9.7	12.7	44			17	55		416		<20				3.3	0.29	2.7	5.4		4	2.7	*4.8*
True Values DS10 ppm		**14.69**	**154.61**	**150.55**	**370**	**2.02**	**74.6**	**12.9**	**875**		**43.7**	**2.59**		**7.5**	**67.1**	**2.49**	**8.23**	**11.65**	**43**			**17.5**	**54.6**		**359**						**3.32**	**0.3**	**2.8**	**5.1**		**4.3**	**2.3**	**5.01**
Percent Difference (8348757)		-4.0	-1.5	3.2	0.0	-15.8	1.1	-1.6	2.4		3.7	4.2		-6.7	4.3	4.4	17.9	9.0	2.3			-2.9	0.7		15.9						-0.6	-3.3	-3.6	5.9		-7.0	17.4	*-4.2*
Reference Material																																						
DS10 ppb (8348758)													63.8																									
True Values DS10 ppb													**91.9**																									
Percent Difference (8348758)													-30.6																									
Detection Limits		0.1	0.1	0.1	1	0.1	0.1	0.1	1	0.01	0.5	0.1	0.5	0.1	1	0.1	0.1	0.1	2	0.01	0.001	1	1	0.01	1	0.001	20	0.01	0.001	0.01	0.1	0.01	0.1	0.1	0.05	1	0.5	*0.2*
Maxxam SOP #		*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*	*1DX*

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Client: SRK CONSULTING

Table 4: MEND SFE Test Results for project HOPE BAY NUNAVUT

Maxxam Sample No	Sample ID	Sample Weight	Volume Used	pH	EC	SO4	Acidity to pH4.5	Acidity to pH8.3	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide	Dissolved Chloride	Nitrate-N	Nitrite-N	Total Ammonia	Total Dissolved Solids	Hardness CaCO3	Dissolved Aluminum (Al)	Dissolved Antimony (Sb)	Dissolved Arsenic (As)	Dissolved Barium (Ba)	Dissolved Beryllium (Be)	Dissolved Bismuth (Bi)
	Units	g	ml	pH Units	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OW5590	16QR 04 <2MM	125	375	8.94	562.0	27.9	-0.5	-0.5	30	37	-0.5	-0.5	106	8.8	0.06	0.494	270	43.5	0.497	0.000260	0.000566	0.00782	-0.000010	##########
PA2308	16QR 04 <2MM SPLIT DUPLICATE	125	375	9.02	556.0	26.9	-0.5	-0.5	29	35	-0.5	-0.5	105	9.4	0.07	0.480	260	40.9	0.302	0.000223	0.000481	0.00498	-0.000010	##########
				-0.9%	1.1%	3.6%	0.0%	0.0%	3.4%	5.6%	0.0%	0.0%	0.9%	-6.6%	-15.4%	2.9%	3.8%	6.2%	48.8%	15.3%	16.2%	44.4%	0.0%	0.0%
OW5591	16QR 05 <2MM	250	750	9.25	128.5	7.6	-0.5	-0.5	31	38	-0.5	-0.5	9.7	1.7	-0.05	0.292	70	23.6	0.568	0.000286	0.00132	0.00157	-0.000010	##########
OW5593	16QR 07 <2MM	250	750	9.30	321.0	24.7	-0.5	-0.5	31	38	-0.5	-0.5	56.5	1.7	-0.05	0.184	150	21.7	0.444	0.000250	0.000476	0.00124	-0.000010	##########
OW5598	16QR 12 <2MM	130	380	9.24	262.0	26.7	-0.5	-0.5	37	44	0.7	-0.5	23.1	4.8	-0.05	0.053	140	20.7	0.347	0.000198	0.00197	0.00286	-0.000010	##########
OW5599	16QR 13 <2MM	250	750	8.96	1211.0	33.0	-0.5	-0.5	20	25	-0.5	-0.5	212	29	0.19	0.921	650	101	0.231	0.000113	0.000094	0.0181	-0.000010	##########
QAQC																								
Duplicates																								
OW5590 Dup	16QR 04 <2MM					27.6							105											
OW5591 Dup	16QR 05 <2MM					7.5							9.8											
OW5593 Dup	16QR 07 <2MM																160							
PA2308 Dup	16QR 04 <2MM SPLIT DUPLICATE					27.1	-0.5	-0.5	29	36	-0.5	-0.5	106		0.06									
						-0.7%	0.0%	0.0%	0.0%	-2.8%	0.0%	0.0%	-0.9%		15.4%									
Blanks																								
Method Blank							<0.5	<0.5											<0.00050	<0.000020	<0.000020	<0.000020	<0.000010	<0.0000050
Method Blank																								
Method Blank		0.00	750	5.98	0.8	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.2	<0.05	<0.005	<10	<0.50	<0.00050	<0.000020	<0.000020	<0.000020	<0.000010	<0.0000050
Method Blank									<0.5	<0.5	<0.5	<0.5												
Method Blank																<0.005								
Method Blank																	<10							
Method Blank																<0.005								
Method Blank													0.7											
Method Blank						<0.5																		
Method Blank															<0.005									
Reference Material																								
CRC ICPMS H2O 10 ppb (8331547) % Recovery																			108.85500	99.00000	103.42000	101.27000	94.40000	99.90000
True Values CRC ICPMS H2O 10 ppb																			**100**	**1**	**10**	**10**	**10**	**1**
Reference Material																								
Acidity 8.3 W-Van (8331598) % Recovery								98.8																
True Values Acidity 8.3 W-Van								**100**																
Reference Material																								
Alkalinity W Soln' B (8331628) % Recovery									97.41597															
True Values Alkalinity W Soln' B									**47.6**															
Reference Material																								
TDS 100 -Van (8331691) % Recovery																	84.00000							
True Values TDS 100 -Van																	**100**							
Reference Material																								
Ammonia-Van (8331729) % Recovery																104.423								
True Values Ammonia-Van																**0.1**								
Reference Material																								
Chloride W K-Van (8333193) % Recovery													105.57000											
True Values Chloride W K-Van													**20**											
Reference Material																								
Sulphate W K-Van (8333194) % Recovery						100.20500																		
True Values Sulphate W K-Van						**20**																		
Reference Material																								
Nitrite Water-Van (8334170) % Recovery															101.40000									
True Values Nitrite Water-Van															**0.1**									
Detection Limits				N/A	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.02	0.005	0.005	10	0.50	0.00050	0.000020	0.000020	0.000020	0.000010	0.0000050
Maxxam SOP #		BBY0SOP-000	BY0SOP-000	BY0SOP-000	BBY0SOP-00000	BBY6SOP-00017	BY6SOP-0003	BBY6SOP-0003	BBY6SOP-00026	BBY6SOP-0002	BBY6SOP-0002	BBY6SOP-0002	BBY6SOP-000	BBY6SOP-0001	BBY6SOP-00010	BY6SOP-000	BY6SOP-0003	BBY WI-00033	BBY7SOP-0000	BBY7SOP-0000	BBY7SOP-0000	BBY7SOP-0000	BBY7SOP-0000	BBY7SOP-000

Notes:
Calculated parameter based on the concentration of Nitrate plus Nitrite(NO2+NO3) minus Nitrite(NO2)

References:
Hardness = (Calcium*2.497) + (Magnesium*4.118)

Maxxam

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Table 4: MEND SFE Test Results for project HOPE BAY NUNAVUT

Maxxam Sample No	Sample ID	Dissolved Boron (B)	Dissolved Cesium (Cs)	Dissolved Cadmium (Cd)	Dissolved Calcium (Ca)	Dissolved Chromium (Cr)	Dissolved Cobalt (Co)	Dissolved Copper (Cu)	Dissolved Lanthanum (La)	Dissolved Iron (Fe)	Dissolved Lead (Pb)	Dissolved Lithium (Li)	Dissolved Magnesium (Mg)	Dissolved Manganese (Mn)	Dissolved Phosphorus (P)	Dissolved Molybdenum (Mo)	Dissolved Nickel (Ni)	Dissolved Potassium (K)	Dissolved Rubidium (Rb)	Dissolved Selenium (Se)	Dissolved Silicon (Si)	Dissolved Silver (Ag)	Dissolved Sodium (Na)	Dissolved Strontium (Sr)	Dissolved Sulphur (S)
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
OW5590	16QR 04 <2MM	0.202	0.000114	-0.0000050	12.0	0.00082	0.000235	0.000717	-0.000050	0.304	0.0000980	0.00141	3.27	0.00925	0.0119	0.00341	0.000294	6.04	0.00548	0.000814	1.44	-0.0000050	88.4	0.0431	11
PA2308	16QR 04 <2MM SPLIT DUPLICATE	0.182	0.000140	-0.0000050	11.2	0.00031	0.000114	0.000446	-0.000050	0.0741	0.0000240	0.00131	3.16	0.00314	0.0097	0.00362	0.000075	6.08	0.00568	0.000763	1.28	-0.0000050	89.1	0.0437	-10
		10.4%	-20.5%	0.0%	6.9%	90.3%	69.3%	46.6%	0.0%	121.6%	121.3%	7.4%	3.4%	98.6%	20.4%	-6.0%	118.7%	-0.7%	-3.6%	6.5%	11.8%	0.0%	-0.8%	-1.4%	9.5%
OW5591	16QR 05 <2MM	0.096	-0.000050	-0.0000050	7.19	0.00100	0.000210	0.00208	0.000061	0.334	0.000185	0.00114	1.37	0.00900	0.0212	0.00259	0.000411	2.58	0.00185	0.000750	1.40	-0.0000050	16.8	0.0167	-10
OW5593	16QR 07 <2MM	0.182	0.000100	-0.0000050	6.41	0.00032	0.0000480	0.000372	-0.000050	0.0365	0.0000100	0.00072	1.39	0.00148	0.0107	0.00253	0.000027	3.35	0.00291	0.00130	1.12	-0.0000050	58.7	0.0189	-10
OW5598	16QR 12 <2MM	0.169	-0.000050	-0.0000050	5.90	0.00017	0.0000540	0.00131	-0.000050	0.0128	0.0000060	0.00052	1.45	0.000854	0.0227	0.00369	0.000025	3.24	0.00203	0.000829	1.69	-0.0000050	41.7	0.0162	-10
OW5599	16QR 13 <2MM	0.196	0.000551	-0.0000050	21.5	0.00012	0.000125	0.000231	-0.000050	0.0090	-0.0000050	0.00164	11.5	0.00385	0.0078	0.00143	-0.000020	7.76	0.00810	0.000684	0.73	-0.0000050	201	0.0927	13
QAQC																									
Duplicates																									
OW5590 Dup	16QR 04 <2MM																								
OW5591 Dup	16QR 05 <2MM																								
OW5593 Dup	16QR 07 <2MM																								
PA2308 Dup	16QR 04 <2MM SPLIT DUPLICATE																								
Blanks																									
Method Blank		<0.050	<0.000050	<0.0000050	<0.050	<0.00010	<0.0000050	<0.000050	<0.000050	<0.0010	<0.0000050	<0.00050	<0.050	<0.000050	0.0029	<0.000050	<0.000020	<0.050	<0.000050	<0.000040	<0.10	<0.0000050	<0.050	<0.000050	<10
Method Blank																									
Method Blank		<0.050	<0.000050	<0.0000050	<0.050	<0.00010	<0.0000050	0.000061	<0.000050	<0.0010	<0.0000050	<0.00050	<0.050	<0.000050	0.0040	<0.000050	<0.000020	<0.050	<0.000050	<0.000040	<0.10	<0.0000050	<0.050	<0.000050	<10
Method Blank																									
Method Blank																									
Method Blank																									
Method Blank																									
Method Blank																									
Method Blank																									
Reference Material																									
CRC ICPMS H2O 10 ppb (8331547) % Recovery		97.88900	104.80000	103.94000		103.00000	102.46000	104.10000	104.90000	109.89900	98.42000	96.41000		104.88000		93.90000	104.74000			108.81000		98.00000		105.14000	
True Values CRC ICPMS H2O 10 ppb		**100**	**1**	**10**		**10**	**10**	**10**	**1**	**100**	**10**	**10**		**10**		**1**	**10**			**10**		**1**		**10**	
Reference Material																									
Acidity 8.3 W-Van (8331598) % Recovery																									
True Values Acidity 8.3 W-Van																									
Reference Material																									
Alkalinity W Soln' B (8331628) % Recovery																									
True Values Alkalinity W Soln' B																									
Reference Material																									
TDS 100 -Van (8331691) % Recovery																									
True Values TDS 100 -Van																									
Reference Material																									
Ammonia-Van (8331729) % Recovery																									
True Values Ammonia-Van																									
Reference Material																									
Chloride W K-Van (8333193) % Recovery																									
True Values Chloride W K-Van																									
Reference Material																									
Sulphate W K-Van (8333194) % Recovery																									
True Values Sulphate W K-Van																									
Reference Material																									
Nitrite Water-Van (8334170) % Recovery																									
True Values Nitrite Water-Van																									
Detection Limits		0.050	0.000050	0.0000050	0.050	0.00010	0.0000050	0.000050	0.000050	0.0010	0.0000050	0.00050	0.050	0.000050	0.0020	0.000050	0.000020	0.050	0.000050	0.000040	0.10	0.0000050	0.050	0.000050	10
Maxxam SOP #	BB	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-000

Notes:
Calculated parameter based on the concentration of Nitrate plus Nitrite(NO2+NO3) minus Nitrite(NO2)

References:
Hardness = (Calcium*2.497) + (Magnesium*4.118)

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Table 4: MEND SFE Test Results for project HOPE BAY NUNAVUT

Maxxam Sample No	Sample ID	Dissolved Tellurium (Te)	Dissolved Thallium (Tl)	Dissolved Thorium (Th)	Dissolved Tin (Sn)	Dissolved Titanium (Ti)	Dissolved Tungsten (W)	Dissolved Uranium (U)	Dissolved Vanadium (V)	Dissolved Zinc (Zn)	Dissolved Zirconium (Zr)	Dissolved Mercury (Hg)	Anion Sum	Cation Sum	Balance %
	Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	N/A	N/A	N/A
OW5590	16QR 04 <2MM	0.000033	0.0000100	-0.0000050	-0.00020	0.00420	0.000050	0.0000060	0.00400	0.00111	-0.00010	-0.000050	4.79	4.97	-1.80
PA2308	16QR 04 <2MM SPLIT DUPLICATE	0.000020	0.0000090	-0.0000050	-0.00020	0.00070	0.000042	0.0000020	0.00269	0.00099	-0.00010	-0.000050	4.78	4.92	-1.40
		49.1%	10.5%	0.0%	0.0%	142.9%	17.4%	100.0%	39.2%	11.4%	0.0%	0.0%			
OW5591	16QR 05 <2MM	-0.000020	0.0000030	0.0000070	-0.00020	0.00463	0.000073	0.0000060	0.00526	0.00096	-0.00010	-0.000050	1.17	1.37	-7.50
OW5593	16QR 07 <2MM	-0.000020	0.0000180	-0.0000050	-0.00020	0.00056	0.000028	0.0000030	0.00458	0.00109	-0.00010	-0.000050	2.85	3.14	-4.80
OW5598	16QR 12 <2MM	-0.000020	0.0000050	-0.0000050	-0.00020	-0.00050	0.000060	0.0000020	0.00498	0.00012	-0.00010	-0.000050	2.30	2.35	-1.30
OW5599	16QR 13 <2MM	-0.000020	0.0000940	-0.0000050	-0.00020	-0.00050	0.000012	-0.0000020	0.00174	0.00017	-0.00010	-0.000050	9.16	11.1	-9.40
QAQC															
Duplicates															
OW5590 Dup	16QR 04 <2MM														
OW5591 Dup	16QR 05 <2MM														
OW5593 Dup	16QR 07 <2MM														
PA2308 Dup	16QR 04 <2MM SPLIT DUPLICATE														
Blanks															
Method Blank		0.000024	<0.0000020	<0.0000050	<0.00020	<0.00050	<0.000010	<0.0000020	<0.00020	<0.00010	<0.00010	<0.000050			
Method Blank															
Method Blank		<0.000020	<0.0000020	<0.0000050	<0.00020	<0.00050	<0.000010	<0.0000020	<0.00020	0.00056	<0.00010	<0.000050	0.000	0.00100	-100
Method Blank															
Method Blank															
Method Blank															
Method Blank															
Method Blank															
Method Blank															
Method Blank															
Reference Material															
CRC ICPMS H2O 10 ppb (8331547) % Recovery		101.80000	95.20000		98.40000	105.65000		98.70000	101.55000	105.60000		96.40000			
True Values CRC ICPMS H2O 10 ppb		**1**	**1**		**1**	**10**		**10**	**10**	**10**		**1**			
Reference Material															
Acidity 8.3 W-Van (8331598) % Recovery															
True Values Acidity 8.3 W-Van															
Reference Material															
Alkalinity W Soln' B (8331628) % Recovery															
True Values Alkalinity W Soln' B															
Reference Material															
TDS 100 -Van (8331691) % Recovery															
True Values TDS 100 -Van															
Reference Material															
Ammonia-Van (8331729) % Recovery															
True Values Ammonia-Van															
Reference Material															
Chloride W K-Van (8333193) % Recovery															
True Values Chloride W K-Van															
Reference Material															
Sulphate W K-Van (8333194) % Recovery															
True Values Sulphate W K-Van															
Reference Material															
Nitrite Water-Van (8334170) % Recovery															
True Values Nitrite Water-Van															
Detection Limits		0.000020	0.0000020	0.0000050	0.00020	0.00050	0.000010	0.0000020	0.00020	0.00010	0.00010	0.000050			
Maxxam SOP #		BBY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BY7SOP-0000	BBY7SOP-00002	BBY WI-00031	BBY WI-00033	BBY WI-00033

Notes:
Calculated parameter based on the concentration of Nitrate plus Nitrite(NO2+NO3) minus Nitrite(NO2)

References:
Hardness = (Calcium*2.497) + (Magnesium*4.118)

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Table 5: Sample List for project HOPE BAY NUNAVUT

Maxxam Sample ID	Client Sample ID	Sample Form	Dry Weight Received (kg)
OW5570	16QR 01 (1CM-2MM)	Rock	1.314
OW5571	16QR 02 (1CM-2MM)	Rock	1.146
OW5572	16QR 03 (1CM-2MM)	Rock	0.8430
OW5573	16QR 04 (1CM-2MM)	Rock	0.9590
OW5574	16QR 05 (1CM-2MM)	Rock	1.157
OW5575	16QR 06 (1CM-2MM)	Rock	0.9030
OW5576	16QR 07 (1CM-2MM)	Rock	0.9270
OW5577	16QR 08 (1CM-2MM)	Rock	0.7010
OW5578	16QR 09 (1CM-2MM)	Rock	1.176
OW5579	16QR 10 (1CM-2MM)	Rock	1.008
OW5580	16QR 11 (1CM-2MM)	Rock	1.136
OW5581	16QR 12 (1CM-2MM)	Rock	1.173
OW5582	16QR 13 (1CM-2MM)	Rock	1.009
OW5583	16QR 14 (1CM-2MM)	Rock	1.235
OW5584	16QR 15 (1CM-2MM)	Rock	0.8950
OW5585	16QR 16 (1CM-2MM)	Rock	0.9870
OW5586	16QR 17 (1CM-2MM)	Rock	0.8750
OW5587	16QR 01 <2MM	Rock	0.7940
OW5588	16QR 02 <2MM	Rock	0.04000
OW5589	16QR 03 <2MM	Rock	0.2730
OW5590	16QR 04 <2MM	Rock	0.7480
OW5591	16QR 05 <2MM	Rock	0.3750
OW5592	16QR 06 <2MM	Rock	0.6370
OW5593	16QR 07 <2MM	Rock	0.6740
OW5594	16QR 08 <2MM	Rock	0.2990
OW5595	16QR 09 <2MM	Rock	0.6030
OW5596	16QR 10 <2MM	Rock	0.3490
OW5597	16QR 11 <2MM	Rock	0.6220
OW5598	16QR 12 <2MM	Rock	0.2470
OW5599	16QR 13 <2MM	Rock	0.3840
OW5600	16QR 14 <2MM	Rock	0.4640
OW5601	16QR 15 <2MM	Rock	0.2640
OW5602	16QR 16 <2MM	Rock	0.6730
OW5603	16QR 17 <2MM	Rock	0.4970
		Total Weight	25.39
		Total Samples Received	34

Maxxam Analytics 4606 Canada Way, Burnaby, BC Canada V5G 1K5 Tel: 604 734 7276 Fax: 604 731 2386 www.maxxam.ca

Table 6: Sample Summary for project HOPE BAY NUNAVUT

SRK CONSULTING, HOPE BAY NUNAVUT
Page 6 of 6

Date Samples Rec'd by Maxxam: 34 sample were rec'd on 21-Jun-2016.

Sample Prep Conducted by Maxxam: YES

Date of Analysis: June 2016

Client:	SRK CONSULTING
Client Project Name:	HOPE BAY NUNAVUT
Client Project No:	1CT022.009, TASK 700
ARD Project #:	
Maxxam Job No:	B649876
Contact Person:	Kirsty Ketchum
E-mail Address:	kketchum@srk.com

Data Validated by:	Ashley Leow
Position:	Burnaby ARD Laboratory Supervisor

Sample Storage

Sample rejects (and selected test residues where applicable) have been archived
Standard archive protocol is archiving for samples for 3 months after testing is complete.
If archiving is required past 3 months a fee will be required.

Appendix B – Geochemical Monitoring of Waste Rock, Doris Mine

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Memo

To:	Shelley Potter, TMAC	**Client:**	TMAC Resources Inc.
From:	Jessica Charles Lisa Barazzuol	**Project No:**	1CT022.009
Cc:	Oliver Curran, TMAC John Roberts, TMAC Kirsty Ketchum, SRK	**Date:**	March 27, 2017
Subject:	Geochemical Monitoring of Waste Rock, Doris Mine		

1 Introduction

In April 2015, TMAC re-initiated mining at Doris, with placement of waste rock on surface commencing in October 2015. These activities resulted in the placement of approximately 179,100 tonnes of waste rock on Pad T between 2015 and 2016. All waste rock was designated as mineralized waste rock that, as per TMAC's most recent mine plan (TMAC 2015) will be used as backfill in the underground mine. As of December 2016, no surface waste rock was transferred underground as backfill. At mine closure, no waste rock will remain on surface. Requirements for management and monitoring of waste rock and ore are specified in Water Licence 2AM-DOH1323 Amendment No. 1 (Nunavut Water Board 2016) and the Waste Rock and Ore Management Plan (WROMP, TMAC 2016a and 2016b), which forms part of Licence 2AM-DOH1323 Amendment No. 1.

The waste rock monitoring program was implemented in December 2015. This memo documents the results of monitoring completed between December 2015 and December 2016. Other monitoring activities in the Doris mine area included an annual seep survey along the downgradient toe of the waste rock and ore stockpile area and routine monitoring of the Pollution Collection Pond (PCP). The results of the seepage survey are reported in the accompanying memo (SRK 2017) while results of the routine monitoring program are included in monthly water quality reports prepared by TMAC and submitted to the Nunavut Water Board.

2 Methods

2.1 Geological Inspections

2.1.1 Underground

Protocols for geological inspections are documented in TMAC (2016a). To summarize, geological inspections were conducted by site geologists when monitoring samples were collected, which were initiated in December 2016 and occurred at least once a month for the

duration of 2016. Where possible, both the working face and the blasted rock (muck) pile were inspected to identify the rock type, quantity of sulphide and carbonate minerals. The data were recorded in geological inspection logs (Attachment 1).

2.1.2 Waste Rock Stockpiles

Kirsty Ketchum (P.Geol. NT/NU) of SRK completed an inspection of the waste rock stockpile on the east side of Pad T in June 2016 by walking the perimeter of the stockpile (all surrounding berms) and examining waste rock at the northern end of the stockpile (Figure 1). Waste rock was examined for rock type and the presence of sulphide minerals. Discussions with Paul Christman (Manager of Mining, TMAC Resources) were also conducted to clarify where waste rock was being placed, and segregation procedures. The previous Newmont waste rock pile (on Pad I and H/J) was not inspected as TMAC indicated that it had been reshaped and was now used for storage of high grade and medium grade ore on top of the previous waste rock. TMAC also indicated that two low grade ore stockpiles were also active on the west side of Pad T (Figure 1). These were also not inspected.

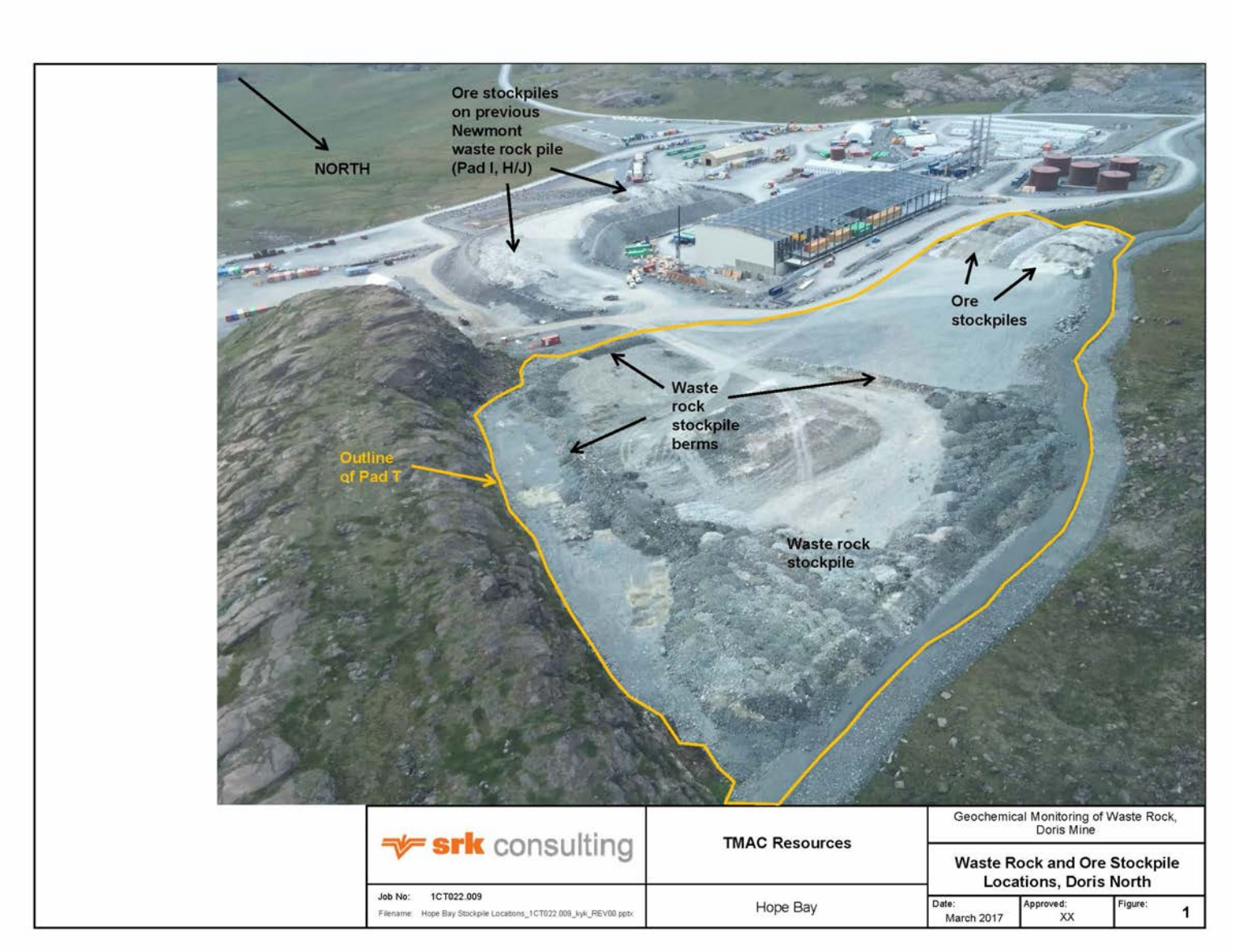

Figure 1. Waste Rock and Ore Stockpile Locations, Doris North

2.2 Sampling and Sample Preparation

Samples were primarily collected from the blasted rock (muck) from the underground mine by site geologists, however selected samples were collected from the face (Attachment 1). The samples were composited over an individual blast round, typically representing 70 to 95 m^3 of rock.

Samples were collected for either i) total sulphur (S) and total inorganic carbon (TIC); ii) acid base accounting (ABA) and elemental analysis or ii) shake flask extraction (SFE) tests. In all cases, samples consisted of a representative mixture of fine and coarse rock fragments from the pile. Samples for SFE were crushed to -1/4" prior to testing while all others were pulverized.

The frequency of sample collection, as outlined by the SRK (2015a) WROMP is outlined in Table 1. In 2016, the WROMP described in SRK (2015a) was superseded by TMAC (2016a and 2016b), which is the approved WROMP under licence 2AM-DOH1323 Amendment No. 1. The numbers of samples collected by TMAC and the associated geochemical tests are summarized in Table 2. All of the samples tested were designated and managed as mineralized waste regardless of sulphur content or the mineralized/unmineralized designation noted in Attachment A. Ore is considered to be mineralized by definition, and therefore geochemical testing was not required. Samples were shipped directly Maxxam Laboratories (Maxxam) for preparation and analysis. Analytical instructions were provided by TMAC.

Table 1: Summary of Sampling Frequency

Mining Zone[1]	Number of Samples	Analysis Parameters
Diabase	1 sample per 60 m of mining (~5,000 t)	Full ABA test
Basalt and buffer zone	1 sample per 12 m of mining (~1,000 t)	Full ABA test for every 1 in 5 samples. Total sulphur and TIC for remaining 4 of 5 samples
Low NP basalt[2]	1 sample per 5,000 t	Full ABA test
Alteration zone	1 sample per 5,000 t	Full ABA test
All zones	3 samples within first 3 months of renewed mining; then 1 in 10 samples collected	Shake flask extraction test

Source: SRK (2015a)

[1]Altered basalt used by TMAC during sample logging.
[2]Low NP Basalt defined as within approximately 15 metres of the diabase, and altered by contact metamorphism (heat) from the diabase.

Table 2: Waste Rock Monitoring Samples Collected and Associated Test Program

Sample Description		Test Program		
Mining Zone	**Rock Type[1]**	**Sulphur & TIC**	**ABA and Elemental Analysis**	**SFE**
Diabase	1a	5	5	0
	11c	27	27	0
Basalt and buffer zone	1a	76	25	4
	1as	5	1	0
	11c	1	1	0
Low NP Basalt[2]	--	0	0	0
Alteration zone	1a	2	2	0
	1as	24	23	0
	12q	12	12	0
Any Zone	1a	0	0	1
	12q	0	0	3
Total Number of Tests		152	96	8

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[1] 1a = mafic metavolcanic, 1as = altered mafic metavolcanic, 11c = diabase, 12q = quartz vein

[2] Four samples were later classified as Low NP Basalt by TMAC based on their proximity (within 15 m) of diabase. The initial mining zone designations were maintained and include alteration zone (n=1), basalt and buffer zone (n=2) and any zone (n=1). Sample IDs of Low NP basalt are: R828257, R828279, R828295 and R828318.

2.3 Analytical Methods

The following test methods were used in this analysis program:

- Total sulphur analyses were completed using the Leco method.
- TIC was determined by using a Leco furnace to directly measure CO_2 gas evolved from HCl treatment of the sample.
- Modified Sobek NP (MEND 1991).
- Sulphate by HCl leach.
- Elemental concentrations were determined by aqua regia digestion followed by Inductively Coupled Plasma Mass Spectrometry (ICP-MS) analyses. This included determination of major elements (e.g. aluminium, calcium, magnesium, sodium, potassium, iron, sulphur) and trace elements (e.g. arsenic, zinc, copper, cadmium, lead).
- SFE tests were completed using a water to rock ratio of 3:1, with ultrapure deionized water contacting the rock for 24 hours (MEND 2009). The leachate was filtered through a 0.45 µm filter and was analysed for pH, EC, acidity, alkalinity, sulphate, chloride, nitrate, nitrite, ammonia, and a full suite of trace elements by ICP-MS (including Hg & Se).

2.4 Data Interpretation Methods

The ratio of TIC to acid generating potential (AP) provides a measure of the acid rock drainage (ARD) potential of the sample. Samples are classified as non-potentially ARD generating (non-PAG) when TIC/AP ratios are greater than 3, as PAG when ratios are less than 1 and as an uncertain potential for ARD when ratios are between 1 and 3.

3 Results and Discussion

3.1 Geological Inspections

3.1.1 Underground

The complete results of the geological inspections are provided in Attachment 1 and a summary of the samples collected are provided in Table 2. Inspections were conducted when samples were collected (n=160) resulting in up to approximately 27,000 tonnes[1] (or 15%) of the waste rock on surface being geologically identified. The dominant rock types sampled, as defined by TMAC geological codes (as opposed to mining zones, Table 2) were mafic volcanic flow (1a, 55%), altered mafic volcanic flow (1as[2], 18%), diabase (11c, 18%) and quartz vein (12q, 9%).

Samples from the alteration zone were geologically logged as rock type 1as, 12q and 1a (n=2). Samples from the basalt and buffer zone were primarily logged as 1a but also included samples of 1as and 11c. Samples from mining zone diabase were geologically logged as 1a and 11c. TMAC later identified four samples as mining zone Low NP Basalt. These samples were classified as basalt (n=3) and altered basalt (n=1) when collected and described and are presented herein according to their initial classification. Visual sulphide levels were typically low (<1%) for all samples, with levels up to 1% in selected samples of altered basalt, basalt and quartz vein.

As per the WROMP (TMAC 2016a), all waste rock was classified as mineralized and stockpiled on surface as mineralized waste. All waste rock will be placed underground as backfill with no waste rock remaining on surface at closure.

3.1.2 Waste Rock Stockpiles

The majority of waste rock inspected in the waste rock stockpile on Pad T was un-mineralized foliated grey mafic metavolcanic rock with carbonate veins and trace to no visible sulphides; however, some areas of the waste rock stockpile contained mafic metavolcanic rock that was rich in quartz veins and pyrite veining (Figure 2 and Figure 3), and included evidence of sulphide oxidation (rusty brown surfaces around pyrite grains). Minor areas of the waste rock also included un-mineralized diabase, and a pale cream coloured schist that may have been highly altered metavolcanic rock.

[1] Based on volume of each blast round (Section 2.2).
[2] The alteration package is proximal to the ore body, is characterized by carbonate and sericite with localized chloritic infill along joint planes and has a schistose fabric. This rock type was previously geochemically characterized (e.g. SRK 2012, SRK 2015b) but not coded as 1as.

Discussions with Paul Christman indicated that waste rock from underground was not being segregated, but rather, was being treated as mineralized waste rock and stockpiled together, regardless of sulphide content, in the waste rock stockpile on Pad T so that it could later be backfilled underground. SRK's observations of waste rock with abundant quartz and pyrite veins being present in the waste rock stockpile were entirely consistent with this waste management approach.

Figure 2. Pyrite and Quartz Veining in Mafic Metavolcanic Rock in the Waste Rock Stockpile on Pad T

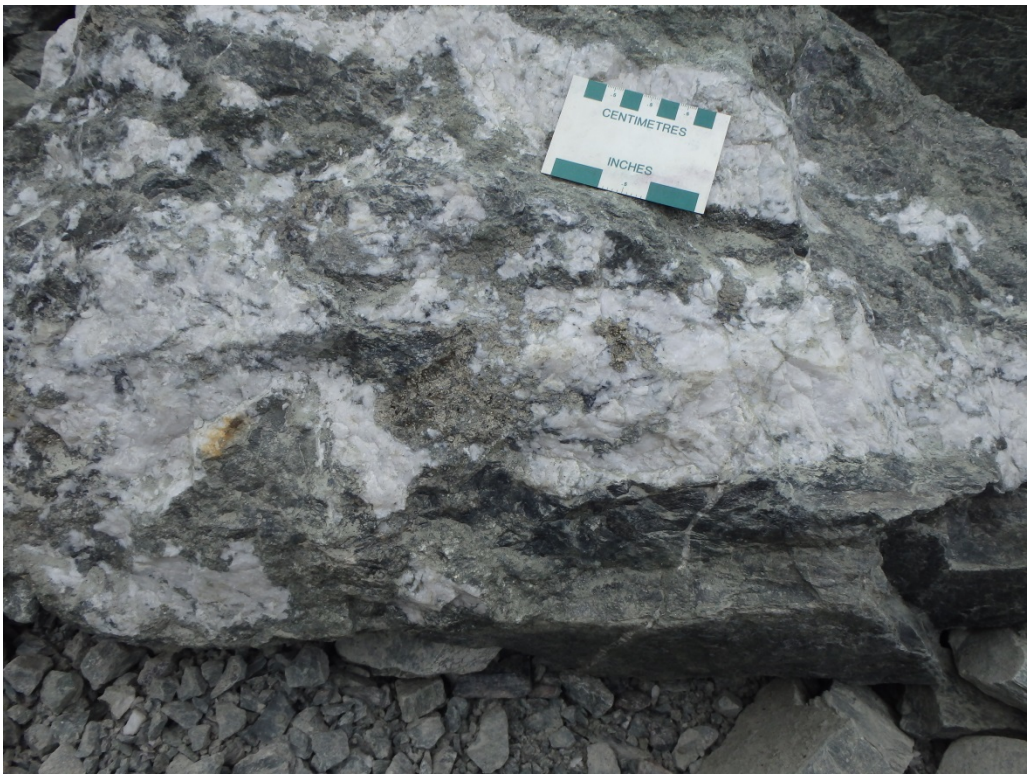


Figure 3. Boulder of Mafic Metavolcanic Rock Dominated by Quartz and Pyrite Veining, in the Waste Rock Stockpile on Pad T

3.2 Laboratory Test Results

Laboratory testing data are provided in Attachments 2 to 4.

3.2.1 Sulphur and TIC

Sulphur and TIC results from Maxxam are available for 152 of the samples. Geological identification of samples did not consistently correspond to the mining zone (e.g. 5 samples in the diabase mining zone were identified as mafic metavolcanics (1a), Table 2). Accordingly, the data are discussed in the context of rock type with the sample distribution as follows: 28 diabase (11c), 83 mafic metavolcanics (1a), 29 altered mafic metavolcanics (1as) and 12 quartz vein (12q) samples. Summaries of the sulphur and TIC data by rock type are provided in Figure 1 and Figure 2 and the data are presented in full in Attachment 2.

Diabase (11c)

The results show that the 11c samples had generally low sulphur (P25 to P75[3] range from 0.03 to 0.04%) and low TIC (P25 to P75 range from 0.9 to 2.1 kg $CaCO_3$ eq/tonne) content. Three samples had sulphur levels (0.3 to 1.1%) higher than expected given typical concentrations

[3] A percentile is a statistical measure indicating the value below which a given percentage of observations in a group of observations fall. P25 = 25th percentile (first quartile) and P75 = 75th percentile (third quartile).

observed in diabase from the Doris area (maximum 0.13%, SRK 2015b). In contrast, the maximum total sulphur levels for all other samples was 0.06%.

Almost all samples were classified as PAG or uncertain (P25 to P75 range from 0.67 to 1.24), however for the samples with low sulphur content (≤0.06%), the risk of ARD from these materials is considered to be low based on low sulphide content and buffering from silicate minerals (SRK 2015b). The samples with higher sulphur content (0.3 to 1%) were all classified as PAG. This material has not been characterized by kinetic test methods and therefore based on the static results alone, there is a possibility that it may generate ARD upon weathering.

Mafic Metavolcanics (1a)

Sulphur concentrations for samples of 1a were typically (P25 to P75) between 0.08 to 0.37%, while TIC values were typically between 5.2 to 190. Approximately 40% (n=32) of samples have TIC content below 20 kg $CaCO_3$ eq/tonne.

TIC levels were lower than expected given typical concentrations observed in basalt from the Doris area (P25 to P75 values between 167 to 339 kg $CaCO_3$ eq/tonne, SRK 2015b). Based on their spatial proximity to diabase, four samples within the 1a sample set (3 of which were analyzed for total sulphur and TIC) were later identified by TMAC as Low NP Basalt (Table 2). Maximum TIC levels for the three samples of Low NP Basalt were 6.6 kg $CaCO_3$ eq/tonne. The lower levels of TIC observed for samples of 1a may be due in part to unidentified samples of Low NP Basalt within the sample set and/or that the SRK (2015b) statistics include samples of both 1a and 1as, the latter rock type which has higher levels of TIC.

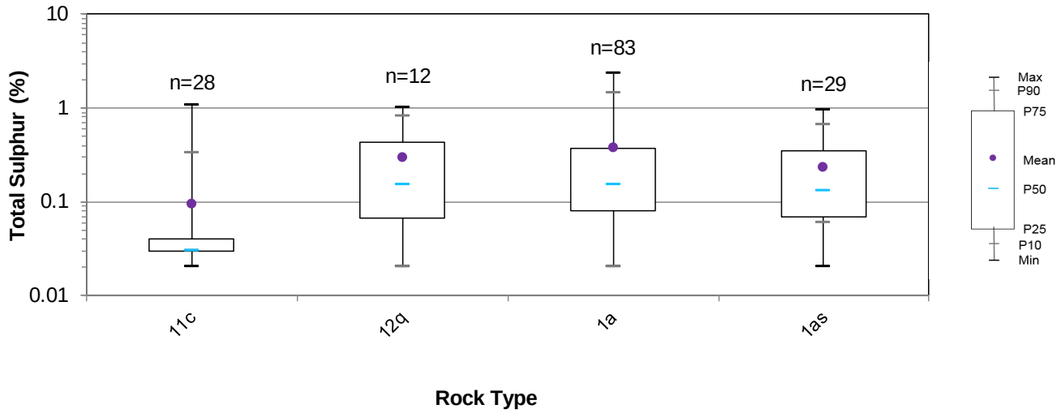
TIC/AP ratios in the basalt were typically between 1.6 and 36 with a median of 12. 14 samples (17%) were classified as uncertain and 15 samples (18%) as PAG. Samples classified as PAG typically had low levels of TIC (<15 kg $CaCO_3$ eq/tonne) and variable sulphur content (ranging from 0.03 to 1.8%). The sulphur content was variable for the three samples of Low NP Basalt resulting in one sample each classified as PAG, non-PAG and having an uncertain potential for ARD.

Altered Mafic Metavolcanics (1as)

Sulphur concentrations for 1as samples were typically (P25 to P75) between 0.07 to 0.35%, while TIC values were typically (P25 to P75) between 199 to 331 kg $CaCO_3$ eq/tonne. TIC/AP ratios typically (P25 to P75) ranged between 27 and 98. Of the 29 samples tested, 28 were classified as non-PAG and one as PAG. The one sample classified as PAG had relatively low levels of TIC (11 kg $CaCO_3$ eq/tonne).

Quartz Vein (12q)

Sulphur concentrations in the quartz vein material were typically (P25 to P75) between 0.07 to 0.44%. TIC content was generally (P25 to P75) between 1.7 to 44 $CaCO_3$ eq/tonne. TIC/AP ratios in the quartz vein material were typically (P25 to P75) between 0.8 and 4.7. Of the 12 samples tested, five were classified as non-PAG, three as having an uncertain potential for ARD and four as PAG.



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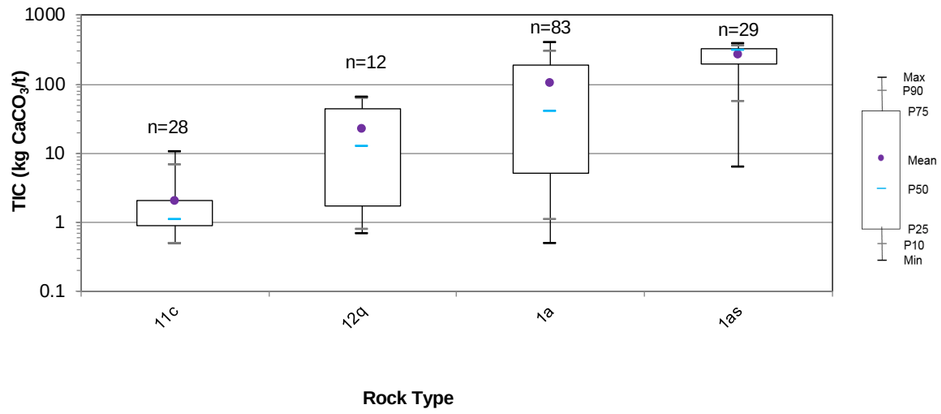

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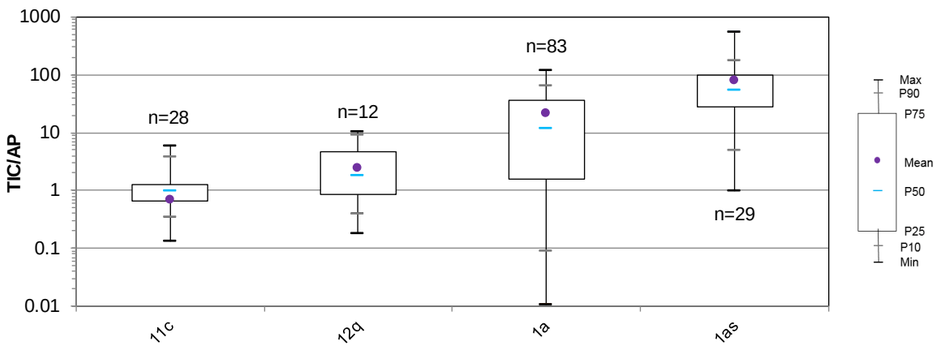

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Figure 4: Box and Whisker Plots of S, TIC, and TIC/AP ratios by Rock Type

(These plots are conventional box and whisker graphs, with the upper and lower extremes showing the minimum and maximum values, tick marks outside of the box showing the 5th and 95th percentiles, outer margins of the box showing the 25th and 75th percentiles and central division in the box showing the median value)

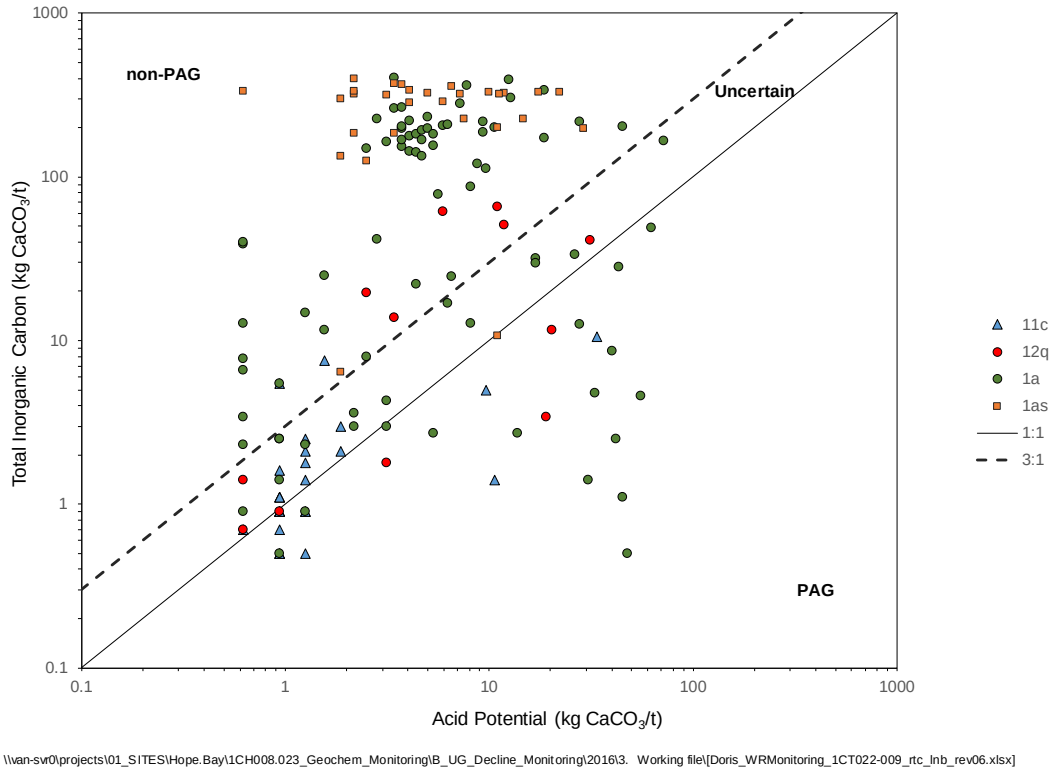

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Figure 5: TIC versus AP for Monitoring Samples

3.2.2 ABA Results

Full ABA results are available for 96 samples and are presented in Figure 3 to Figure 5 and Attachment 2.

The results indicate consistently neutral to alkaline paste pH, with median paste pH values for the four rock types ranging from 8.0 to 8.6.

Total sulphur concentrations are plotted against sulphide sulphur in Figure 3. Total sulphur has a generally linear relationship with sulphide sulphur. This indicates the majority of the sulphur is present as sulphide minerals. Accordingly, total sulphur was used to calculate acid potential (AP). A discussion of sulphur levels according to sample type is presented in Section 3.2.1.

Modified NP for the four rock types is typically (P25 to P75) between 14 to 170 kg $CaCO_3$/t. Modified NP is highest for altered basalt with median values of 186 kg $CaCO_3$/t compared to 59 kg $CaCO_3$/t for basalt, 20 kg $CaCO_3$/t for quartz vein and 12 kg $CaCO_3$/t for diabase. For samples with levels of Modified NP up to approximately 60 kg $CaCO_3$/t, levels of NP are generally greater than TIC, suggest that silicates contributed to the buffering capacity in the tests (Figure 4). Above NP levels 60 kg $CaCO_3$/t, TIC levels tended to be greater than NP, suggesting the occurrence of iron-bearing carbonates which do not contribute to net-neutralization potential as they both produce and consume acid.

Of the 96 samples tested, 90% were classified as non-PAG on the basis of NP/AP (Figure 5) with 3 samples classified as uncertain potential for ARD and 7 as PAG. Fewer samples were classified as PAG by NP/AP as opposed to TIC/AP due to higher NP levels.

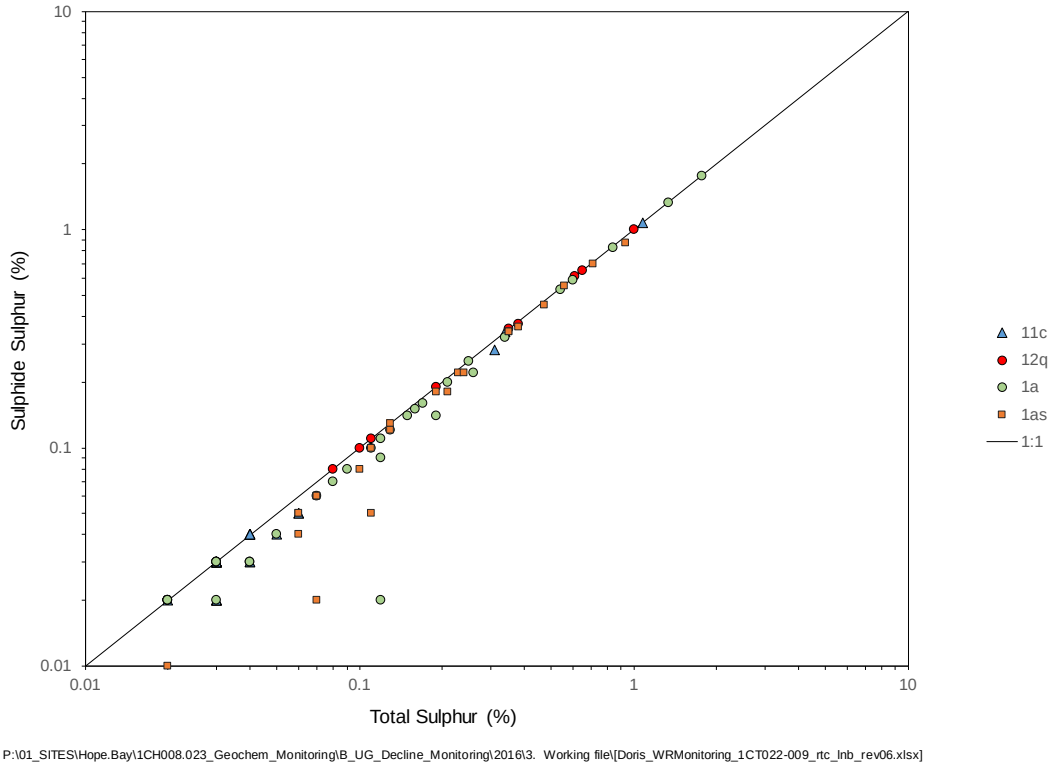

Figure 6: Total Sulphur Plotted against Sulphide Sulphur for ABA Samples

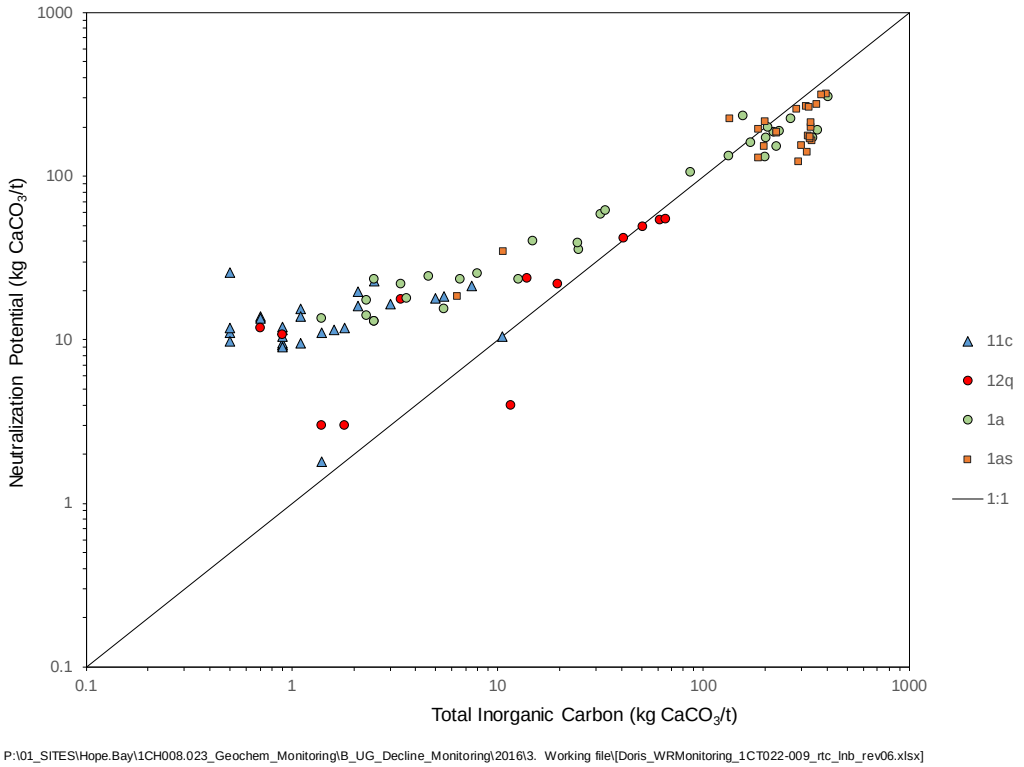

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Figure 7: Modified Sobek NP versus TIC for ABA Samples

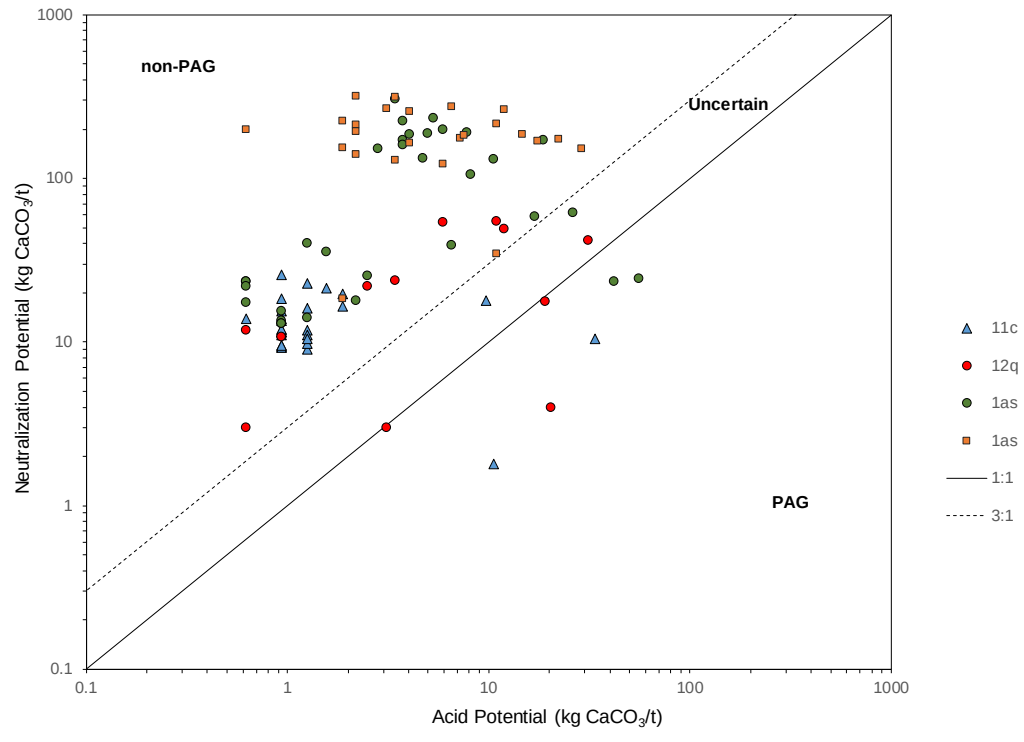

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Figure 8: Modified Sobek NP versus AP for ABA Samples

3.2.3 Elemental Analysis

Results of the elemental analysis for the four rock types have been compared to average crustal abundance data (Price 1997) as an indicator of enrichment and are summarised in Table 3 to Table 6 below. The full laboratory results are presented in Attachment 3. For most samples selenium could not be assessed due to high detection limits.

Results of the elemental analyses indicate that concentrations of trace elements in diabase (11c) were less than ten times the average crustal abundance for basalt (Price 1997) (Table 4). The only exception is gold, for which the 95th percentile (52 ppb) exceeds the average crustal abundance value (4 ppb) by greater than ten times.

For mafic metavolcanics (1a), concentrations were generally less than ten times the average crustal abundances (Table 4). However, the 95th percentile levels of arsenic (47 ppm), gold (87 ppb), lead (76 ppm) and sulphur (0.93%) exceeded ten times the respective average crustal abundances. Two samples exceeded the selenium screening criteria, while all others were below the analytical limit of detection and could not be assessed.

For altered mafic metavolcanics (1as), elemental concentrations were also typically less than ten times the average crustal abundance, with the exception of arsenic, gold and sulfur (Table 5). Enrichment of arsenic and gold is reported with the 75th and 95th percentile results exceeding the relevant average crustal abundance values by greater than ten times. The 95th percentile of sulfur (0.56%) also exceeds 10 times the average crustal abundance.

Arsenic and gold concentrations in quartz vein (12q) also show enrichment. Gold exceeds ten times the average crustal abundance for 25th percentile to 95th percentile results and arsenic at the 95th percentile (23 ppm) exceeds the crustal abundance criteria (Table 6). Sulfur results for the 75th (0.57%) and 95th (0.87%) percentile exceed the average crustal abundance value (0.03%) by greater than ten times.

Table 3: Summary of Elemental Analyses for Diabase (11c)

Parameter	Detection Limit	Unit	P25	Median	P75	P95	10X Average Crustal Abundance* for Basalt
Ag	0.1	ppm	0.1	0.1	0.1	0.27	1.1
As	0.5	ppm	0.5	0.5	0.7	2.3	20
Au	0.5	ppb	6.1	7.6	10	52	40
Ba	1	ppm	23	29	32	56	3300
Ca	0.01	%	1	1.1	1.2	1.3	76
Cd	0.1	ppm	0.1	0.1	0.1	0.37	2.2
Co	0.1	ppm	15	17	18	23	480
Cr	1	ppm	32	36	50	67	1700
Cu	0.1	ppm	290	310	330	540	870
Fe	0.01	%	3.8	4.1	4.4	6.4	86.5
Hg	0.01	ppm	0.01	0.01	0.01	0.01	0.9
Mg	0.01	%	0.46	0.52	0.62	1.2	46
Mn	1	ppm	280	300	350	800	15000
Mo	0.1	ppm	0.3	0.4	0.4	0.5	15
Ni	0.1	ppm	17	20	22	31	1300
P	0.001	%	0.068	0.071	0.079	0.12	1
Pb	0.1	ppm	2	2.8	4.8	13	60
S	0.05	%	0.05	0.05	0.05	0.16	0.3
Sb	0.1	ppm	0.1	0.1	0.1	0.1	2
Se	0.5	ppm	0.5	0.5	0.5	0.5	0.5
Sr	1	ppm	26	32	36	46	4650
U	0.1	ppm	0.1	0.1	0.1	0.1	10
V	2	ppm	250	270	290	300	2500
W	0.1	ppm	0.1	0.1	0.1	0.1	7
Zn	1	ppm	59	67	79	160	1050

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Note:

Numbers highlighted in bold exceed 10 times the average crustal abundance for basaltic rocks from Price (1997)

Statistics based on 28 samples.

Table 4: Summary of Elemental Analyses for Mafic Metavolcanics (1a)

Parameter	Detection Limit	Unit	P25	Median	P75	P95	10X Average Crustal Abundance* for Basalt
Ag	0.1	ppm	0.1	0.1	0.1	0.43	1.1
As	0.5	ppm	0.78	1.8	7.6	47	20
Au	0.5	ppb	1.2	7.3	13	87	40
Ba	1	ppm	7	14	32	86	3300
Ca	0.01	%	1.1	2.1	5.1	6.3	76
Cd	0.1	ppm	0.1	0.1	0.1	0.29	2.2
Co	0.1	ppm	21	31	43	62	480
Cr	1	ppm	15	20	49	130	1700
Cu	0.1	ppm	34	94	140	300	870
Fe	0.01	%	5.1	7.6	9.8	11	86.5
Hg	0.01	ppm	0.01	0.01	0.01	0.01	0.9
Mg	0.01	%	1.5	2	2.7	3.4	46
Mn	1	ppm	730	1200	1900	2300	15000
Mo	0.1	ppm	0.2	0.25	0.3	0.45	15
Ni	0.1	ppm	2.9	21	43	100	1300
P	0.001	%	0.053	0.072	0.092	0.1	1
Pb	0.1	ppm	1	2.3	11	76	60
S	0.05	%	0.05	0.075	0.17	0.93	0.3
Sb	0.1	ppm	0.1	0.1	0.1	0.29	2
Se	0.5	ppm	0.5	0.5	0.5	0.82	0.5
Sr	1	ppm	12	24	30	52	4650
U	0.1	ppm	0.1	0.1	0.1	0.1	10
V	2	ppm	51	110	190	250	2500
W	0.1	ppm	0.1	0.1	0.13	0.87	7
Zn	1	ppm	51	76	110	220	1050

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Note:

Numbers highlighted in bold exceed 10 times the average crustal abundance for basaltic rocks from Price (1997)

Statistics based on 32 samples.

Table 5: Summary of Elemental Analyses for Altered Mafic Metavolcanics (1as)

Parameter	Detection Limit	Unit	P25	Median	P75	P95	10X Average Crustal Abundance* for Basalt
Ag	0.1	ppm	0.1	0.1	0.1	0.29	1.1
As	0.5	ppm	5.5	20	28	71	20
Au	0.5	ppb	7.5	16	45	610	40
Ba	1	ppm	4	5.5	8.3	36	3300
Ca	0.01	%	4.1	5.5	6.7	8	76
Cd	0.1	ppm	0.1	0.1	0.1	0.47	2.2
Co	0.1	ppm	29	33	42	56	480
Cr	1	ppm	14	22	55	83	1700
Cu	0.1	ppm	41	81	100	150	870
Fe	0.01	%	6.6	8.3	9.5	10	86.5
Hg	0.01	ppm	0.01	0.01	0.01	0.01	0.9
Mg	0.01	%	1.6	2	2.6	2.8	46
Mn	1	ppm	1500	1700	2200	2300	15000
Mo	0.1	ppm	0.18	0.2	0.3	0.4	15
Ni	0.1	ppm	5.2	18	96	110	1300
P	0.001	%	0.021	0.072	0.09	0.1	1
Pb	0.1	ppm	0.88	1.2	1.9	4.1	60
S	0.05	%	0.075	0.13	0.29	0.56	0.3
Sb	0.1	ppm	0.1	0.1	0.1	0.19	2
Se	0.5	ppm	0.5	0.5	0.5	0.5	0.5
Sr	1	ppm	25	32	40	50	4650
U	0.1	ppm	0.1	0.1	0.1	0.1	10
V	2	ppm	13	39	75	180	2500
W	0.1	ppm	0.1	0.1	0.1	0.4	7
Zn	1	ppm	58	65	89	200	1050

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Note:

Numbers highlighted in bold exceed 10 times the average crustal abundance for basaltic rocks from Price (1997)

Statistics based on 24 samples

Table 6: Summary of Elemental Analyses for Quartz Vein (12q)

Parameter	Detection Limit	Unit	P25	Median	P75	P95	10X Average Crustal Abundance* for Basalt
Ag	0.1	ppm	0.1	0.1	0.15	0.69	1.1
As	0.5	ppm	2.6	12	17	23	20
Au	0.5	ppb	75	220	650	3900	40
Ba	1	ppm	1	2	3	12	3300
Ca	0.01	%	0.3	0.73	1.3	1.5	76
Cd	0.1	ppm	0.1	0.1	0.1	0.1	2.2
Co	0.1	ppm	3.6	10	11	15	480
Cr	1	ppm	88	100	150	170	1700
Cu	0.1	ppm	19	31	130	260	870
Fe	0.01	%	0.46	1	1.5	3.2	86.5
Hg	0.01	ppm	0.01	0.01	0.01	0.01	0.9
Mg	0.01	%	0.09	0.2	0.52	0.8	46
Mn	1	ppm	96	200	300	390	15000
Mo	0.1	ppm	0.3	0.35	0.5	0.74	15
Ni	0.1	ppm	5.3	10	17	23	1300
P	0.001	%	0.001	0.0035	0.008	0.043	1
Pb	0.1	ppm	1.2	2.1	2.5	3.3	60
S	0.05	%	0.095	0.23	0.57	0.87	0.3
Sb	0.1	ppm	0.1	0.1	0.1	0.1	2
Se	0.5	ppm	0.5	0.5	0.5	0.5	0.5
Sr	1	ppm	3.5	5	6.3	22	4650
U	0.1	ppm	0.1	0.1	0.1	0.1	10
V	2	ppm	2.8	4	6.8	130	2500
W	0.1	ppm	0.1	0.1	0.1	0.1	7
Zn	1	ppm	6	7	9.3	27	1050

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Note:

Numbers highlighted in bold exceed 10 times the average crustal abundance for basaltic rocks from Price (1997)

Statistics based on 12 samples.

3.2.4 Shake Flask Extractions

Eight samples, including five mafic metavolcanics (1a) and three quartz vein (12q) samples were submitted for SFE tests. One sample of 1a (sample ID R828279) was later identified as Low NP Basalt by TMAC. The results are summarized in Table 7 below and presented in full in Attachment 4.

The leachate analyses indicated neutral to slightly alkaline pH (ranging between 8.4 and 9.7 s.u). Median conductivity was 513 uS/cm with P95 conductivity of 1,300 uS/cm. Chloride levels ranged from 20 to 656 mg/L and are attributed to the use of calcium chloride brines for drilling water in the underground mine, while the elevated ammonia (0.3 to 4.3 mg/L) and nitrate (2.2 to 25 mg/L) concentrations are attributed to residues from blasting with ammonia-based explosives.

Results were compared to screening criteria based on ten times the CCME guidelines for freshwater aquatic life (CCME, 2007). With the exception of pH at the 95th percentile, none of the results exceeded these screening criteria.

Table 7: Statistical Summary of Eight Shake Flask Extraction Tests

Parameter	Detection Limit	Units	P25	Median	P75	P95	Screening Criteria (CCME*10)
pH (24h)	0.01	pH Units	8.5	8.6	9	9.5	6.5-9
EC	0.5	uS/cm	290	510	650	1300	
SO_4	0.5	mg/L	3.8	5	7.1	15	
Total Alkalinity	0.5	mg $CaCO_3$/L	16	20	27	40	
Hardness	0.5	mg $CaCO_3$/L	32	130	210	330	
Nitrate	0.02	mgN/L	5.3	7.3	16	24	130
Nitrite	0.05	mgN/L	0.05	0.05	0.05	0.07	0.18
Ammonia	0.1	mgN/L	0.78	0.95	2.8	3.9	12.7
Cl	5	mg/L	86	150	180	490	6400
Al	0.001	mg/L	0.16	0.19	0.27	0.45	1
Sb	0.0001	mg/L	0.00022	0.00026	0.00048	0.00051	
As	0.0001	mg/L	0.00013	0.00025	0.00062	0.0012	0.05
B	0.05	mg/L	0.05	0.05	0.076	0.14	15
Cd	0.00003	mg/L	0.000005	0.000005	0.000005	0.000005	0.0009
Ca	0.3	mg/L	11	47	73	120	
Cr	0.0001	mg/L	0.0001	0.0001	0.00012	0.00027	
Co	0.00003	mg/L	0.000044	0.000067	0.000089	0.00017	
Cu	0.0003	mg/L	0.00005	0.00005	0.000067	0.00016	0.03* 0.02[1]
Fe	0.005	mg/L	0.0061	0.0094	0.047	0.15	3.00
Mg	0.3	mg/L	1.4	3.8	5.7	11	
Mn	0.0003	mg/L	0.0032	0.0076	0.015	0.024	
Hg	0.00005	mg/L	0.00005	0.00005	0.00005	0.00005	0.00026
P	0.002	mg/L	0.002	0.0043	0.0053	0.0055	0.04
Mo	0.0003	mg/L	0.0003	0.00048	0.00091	0.001	0.73
Ni	0.0001	mg/L	0.00004	0.000067	0.0001	0.00016	1.19* 0.25[1]
Pb	0.000005	mg/L	0.000022	0.000035	0.00011	0.00052	0.046* 0.01[1]
Se	0.0002	mg/L	0.00011	0.00015	0.00026	0.00036	0.01
Ag	0.00003	mg/L	0.000005	0.000005	0.000009	0.00002	0.0025
Sr	0.0003	mg/L	0.024	0.096	0.17	0.24	
S	50	mg/L	10	10	10	10	
Tl	0.000002	mg/L	0.0000063	0.000011	0.000016	0.000026	0.008
U	0.00001	mg/L	0.0000028	0.0000055	0.0000093	0.000024	0.15
Zn	0.0005	mg/L	0.0001	0.00011	0.00019	0.00029	0.3

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Note:

Values in **bold** exceed criteria

* Guideline value calculated based on median hardness concentration of 134 mg/L (presented with 2 significant figures, 130 mg/L in the table)

Cu CWQG (µg/L) = 0.2 * e{0.8545[ln(hardness)]-1.465}

Ni CWQG (µg/L) = e{0.76[ln(hardness)]+1.06}

Pb CWQG (µg/L) = e{1.273[ln(hardness)]-4.705}

[1] Lowest guideline value

4 Summary and Conclusions

Mining activities have resulted in the placement of approximately 179,100 tonnes of waste rock between 2015 and 2016 on Pad T, all of which was managed as mineralized waste rock. No waste rock from the surface stockpile was placed as backfill underground between 2015 and 2016. Throughout the mine life, waste rock will be placed underground as backfill with no waste rock remaining on surface at closure

A total of 160 samples were collected as part of the waste rock monitoring program and geologically identified as diabase (11c), mafic metavolcanics (1a), altered mafic metavolcanics (1as), and quartz vein (12q). Four samples of mafic metavolcanics (1a) were also identified as Low NP Basalt. Low NP basalt is defined as approximately within 15 metres of the diabase, and altered by contact metamorphism (heat) from the diabase.

Geological inspections of waste rock were conducted when monitoring samples were collected resulting in approximately 15% of the waste rock stockpiled on surface being geologically identified. On the basis of the sample set, mafic metavolcanics (1a) was the dominant rock type, representing 55% of samples, followed by altered mafic metavolcanics (1as, 18%) and diabase (11c, 18%) then quartz vein (12q, 9%). The ore was a mixture of basalt with quartz veins.

Diabase (11c) generally had low sulphur concentrations (maximum 0.06%), however three samples had sulphur levels (0.3 to 1%) that were higher than expected compared to typical concentrations observed in diabase from the Doris area (maximum 0.13%, SRK 2015b). TIC levels were uniformly low (maximum 11 kg CaCO3 eq/tonne). Almost all diabase samples were classified as PAG or uncertain. Diabase samples with sulphur ≤0.06% have a low risk of ARD based on the occurrence of silicate minerals in the samples. The three samples with higher sulphur levels have not been previously characterized by either static or kinetic test methods. Therefore, based on the static results alone, there is a possibility that it may generate ARD upon weathering.

Quartz vein (12q) had 25th to 75th sulphur concentrations ranging from 0.07 to 0.44%, while 25th to 75th levels of TIC ranged from 1.7 to 44 $CaCO_3$ eq/tonne. Of the 12 samples tested, five were classified as non-PAG, three as having an uncertain potential for ARD and four as PAG.

Altered mafic metavolcanics (1as) had 25th to 75th sulphur concentrations ranging from 0.07 to 0.35%, while TIC values were typically between 199 to 331 kg $CaCO_3$ eq/tonne. All samples were classified as non-PAG with the exception of one sample with anomalously low TIC (11 kg $CaCO_3$ eq/tonne), which was classified as PAG.

Mafic metavolcanics (1a) had 25th to 75th sulphur concentrations ranging from 0.08 to 0.37% with P95 values of 1.4%. The 25th to 75th values for TIC ranged from 5.2 to 190 kg CaCO3 eq/tonne, with 40% of samples with levels less than 20 kg CaCO3 eq/tonne. TIC levels are lower than expected given typical concentrations observed in basalt from the Doris area (25th to 75th values between 167 to 339 kg CaCO3 eq/tonne, SRK 2015b). The lower levels of TIC observed for samples of 1a may be due in part to unidentified samples of Low NP Basalt within the sample set and/or that the SRK (2015b) statistics include samples of both 1a and 1as, the latter rock type

which has higher levels of TIC. A total of 17% of the basalt samples were classified as having an uncertain potential for ARD based on TIC/AP ratios, and 18% as PAG. Comparison of TIC and Modified Sobek NP results for samples subjected to full ABA tests indicated that NP was typically greater than TIC, indicating that some NP would be contributed by silicate minerals. As a result, a smaller proportion of the basalt samples (3%) were classified as having an uncertain potential for ARD, and 6% as PAG.

Trace element analyses on the solids indicated that arsenic, lead and sulphur concentrations were enriched relative to typical basalt in a small proportion of the samples.

Shake flask extraction tests indicated that leachate in contact with these samples had chloride, ammonia and nitrate levels indicative of calcium chloride drilling brines and residues from ammonia-based explosives. Concentrations of other trace elements were low in comparison to screening criteria.

A long term assessment of the anticipated geochemical behaviour of the waste rock in the stockpile on Pad T with respect to acid rock drainage and metal leaching (ARD/ML) is not possible for the reasons described as follows:

- The occurrence of high sulphur diabase (11c) that has not been previously characterized, either by static or kinetic test work.
- The higher incidence of mafic metavolcanics (1a) with lower TIC content. Based on kinetic test work (SRK 2015b), the risk for metal leaching from this material is expected to be low.
- Volumes of the waste rock according to rock type, specifically for the high sulphur diabase and low TIC mafic metavolcanics materials cited above, are not documented.

The geochemical behaviour of the waste rock is monitored through the annual seep survey along the downgradient toe of the waste rock and ore stockpile area and routine monitoring of the Pollution Control Pond (PCP). The results of the seepage survey are reported in the accompanying memo (SRK 2017) while results of the routine monitoring program are included in monthly water quality reports prepared by TMAC and submitted to the Nunavut Water Board. All waste rock will be placed underground at closure.

5 References

Canadian Council of the Environment, 2007. Canadian Water Quality Guidelines for the Protection of Aquatic Life Update 7.0.

MEND 1991. Acid Rock Drainage Prediction Manual. Mine Environment Neutral Drainage Program. Report 1.16.1b.

MEND 2009. Prediction Manual for Drainage Chemistry from Sulphidic Geologic Materials. Report 1.20.1. http://mend-nedem.org/wp-content/uploads/1.20.1_PredictionManual.pdf

Nunavut Water Board (2016) Water Licence No. 2AM-DOH1323 – Amendment No. 1. Issued on November 4, 2016.

Price, W.A. 1997. DRAFT Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. BC Ministry of Employment and Investment, Energy and Minerals Division. 151pp

SRK 2012. Geochemical Monitoring of Waste Rock from the Underground Decline. Memo prepared for Hope Bay Mining Ltd by SRK Consulting, March 2012.

SRK 2015a. Hope Bay Project – Doris North Waste Rock and Ore Management Plan – Revision 2. Report prepared for TMAC Resources Inc. by SRK Consulting, April 2015.

SRK 2015b. Static Testing and Mineralogical Characterization of Waste Rock and Ore from the Doris Deposit, Hope Bay. Report prepared for TMAC Resources by SRK Consulting, June 2012.

SRK 2017. 2016 Waste Rock and Quarry Monitoring Report, Doris Mine, Hope Bay Project. Report prepared for TMAC Resources by SRK Consulting, March 2017.

TMAC 2016. Revisions to TMAC Resources Inc. Amendment Application No. 1 of Project Certificate No. 003 and Water Licence 2AM-DOH1323. Regulatory submission prepared for the Nunavut Water Board by TMAC Resources, June 2015.

TMAC 2016a. Waste Rock and Ore Management Plan, Hope Bay Project, Nunavut. Report prepared for the Nunavut Water Board by TMAC Resources, August 2016.

TMAC 2016b. Waste Rock and Ore Management Plan, Hope Bay Project, Nunavut. Addendum prepared for the Nunavut Water Board by TMAC Resources, September 2016.

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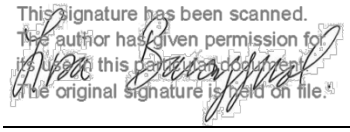

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Attachment 1– Geological Inspection Logs

WASTE ROCK SAMPLES

SAMPLE #	GEO	DATE SAMPLED	SAMPLE LOCATION					GEOLOGIC DESCRIPTION			SULPHIDE %	CARBONATE %	ANALYSIS	DESCRIPTION
			X	Y	Z	LEVEL	STN/GP#	ROCK CODE	MINING ZONE	MINERALIZED/NOT MINERALIZED				
S332953	KC	13-Dec-15	433878	7559664	4948	4946		1a	Basalt and buffer zone	Not Mineralized	<1	<1	ABA test	Light grey, aphanitic with tr py. Masssive. Prominent jointing perpindicular to FN.
S332954	KC	13-Dec-15	433854	7559668	4978	4977	electric bay	1a	Basalt and buffer zone	Not Mineralized	<1	0	ABA test	Massive, aphanitic. Tr py.
S332955	KC	13-Dec-15	433873	7559689	4967	4966		1a	Basalt and buffer zone	Not Mineralized	<1	<1	ABA test	Massive, aphanitic. Minor foliation and qtz stringers.
S332956	KC	13-Dec-15	433696	7559306	4990	4984	529	1a	Basalt and buffer zone	Not Mineralized	1	<1	ABA test	Tr py. Light grey, aphanitic, weakly foliated.
S332951	KC	13-Dec-15	433827	7559826	4930	4926	GP2602	11c	Diabase	Not Mineralized	<1	<1	ABA test	Dark coloured, with mm scale crystals. Holocrystaline and aphanitic.
S332952	KC	13-Dec-15	433895	7559773	4933	4932	GP32-2	11c	Diabase	Not Mineralized	0	<1	ABA test	Dark coloured with mm scale crystals. Holocrystalline and phaneritic. Minor cc vnlets throughout
S332957	SH	11-Jan-16	433756	7559845	4921	DD Bay 1 (4926)		1a	Basalt and buffer zone	Not Mineralized	<1	0	ABA test	Mafic flow - breccia with tr pyrite. Light in colour.
S332958	KC	22-Feb-16	433740	7559878	4915	4926	2615	1a	Basalt and buffer zone	Not Mineralized	<1	<1	Shake flask extraction test	Mafic flow - black, aphenitic. Proximal to dykes, cc vnlts.
S332976	KC	22-Mar-16	433751	7559314	4985	4982	GP4	1a	Basalt and buffer zone	Not Mineralized	<1	0	ABA test	Chl alteration and minor qtz blebs.
S332977	KC	22-Mar-16	433767	7559310	4985	4982	15m from GP4	1as	Basalt and buffer zone	Not Mineralized	<1	0	Total Sulphur and TIC	Light grey, massive. Tr py.
S332978	KC	22-Mar-16	433754	7559313	4967	4966R WLS		1as	Basalt and buffer zone	Not Mineralized	<1	0	ABA test	Chl filled fractures. Minor tiger striping.
S332979	KC	22-Mar-16	433762	7559314	4967	4966R WLN		1a	Basalt and buffer zone	Not Mineralized	<1	<1	Shake flask extraction test	
S332980	KC	22-Mar-16	433761	7559902	4910	4926 DD bay 2	2621	1a	Basalt and buffer zone	Not Mineralized	<1	<1	ABA test	Minor qtz veining, iron staining.
S332981	KC	22-Mar-16	433659	7559343	4960	4984 decline	GP9	1a	Basalt and buffer zone	Not Mineralized	<1	<1	Total Sulphur and TIC	Massive.
S332982	KC	22-Mar-16	433677	7559333	5001	4984 incline	GP1	1a	Basalt and buffer zone	Not Mineralized	<1	<1	Total Sulphur and TIC	Minor veining.
S332983	SH	27-Mar-16	433659	7559359	4958	4984 decline		1a	Basalt and buffer zone	Not Mineralized	<1	<1	Total Sulphur and TIC	
S332984	SH	7-Apr-16	433670	7559361	4959	4984 decline		1a	Basalt and buffer zone	Not Mineralized	<1	<1	Total Sulphur and TIC	
S332985	KC	7-Apr-16	433763	7559943	4908	4926 DB3		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	min chl alt.
S332990	KC	1-May-16	433795	7559309	4984	4982		1as	Alteration zone	Not Mineralized	0.5		ABA test	
S332991	KC	1-May-16	433806	7559308	4984	4982		1as	Alteration zone	Not Mineralized	0.5		ABA test	
S332992	KC	1-May-16	433756	7559311	4984	4982		1as	Alteration zone	Not Mineralized	0.5		ABA test	
S332987	KC	1-May-16	433678	7559295	5005	4984 incline	GP1+9	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
S332988	KC	1-May-16	433681	7559286	5008	4984 incline	GP11	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332989	KC	1-May-16	433684	7559273	5009	4984 incline	GP14	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332993	KC	1-May-16	433675	7559356	4977	4984 decline	GP12	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332994	KC	1-May-16	433684	7559351	4953	4984 decline	TO562	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332995	KC	1-May-16	433687	7559356	4952	4984 decline	TO562+12	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332986	KC	1-May-16	433845	7559622	4933	4932	GP13+14	11c	Diabase	Not Mineralized	<1		ABA test	
S332998	KC	5-May-16	433786	7559306	4966	4965ELS	49673+5m	1as	Alteration zone	Not Mineralized			ABA test	
S332996	KC	5-May-16	433689	7559323	4953	4984 decline	elec cut out +5m	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332997	KC	5-May-16	433690	7559254	5013	4984 incline		1as	Basalt and buffer zone	Not Mineralized			Total Sulphur and TIC	
S332999	KC	5-May-16	433809	7559491	4967	Test stop 4966		1a	Basalt and buffer zone	Not Mineralized			Shake flask extraction test	
S333000	KC	5-May-16	433836	7559566	4956	4946 ELS	GP3	1a	Basalt and buffer zone	Not Mineralized			Shake flask extraction test	
R828254	KC	15-May-16	433792	7559305	-31	4965 WLS	corner	1as	Alteration zone	Not Mineralized	0.5		ABA test	
R828257	KC	10-Jun-16	433861	755685	-51	4946 WLN	corner +10m	1a	Alteration zone	Not Mineralized	<1		ABA test	
R828258	KC	10-Jun-16	433880	7559675	-34	4966 ELS	June 10 face	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828263	KC	10-Jun-16	433742	7559258	4938	4965 WLS	face june 10	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828264	KC	10-Jun-16	433762	7559370	4938	4965 WLN	face june 10	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828255	KC	10-Jun-16	433846	7559525	-51	4946 ELS	June 10 face	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828259	KC	10-Jun-16	433688	7559326	-49	4945		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	

WASTE ROCK SAMPLES

SAMPLE #	GEO	DATE SAMPLED	SAMPLE LOCATION					GEOLOGIC DESCRIPTION			SULPHIDE %	CARBONATE %	ANALYSIS	DESCRIPTION
			X	Y	Z	LEVEL	STN/GP#	ROCK CODE	MINING ZONE	MINERALIZED/NOT MINERALIZED				
R828260	KC	10-Jun-16	433707	7559340	-47	4945	R corner vent	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828261	KC	10-Jun-16	433692	7559340	-48	4945	corner entrance	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828262	KC	10-Jun-16	433709	7559316	-48	4945	face substation	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828266	KC	10-Jun-16	433832	7559494	-33	4966T	GP2	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828267	KC	10-Jun-16	433822	7559488	4938	4966T	4606/850	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828256	KC	10-Jun-16	433851	7559679	-51	4946 WLN	corner pillar	11c	Diabase	Not Mineralized	<1		ABA test	
R828265	KC	10-Jun-16	433788	7559488	4938	4965 ELN	face june 10	12q	Any zone	Not Mineralized	<1		Shake flask extraction test	
R828279	KC	28-Jun-16	433871	7559699	-50	4946WLN	stn 461+24	1a	Any zone	Not Mineralized	<1		Shake flask extraction test	
R828268	KC	28-Jun-16	433713	7559331	-26	4965RMK	corner	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828269	KC	28-Jun-16	433706	7559317	-25	4965 RMK	end	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828270	KC	28-Jun-16	433697	7559317	-49	4984 decline	corner	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828271	KC	28-Jun-16	433681	7559300	-51	4984 decline	corner +24	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828272	KC	28-Jun-16	433726	7559325	-52	4945 level access	stn 4506	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828273	KC	28-Jun-16	433737	7559321	-52	4945 level access	stn 4506+12	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828274	KC	28-Jun-16	433709	7559357	-46	4945RMK	end	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828275	KC	28-Jun-16	433724	7559350	-49	4945 elec sub end	end	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828276	KC	28-Jun-16	433851	7559679	-51	4946WLN	corner	1a	Diabase	Not Mineralized	<1		ABA test	
R828277	KC	28-Jun-16	433857	7559685	-52	4946WLN	stn 461	1a	Diabase	Not Mineralized	<1		ABA test	
R828278	KC	28-Jun-16	433861	755691	-52	4946WLN	stn 461+12	1a	Diabase	Not Mineralized	<1		ABA test	
R828280	KC	28-Jun-16	433837	7559571	-70	4932	June 29face	1a	Diabase	Not Mineralized	<1		ABA test	
R828281	AG	5-Jul-16	433666	7559308	-54	4984 decline	GP#1 + 11.98m	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828282	AG	5-Jul-16	433752	7559318	-51	4945 Access	Face July 5, 16	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828283	AG	17-Jul-16	433844	7559521	-33	4964 ELN	Face July 17, 2016	1as	Alteration zone	Not Mineralized	<1		ABA test	1as/Fault zone-Alteration consists of ~5% Hematite and minor Chlorite
R828285	AG	18-Jul-16	433872	7559651	-35	4966 ELS	Face July 18, 2016	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828286	AG	18-Jul-16	433700	7559250	-10	4984 Incline	Muck pile from July 16 blast	1as	Alteration zone	Not Mineralized	<1		ABA test	1as with quartz stringers. Minor chlorite filling fractures. Trace fine to medium grained PY.
R828284	AG	18-Jul-16	433833	7559558	-70	4932 ELS	Face July 18, 2016	11c	Diabase	Not Mineralized	<1		ABA test	
R828289	KC	4-Aug-16	433768	7559316	-52	4945 Access	end aug 4	1a	Alteration zone	Not Mineralized	<1		ABA test	
R828287	KC	4-Aug-16	433744	7559299	-52	4945WLS	face aug 4	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828288	KC	4-Aug-16	433741	7559311	-52	4945WLS	GP1+6	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828292	KC	4-Aug-16	433698	7559255	-10	4984 incline	rmk corner	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828293	KC	4-Aug-16	433715	7559248	-10	4984 incline	Aug 4 face	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828295	KC	4-Aug-16	433879	7559728	-48	4946 WLN	Aug 4 face	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828296	KC	4-Aug-16	433873	7559709	-51	4946 WLN	GP4	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828297	KC	4-Aug-16	433833	7559549	-70	4932 ELS	end face	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828294	KC	4-Aug-16	433876	7559716	-51	4946 WLN	stn4621	11c	Diabase	Not Mineralized	<1		ABA test	
R828298	KC	4-Aug-16	433833	7559549	-70	4932 ELS	end face	11c	Diabase	Not Mineralized	<1		ABA test	
R828299	KC	4-Aug-16	433671	7559339	-61	4984 decline	GP1	11c	Diabase	Not Mineralized	<1		ABA test	
R828300	KC	4-Aug-16	433661	7559322	-57	4985 decline	Safety bay	11c	Diabase	Not Mineralized	<1		ABA test	
R828301	KC	4-Aug-16	433668	7559311	-55	4986 decline	stn 568	11c	Diabase	Not Mineralized	<1		ABA test	
R828302	KC	4-Aug-16	433677	7559350	-58	4984 decline	Aug 4 face	11c	Diabase	Not Mineralized	<1		ABA test	
R828290	KC	4-Aug-16	433791	7559355	-30	4965 ELN	Aug 4 face	12q	Alteration zone	Not Mineralized	1		ABA test	
R828291	KC	4-Aug-16	433796	7559327	-33	4965 ELN	Stn 6521	12q	Alteration zone	Not Mineralized	<1		ABA test	
R828303	KC	9-Aug-16	433720	7559243	9	4984 incline	Aug 9 face	1a	Diabase	Not Mineralized	<1		ABA test	
R828304	KC	9-Aug-16	433681	7559348	-61	4984 decline	Aug 9 face	11c	Diabase	Not Mineralized	0		ABA test	
R828305	AG	22-Aug-16	433891	7559760	-47	4946-WLN-33	Muck Pile from Rnd 33	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828306	AG	22-Aug-16	433744	7559241	-6	5002 Access	LW 5.72m from face as of Aug22, 16	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828307	AG	22-Aug-16	433847	7559530	-30	4964-ELN-18	Muck Pile from Rnd 18	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828308	AG	23-Aug-16	433750	7559357	-50	4945-WLN-9	Face of Rnd 9	1as	Alteration zone	Not Mineralized	<1		ABA test	

WASTE ROCK SAMPLES

SAMPLE #	GEO	DATE SAMPLED	SAMPLE LOCATION					GEOLOGIC DESCRIPTION			SULPHIDE %	CARBONATE %	ANALYSIS	DESCRIPTION
			X	Y	Z	LEVEL	STN/GP#	ROCK CODE	MINING ZONE	MINERALIZED/NOT MINERALIZED				
R828310	AG	23-Aug-16	433732	7559280	-52	4945 WLS-13	15.35m from St. 4511. Face as of Aug 23, 16	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828309	AG	23-Aug-16	433776	7559315	-52	4945 LA	15.11m from St. 4510 face as of 23-Aug-16	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828311	AG	24-Aug-16	433706	7559336	-70	4984 decline	22.96m St #574. Muck pile on Aug 24, 16	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828312	AG	25-Aug-16	433825	7559462	-52	4946-ELS	Muck from RND 53. face 15.87m from GP#1	12q	Any zone	Not Mineralized	<1		Shake flask extraction test	
R828313	AG	29-Aug-16	433765	7559237	-6	5002 Access	Muck pile blasted on Aug 29, 16.	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828314	KC	12-Sep-16	433783	7559238	4.7	5002 Access	stn 0209	1as	Alteration zone	Not Mineralized	1		ABA test	
R828315	KC	12-Sep-16	433763	7559239	4.3	5002 Access	stn 0207	1as	Basalt and buffer zone	Not Mineralized	1		Total Sulphur and TIC	
R828316	KC	12-Sep-16	433794	7559391	-15	4982 ELN	sept 11 face	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828317	KC	12-Sep-16	433712	7559321	-68	4926 opening slash	stn 576	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828318	KC	12-Sep-16	433700	7559307	-90	4984 dec	Sept 8 face	1a	Basalt and buffer zone	Not Mineralized			Total Sulphur and TIC	
R828319	KC	12-Sep-16	433851	7559554	-32	4964 ELN	Sept 12 face	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828320	KC	12-Sep-16	433841	7559445	-32	4964 ELS	Sept 12 face	12q	Alteration zone	Not Mineralized	1		ABA test	
R828322	KC	13-Sep-16	433759	7559390	-51	4945 WLN	Sept 13 face	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828321	KC	13-Sep-16	433816	7559437	-51	4946 ELS	Sept12 face	12q	Alteration zone	Not Mineralized	1		ABA test	
R828324	KC	18-Sep	433694	7559297	-70	4984 dec	Sept 18 face	11c	Diabase	Not Mineralized			ABA test	
R828323	AG	29-Sep-16	433806	7559416	-45	4946 ELS	Sept 29 Face	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828326	AG	29-Sep-16	433804	7559328	-45	4945-ELS	Muck pile blasted on Sep 29, 16.	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828325	AG	29-Sep-16	433855	7559616	-29	4966 ELS	Sept 29 Face	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828327	AG	29-Sep-16	433780	7559434	-29	4965 WLN	Muck pile blasted on Sep 29, 16.	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828328	AG	2-Oct-16	433728	7559321	-45	4926 LA	Muck pile from face as of oct 2, 2016	11c	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828329	AG	2-Oct-16	433673	7559313	-79	4984 decline	Face as of Oct 2, 2016	11c	Diabase	Not Mineralized	<1		ABA test	
R828330	AG	2-Oct-16	433677	7559301	-79	4984 decline	16m from face of oct 2, 2016	11c	Diabase	Not Mineralized	<1		ABA test	
R828333	KC	17-Oct-16	433660	7559315	-75	4984 RMK	1/2 way in	11c	Diabase	Not Mineralized	<1		ABA test	
R828334	KC	17-Oct-16	433650	7559312	-74	4984 RMK	end	11c	Diabase	Not Mineralized	<1		ABA test	
R828335	KC	17-Oct-16	433677	7559332	-77	4984	Oct 17 face	11c	Diabase	Not Mineralized	<1		ABA test	
R828331	KC	17-Oct-16	433779	7559438	-32	4965 ELS	STN 6548	12q	Alteration zone	Not Mineralized	<1		ABA test	
R828332	KC	17-Oct-16	433751	7559366	-51	4945 ELN	STN 4614	12q	Alteration zone	Not Mineralized	<1		ABA test	
R828336	KC	17-Oct-16	433802	7559398	-51	4946 ELS	Oct 17 face	12Q	Alteration zone	Not Mineralized	<1		ABA test	
R828337	KC	25-Oct-16	433696	7559347	-82.5	4984	Oct 25 face	11c	Diabase	Not Mineralized	<1		ABA test	
R828338	KC	25-Oct-16	433799	7559387	-51	4946 ELS	Oct 25 face	12Q	Alteration zone	Not Mineralized	<1		ABA test	
R828340	AG	4-Nov-16	433772	7559161	-30	4965 ELS	~2.8m back from face as of Nov 1 on LW	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828341	AG	4-Nov-16	433842	7559573	-30	4966 ELS	Face as of Nov 4. Face stoped	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828339	AG	4-Nov-16	433791	7559469	-30	4965 WLN	Nov 4 Face	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
R828342	AG	4-Nov-16	433798	7559383	-48	4946- ELS	Face as of Nov 4. Face stoped	12q	Any zone	Not Mineralized	1		Shake flask extraction test	
R828343	AG	5-Nov-16	433747	7559156	5	5002 WLS	Face as of Nov 5.	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828344	AG	14-Nov-16	433706	7559293	-87.2	4984 decline	Muck pile from nov 14 blast DS.	11c	Diabase	Not Mineralized	<1		ABA test	
R828345	AG	17-Nov-16	433763	7559308	-67	4926LA	Muck pile from nov 16 blast NS	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828346	AG	21-Nov-16	433847	7559573	-30	4964 ELN	Face as of Nov 21, 2016	1a	Basalt and buffer zone	Not Mineralized	<1		ABA test	
R828347	AG	21-Nov-16	433801	7559373	-51	4945 ELN	Face as of Nov 21, 2016	12Q	Alteration zone	Not Mineralized	<1		ABA test	
R828348	AG	22-Nov-16	433767	7559138	-24	4965 ELS	Face as of Nov 22, 2016	1as	Alteration zone	Not Mineralized	<1		ABA test	
R828349	AG	22-Nov-16	433772	7559157	7	5002 ELS	~3m from face as of Nov 22, on RW	1as	Alteration zone	Not Mineralized	<1		ABA test	

WASTE ROCK SAMPLES

SAMPLE #	GEO	DATE SAMPLED	SAMPLE LOCATION					GEOLOGIC DESCRIPTION			SULPHIDE %	CARBONATE %	ANALYSIS	DESCRIPTION
			X	Y	Z	LEVEL	STN/GP#	ROCK CODE	MINING ZONE	MINERALIZED/NOT MINERALIZED				
R828353	KC	5-Dec-16	433739	7559288	-52	4945 WLS	pillar	1a	Basalt and buffer zone	Not Mineralized	1		Total Sulphur and TIC	
R828351	KC	5-Dec-16	433689	7559353	-101	BTD	opening slash	11c	Diabase	Not Mineralized	<1		ABA test	
R828352	KC	5-Dec-16	433661	7559339	-98	4984 decline	end of rmk	11c	Diabase	Not Mineralized	<1		ABA test	
R828350	KC	5-Dec-16	433782	7559237	-50	4945 ELS	Dec 5th face	12q	Alteration zone	Not Mineralized	1		ABA test	
R828354	KC	6-Dec-16	433796	7559480	-32	4964 WLS	15m from corner	1a	Basalt and buffer zone	Not Mineralized	1		Total Sulphur and TIC	
R828355	KC	6-Dec-16	433815	7559289	-71	4926	end of access	1as	Basalt and buffer zone	Not Mineralized	1		Total Sulphur and TIC	
R828356	AG	14-Dec-16	433773	7559124	7.5	5002 ELS	Face as of Dec 14, 2016	12q	Alteration zone	Not Mineralized	1		ABA test	
R828357	AG	16-Dec-16	433771	7559118	-20	4965-ELS	Face as of Dec 15, 2016	12q	Alteration zone	Not Mineralized	1		ABA test	Bag 1 ABA - 36.1lbs
R828359	KC	31-Dec-16				5002 WLS	Dec 31 face	1as	Alteration zone	Mineralized	1		Total Sulphur and TIC	
R828358	KC	31-Dec-16				4946 WLS	Dec 31 face	11c	Diabase	Not Mineralized	<1		ABA test	
R828360	KC	31-Dec-16				4905 LA	Corner of FA	11c	Diabase	Not Mineralized	<1		ABA test	
R828361	KC	31-Dec-16				BTD	Dec 31 face	11c	Diabase	Not Mineralized	<1		ABA test	
R828362	KC	31-Dec-16				BTD RMK	end	11c	Diabase	Not Mineralized	<!		ABA test	
R828363	KC	31-Dec-16				BTD	SB on left	11c	Diabase	Not Mineralized	<1		ABA test	
S332959	SH		433714	7559346	-9	4982 vent		1a	Basalt and buffer zone	Not Mineralized			Total Sulphur and TIC	
S332960	SH					4984		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332961	SH					4984		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332962	SH					4984		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332963	SH					4984		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	Tr py and minor qtz veining.
S332964	SH					4984		1a	Basalt and buffer zone	Not Mineralized	<1	<1	Total Sulphur and TIC	Tr py, minor qtz and carb veining.
S332965	SH		433683	7559302	4986	4984/4982 intersection		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	Qtz veining and tr py.
S332966	SH		433735	7559328	4988	4982 access	544	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332967	SH		433748	7559321	4986	4982 access	16m from stn 544	1a	Basalt and buffer zone	Not Mineralized			Total Sulphur and TIC	
S332968	SH		433717	7559356	-8	4992 break through		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332969	SH		433700	7559369	-8	4992 bulkhead		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	Qtz veining, trace pyrite
S332970	SH		433677	7559374	-9	4992		1a	Basalt and buffer zone	Not Mineralized	0.5		Total Sulphur and TIC	
S332971	SH		433666	7559326	4983	4984 decline acc		1a	Basalt and buffer zone	Not Mineralized			Total Sulphur and TIC	
S332972	SH					4984 decline		1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332973	SH		433757	7559827	4919	4926 DDB1	2610	1a	Basalt and buffer zone	Not Mineralized	<1		Total Sulphur and TIC	
S332974	SH		433749	7559816	4918	4926 DDB	GP6	1a	Basalt and buffer zone	Not Mineralized			Total Sulphur and TIC	
S332975	SH		433744	7559799	4918	4926 DDB1	12 m from face	1a	Basalt and buffer zone	Not Mineralized			Total Sulphur and TIC	

1a = mafic metavolcanic, 1as = altered mafic metavolcanic, 11c = diabase, 12q = quartz vein

Attachment 2– Laboratory Results – Full ABA

	WASTE ROCK SAMPLES											
SAMPLE #	ROCK CODE	Paste pH	Total S	SO4 (HCl extractable)	Sulphide Sulphur (by diff.)	AP	Mod NP	TIC	TIC	Fizz Rating	NP/AP	TIC/AP
		pH Units	wt%	wt%	wt%	Kg CaCO3/T	Kg CaCO3/T	wt%	Kg CaCO3/T			
S332990	1as	8.06	0.13	- 0.010	0.13	4.06	165	14.9	338	MODERATE	40.6	83.3
S332991	1as	7.97	0.070	0.010	0.060	2.19	140	14.1	320	MODERATE	64.0	146
S332992	1as	7.75	0.11	0.060	0.050	3.44	130	8.15	185	MODERATE	37.8	53.9
S332998	1as	7.86	0.38	0.020	0.36	11.9	264	14.4	326	MODERATE	22.2	27.5
R828254	1as	7.86	0.56	0.010	0.55	17.5	170	14.5	331	MODERATE	9.71	18.9
R828257	1a	9.47	0.030	0.010	0.020	0.94	13.5	0.060	1.40	SLIGHT	14.4	1.49
R828258	1as	8.53	0.21	0.030	0.18	6.56	276	15.7	357	MODERATE	42.1	54.3
R828263	1as	8.33	0.93	0.060	0.87	29.1	152	8.73	198	MODERATE	5.23	6.83
R828264	1as	8.61	0.71	0.010	0.70	22.2	173	14.5	330	MODERATE	7.80	14.9
R828283	1as	7.91	0.47	0.020	0.45	14.7	186	10.0	228	MODERATE	12.7	15.5
R828285	1as	8.23	- 0.020	0.010	- 0.020	0.63	200	14.7	333	MODERATE	320	533
R828286	1as	8.34	0.23	0.010	0.22	7.19	177	14.2	322	MODERATE	24.6	44.8
R828289	1a	8.82	0.17	0.010	0.16	5.31	233	6.84	156	STRONG	43.9	29.3
R828305	1as	8.59	0.060	0.010	0.050	1.88	18.3	0.28	6.40	SLIGHT	9.76	3.41
R828306	1as	8.19	0.070	0.010	0.060	2.19	320	17.5	398	STRONG	146	182
R828308	1as	8.77	0.35	0.010	0.34	10.9	34.5	0.47	10.7	SLIGHT	3.15	0.98
R828310	1as	7.58	0.35	0.010	0.34	10.9	215	8.77	199	STRONG	19.7	18.2
R828314	1as	8.72	0.13	0.010	0.12	4.06	256	12.5	285	STRONG	63.0	70.1
R828323	1as	8.30	0.24	0.020	0.22	7.50	183	9.98	227	MODERATE	24.4	30.2
R828326	1as	8.63	0.070	0.010	0.060	2.19	214	14.7	333	MODERATE	97.8	152
R828340	1as	8.94	0.19	0.010	0.18	5.94	123	12.7	289	MODERATE	20.7	48.7
R828341	1as	8.03	0.10	0.020	0.080	3.13	269	14.0	318	STRONG	86.1	102
R828343	1as	8.12	0.060	0.020	0.040	1.88	223	5.92	135	STRONG	119	71.8
R828348	1as	8.01	0.070	0.060	- 0.020	2.19	194	8.18	186	MODERATE	88.7	85.0
R828349	1as	8.02	0.11	0.010	0.10	3.44	314	16.4	374	MODERATE	91.3	109
R828359	1as	#N/A	0.32	#N/A	#N/A	10.0	#N/A	14.5	329	#N/A	#N/A	32.9
S332953	1a	7.90	0.070	0.010	0.060	2.19	17.8	0.16	3.60	SLIGHT	8.14	1.65
S332954	1a	7.67	0.050	0.010	0.040	1.56	35.8	1.09	24.8	SLIGHT	22.9	15.9
S332955	1a	8.37	0.54	0.010	0.53	16.9	58.8	1.40	31.8	MODERATE	3.48	1.88
S332956	1a	7.86	0.13	0.010	0.12	4.06	186	9.67	220	STRONG	45.8	54.1
S332957	1a	8.70	- 0.020	- 0.010	- 0.020	0.63	23.5	0.56	12.7	SLIGHT	37.6	20.3
S332959	1a	#N/A	0.89	#N/A	#N/A	27.8	#N/A	0.55	12.5	#N/A	#N/A	0.45
S332960	1a	#N/A	0.16	#N/A	#N/A	5.00	#N/A	8.66	197	#N/A	#N/A	39.4
S332961	1a	#N/A	0.31	#N/A	#N/A	9.69	#N/A	4.96	113	#N/A	#N/A	11.6
S332962	1a	#N/A	0.26	#N/A	#N/A	8.13	#N/A	0.56	12.7	#N/A	#N/A	1.56
S332963	1a	#N/A	0.18	#N/A	#N/A	5.63	#N/A	3.46	78.6	#N/A	#N/A	14.0
S332964	1a	#N/A	0.30	#N/A	#N/A	9.38	#N/A	8.21	187	#N/A	#N/A	19.9
S332965	1a	#N/A	1.44	#N/A	#N/A	45.0	#N/A	8.99	204	#N/A	#N/A	4.54
S332966	1a	#N/A	0.41	#N/A	#N/A	12.8	#N/A	13.3	302	#N/A	#N/A	23.6
S332967	1a	#N/A	0.20	#N/A	#N/A	6.25	#N/A	9.25	210	#N/A	#N/A	33.6
S332968	1a	#N/A	0.12	#N/A	#N/A	3.75	#N/A	8.75	199	#N/A	#N/A	53.0
S332969	1a	#N/A	0.28	#N/A	#N/A	8.75	#N/A	5.28	120	#N/A	#N/A	13.7
S332970	1a	#N/A	2.29	#N/A	#N/A	71.6	#N/A	7.30	166	#N/A	#N/A	2.32
S332971	1a	#N/A	0.20	#N/A	#N/A	6.25	#N/A	0.74	16.8	#N/A	#N/A	2.69
S332972	1a	#N/A	2.01	#N/A	#N/A	62.8	#N/A	2.16	49.1	#N/A	#N/A	0.78
S332973	1a	#N/A	- 0.020	#N/A	#N/A	0.63	#N/A	1.72	39.1	#N/A	#N/A	62.6
S332974	1a	#N/A	0.14	#N/A	#N/A	4.38	#N/A	0.97	22.1	#N/A	#N/A	5.05
S332975	1a	#N/A	- 0.020	#N/A	#N/A	0.63	#N/A	1.76	40.0	#N/A	#N/A	64.0
S332976	1a	7.89	0.34	0.020	0.32	10.6	131	8.83	201	MODERATE	12.3	18.9
S332977	1as	#N/A	0.12	#N/A	#N/A	3.75	#N/A	16.1	366	#N/A	#N/A	97.5
S332978	1as	7.88	0.060	0.010	0.050	1.88	154	13.2	301	MODERATE	82.1	160
S332980	1a	7.54	0.15	0.010	0.14	4.69	132	5.86	133	MODERATE	28.2	28.4
S332981	1a	#N/A	0.030	#N/A	#N/A	0.94	#N/A	- 0.020	- 0.50	#N/A	#N/A	0.53
S332982	1a	#N/A	0.12	#N/A	#N/A	3.75	#N/A	6.79	154	#N/A	#N/A	41.1
S332983	1a	#N/A	- 0.020	#N/A	#N/A	0.63	#N/A	0.040	0.90	#N/A	#N/A	1.44
S332984	1a	#N/A	0.070	#N/A	#N/A	2.19	#N/A	0.13	3.00	#N/A	#N/A	1.37
S332985	1a	#N/A	0.090	#N/A	#N/A	2.81	#N/A	1.83	41.6	#N/A	#N/A	14.8
S332987	1a	8.01	0.16	0.010	0.15	5.00	188	10.3	234	MODERATE	37.6	46.7
S332988	1a	#N/A	0.89	#N/A	#N/A	27.8	#N/A	9.56	217	#N/A	#N/A	7.81
S332989	1a	#N/A	0.23	#N/A	#N/A	7.19	#N/A	12.3	279	#N/A	#N/A	38.9
S332993	1a	#N/A	0.050	#N/A	#N/A	1.56	#N/A	0.51	11.6	#N/A	#N/A	7.42
S332994	1a	#N/A	0.10	#N/A	#N/A	3.13	#N/A	0.19	4.30	#N/A	#N/A	1.38
S332995	1a	#N/A	1.39	#N/A	#N/A	43.4	#N/A	1.24	28.2	#N/A	#N/A	0.65
S332996	1a	#N/A	1.44	#N/A	#N/A	45.0	#N/A	0.050	1.10	#N/A	#N/A	0.024
S332997	1as	#N/A	0.16	#N/A	#N/A	5.00	#N/A	14.3	325	#N/A	#N/A	65.0
R828255	1a	#N/A	0.080	#N/A	#N/A	2.50	#N/A	6.53	148	#N/A	#N/A	59.4
R828259	1a	#N/A	1.29	#N/A	#N/A	40.3	#N/A	0.38	8.60	#N/A	#N/A	0.21
R828260	1a	#N/A	0.17	#N/A	#N/A	5.31	#N/A	0.12	2.70	#N/A	#N/A	0.51
R828261	1a	#N/A	0.98	#N/A	#N/A	30.6	#N/A	0.060	1.40	#N/A	#N/A	0.046
R828262	1a	7.62	1.78	0.020	1.76	55.6	24.3	0.20	4.60	SLIGHT	0.44	0.083
R828266	1a	#N/A	0.15	#N/A	#N/A	4.69	#N/A	8.53	194	#N/A	#N/A	41.4
R828267	1a	#N/A	0.13	#N/A	#N/A	4.06	#N/A	6.29	143	#N/A	#N/A	35.2
R828268	1a	#N/A	0.17	#N/A	#N/A	5.31	#N/A	7.99	182	#N/A	#N/A	34.2
R828269	1a	#N/A	0.13	#N/A	#N/A	4.06	#N/A	7.86	179	#N/A	#N/A	44.0
R828270	1a	8.47	1.34	0.010	1.33	41.9	23.5	0.11	2.50	SLIGHT	0.56	0.060
R828271	1a	#N/A	1.52	#N/A	#N/A	47.5	#N/A	- 0.020	- 0.50	#N/A	#N/A	0.011
R828272	1a	#N/A	0.60	#N/A	#N/A	18.8	#N/A	7.58	172	#N/A	#N/A	9.19
R828273	1a	#N/A	0.54	#N/A	#N/A	16.9	#N/A	1.31	29.8	#N/A	#N/A	1.77
R828274	1a	#N/A	0.44	#N/A	#N/A	13.8	#N/A	0.12	2.70	#N/A	#N/A	0.20

	WASTE ROCK SAMPLES											
SAMPLE #	ROCK CODE	Paste pH	Total S	SO4 (HCl extractable)	Sulphide Sulphur (by diff.)	AP	Mod NP	TIC	TIC	Fizz Rating	NP/AP	TIC/AP
		pH Units	wt%	wt%	wt%	Kg CaCO3/T	Kg CaCO3/T	wt%	Kg CaCO3/T			
R828275	1a	8.15	0.080	0.010	0.070	2.50	25.5	0.35	8.00	SLIGHT	10.2	3.20
R828281	1a	#N/A	0.040	#N/A	#N/A	1.25	#N/A	0.040	0.90	#N/A	#N/A	0.72
R828282	1a	#N/A	0.14	#N/A	#N/A	4.38	#N/A	8.07	183	#N/A	#N/A	41.9
R828287	1a	8.35	0.040	0.010	0.030	1.25	40.0	0.65	14.8	SLIGHT	32.0	11.8
R828288	1a	#N/A	0.15	#N/A	#N/A	4.69	#N/A	7.39	168	#N/A	#N/A	35.8
R828292	1a	7.80	0.60	0.010	0.59	18.8	172	15.0	341	MODERATE	9.17	18.2
R828293	1a	8.43	0.25	- 0.010	0.25	7.81	190	15.9	361	MODERATE	24.3	46.1
R828295	1a	9.75	0.020	- 0.010	0.020	0.63	23.5	0.29	6.60	SLIGHT	37.6	10.6
R828296	1a	9.09	0.020	- 0.010	0.020	0.63	22.0	0.15	3.40	SLIGHT	35.2	5.44
R828297	1a	#N/A	0.020	#N/A	#N/A	0.63	#N/A	0.34	7.70	#N/A	#N/A	12.3
R828307	1a	8.48	0.12	0.030	0.090	3.75	171	8.89	202	MODERATE	45.6	53.9
R828309	1a	7.82	0.26	0.040	0.22	8.13	105	3.81	86.6	MODERATE	12.9	10.7
R828311	1a	8.44	0.040	0.010	0.030	1.25	14.0	0.10	2.30	SLIGHT	11.2	1.84
R828313	1a	8.50	0.11	0.010	0.10	3.44	304	17.8	404	STRONG	88.4	118
R828315	1as	#N/A	0.36	#N/A	#N/A	11.3	#N/A	14.1	321	#N/A	#N/A	28.5
R828316	1a	#N/A	0.11	#N/A	#N/A	3.44	#N/A	11.5	262	#N/A	#N/A	76.3
R828317	1a	#N/A	0.10	#N/A	#N/A	3.13	#N/A	0.13	3.00	#N/A	#N/A	0.96
R828318	1a	#N/A	1.06	#N/A	#N/A	33.1	#N/A	0.21	4.80	#N/A	#N/A	0.14
R828319	1a	#N/A	0.10	#N/A	#N/A	3.13	#N/A	7.23	164	#N/A	#N/A	52.6
R828322	1a	8.77	0.84	0.010	0.83	26.3	61.5	1.47	33.4	MODERATE	2.34	1.27
R828325	1a	8.00	0.12	0.10	0.020	3.75	160	7.45	169	MODERATE	42.7	45.1
R828327	1a	8.38	0.19	0.050	0.14	5.94	200	9.03	205	MODERATE	33.7	34.6
R828339	1a	#N/A	0.30	#N/A	#N/A	9.38	#N/A	9.53	217	#N/A	#N/A	23.1
R828345	1a	8.36	0.21	0.010	0.20	6.56	39.3	1.08	24.6	MODERATE	5.99	3.75
R828346	1a	8.15	0.12	0.010	0.11	3.75	225	11.8	268	MODERATE	60.0	71.3
R828353	1a	#N/A	0.40	#N/A	#N/A	12.5	#N/A	17.3	393	#N/A	#N/A	31.5
R828354	1a	#N/A	0.14	#N/A	#N/A	4.38	#N/A	6.24	142	#N/A	#N/A	32.4
R828355	1as	#N/A	0.080	#N/A	#N/A	2.50	#N/A	5.53	126	#N/A	#N/A	50.3
R828276	1a	8.29	0.030	- 0.010	0.030	0.94	15.5	0.24	5.50	SLIGHT	16.5	5.87
R828277	1a	8.02	0.030	- 0.010	0.030	0.94	13.0	0.11	2.50	NONE	13.9	2.67
R828278	1a	9.30	0.030	- 0.010	0.030	0.94	13.0	0.11	2.50	NONE	13.9	2.67
R828280	1a	9.66	- 0.020	0.010	- 0.020	0.63	17.5	0.10	2.30	SLIGHT	28.0	3.68
R828303	1a	8.26	0.090	0.010	0.080	2.81	151	9.97	227	MODERATE	53.7	80.6
S332951	11c	8.07	0.030	0.010	0.020	0.94	15.5	0.050	1.10	NONE	16.5	1.17
S332952	11c	8.49	0.030	0.010	0.020	0.94	13.8	0.050	1.10	NONE	14.7	1.17
S332986	11c	8.28	0.040	0.010	0.030	1.25	11.8	0.080	1.80	NONE	9.44	1.44
R828256	11c	8.67	0.050	0.010	0.040	1.56	21.3	0.33	7.50	SLIGHT	13.6	4.80
R828284	11c	9.62	0.030	0.010	0.020	0.94	11.5	0.070	1.60	NONE	12.3	1.71
R828294	11c	8.81	0.030	- 0.010	0.030	0.94	18.5	0.24	5.50	SLIGHT	19.7	5.87
R828298	11c	9.69	0.030	- 0.010	0.030	0.94	9.50	0.050	1.10	NONE	10.1	1.17
R828299	11c	8.30	0.040	- 0.010	0.040	1.25	11.0	0.060	1.40	NONE	8.80	1.12
R828300	11c	8.15	0.030	- 0.010	0.030	0.94	9.30	0.040	0.90	NONE	9.92	0.96
R828301	11c	8.08	0.040	0.010	0.030	1.25	9.00	0.040	0.90	NONE	7.20	0.72
R828302	11c	8.67	0.030	- 0.010	0.030	0.94	9.30	0.040	0.90	NONE	9.92	0.96
R828304	11c	8.98	0.030	- 0.010	0.030	0.94	11.0	- 0.020	- 0.50	NONE	11.7	0.53
R828324	11c	9.45	0.040	- 0.010	0.040	1.25	9.80	- 0.020	- 0.50	NONE	7.84	0.40
R828328	11c	8.48	0.31	0.030	0.28	9.69	17.8	0.22	5.00	SLIGHT	1.84	0.52
R828329	11c	9.48	0.040	- 0.010	0.040	1.25	10.5	0.040	0.90	NONE	8.40	0.72
R828330	11c	9.13	1.08	0.010	1.07	33.8	10.5	0.46	10.5	NONE	0.31	0.31
R828333	11c	8.20	0.030	- 0.010	0.030	0.94	11.5	0.040	0.90	NONE	12.3	0.96
R828334	11c	8.42	0.030	- 0.010	0.030	0.94	9.50	0.040	0.90	NONE	10.1	0.96
R828335	11c	8.25	0.030	- 0.010	0.030	0.94	25.9	0.020	- 0.50	NONE	27.6	0.53
R828337	11c	7.68	0.34	- 0.010	0.34	10.6	1.80	0.060	1.40	NONE	0.17	0.13
R828344	11c	7.83	0.030	0.010	0.020	0.94	11.8	0.020	- 0.50	NONE	12.6	0.53
R828351	11c	9.71	0.060	0.010	0.050	1.88	16.5	0.13	3.00	SLIGHT	8.80	1.60
R828352	11c	8.60	0.060	0.010	0.050	1.88	19.8	0.090	2.10	SLIGHT	10.6	1.12
R828358	11c	8.54	0.030	- 0.010	0.030	0.94	12.0	0.040	0.90	NONE	12.8	0.96
R828360	11c	9.83	0.040	- 0.010	0.040	1.25	16.0	0.090	2.10	SLIGHT	12.8	1.68
R828361	11c	9.62	0.030	- 0.010	0.030	0.94	13.5	0.030	0.70	NONE	14.4	0.75
R828362	11c	10.1	0.020	- 0.010	0.020	0.63	13.8	0.030	0.70	SLIGHT	22.1	1.12
R828363	11c	9.12	0.040	- 0.010	0.040	1.25	22.8	0.11	2.50	SLIGHT	18.2	2.00
R828290	12q	8.26	0.19	- 0.010	0.19	5.94	54.0	2.72	61.8	SLIGHT	9.09	10.4
R828291	12q	8.30	0.35	- 0.010	0.35	10.9	55.0	2.89	65.7	SLIGHT	5.03	6.01
R828320	12q	7.94	1.00	- 0.010	1.00	31.3	41.8	1.81	41.1	SLIGHT	1.34	1.32
R828321	12q	7.74	0.11	- 0.010	0.11	3.44	23.8	0.61	13.9	MODERATE	6.92	4.04
R828331	12q	7.95	0.030	- 0.010	0.030	0.94	10.8	0.040	0.90	SLIGHT	11.5	0.96
R828332	12q	7.78	0.10	- 0.010	0.10	3.13	3.00	0.080	1.80	NONE	0.96	0.58
R828336	12Q	7.69	0.61	- 0.010	0.61	19.1	17.6	0.15	3.40	SLIGHT	0.92	0.18
R828338	12Q	8.48	0.020	0.010	- 0.020	0.63	11.8	0.030	0.70	NONE	18.9	1.12
R828347	12Q	7.87	- 0.020	- 0.010	- 0.020	0.63	3.00	0.060	1.40	SLIGHT	4.80	2.24
R828350	12q	8.05	0.65	- 0.010	0.65	20.3	4.00	0.51	11.6	SLIGHT	0.20	0.57
R828356	12q	7.83	0.080	- 0.010	0.080	2.50	21.8	0.86	19.6	SLIGHT	8.72	7.84
R828357	12q	8.19	0.38	0.010	0.37	11.9	49.3	2.24	50.9	SLIGHT	4.15	4.29

1a = mafic metavolcanic, 1as = altered mafic metavolcanic, 11c = diabase, 12q = quartz vein

Attachment 3– Laboratory Results – Multi Element Analysis

WASTE ROCK SAMPLES

SAMPLE #	ROCK CODE	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
S332990	1as	0.2	27.8	1.2	68	-0.1	5.9	25.3	2260	9.07	16.7	-0.1	10.5	0.4	33	-0.1	-0.1	-0.1	5	4.96	0.095	3	8	1.59	8	-0	-20	0.21	0.049	0.06	-0.1	-0.01	8.2	-0.1	0.08	-1	-0.5	-0.2
S332991	1as	0.3	46.5	0.8	91	-0.1	6.1	23.9	2300	9.9	1.3	-0.1	110	0.5	35	-0.1	-0.1	-0.1	7	3.88	0.09	6	16	1.6	9	-0	-20	0.45	0.052	0.07	-0.1	-0.01	9.8	-0.1	-0.05	1	-0.5	-0.2
S332992	1as	0.4	32.8	2	122	-0.1	1.6	30.5	1750	10	2.6	-0.1	103	0.3	70	0.1	-0.1	-0.1	75	3.59	0.088	4	19	1.53	3	0.007	-20	2.29	0.022	-0.01	-0.1	-0.01	27.4	-0.1	0.08	15	-0.5	-0.2
S332998	1as	0.2	108	1.4	88	-0.1	85.4	38.5	1440	6.33	24.4	-0.1	26.2	-0.1	29	0.2	-0.1	-0.1	53	6.34	0.018	-1	65	2.81	3	0.002	-20	1.39	0.047	0.04	-0.1	-0.01	12.9	-0.1	0.29	3	-0.5	-0.2
R828254	1as	0.3	52.4	1.7	206	-0.1	1.9	31.5	2230	9.82	26.9	-0.1	18.4	0.3	47	0.6	-0.1	-0.1	9	4.88	0.096	3	14	1.72	5	0.002	-20	0.58	0.03	0.08	0.4	-0.01	7.8	-0.1	0.46	2	-0.5	-0.2
R828257	1a	0.3	294	0.7	47	-0.1	29.4	18.2	484	3.85	-0.5	-0.1	8.7	0.4	31	-0.1	-0.1	-0.1	243	1.05	0.059	4	36	0.91	24	0.153	29	1.84	0.346	0.18	-0.1	-0.01	3.1	-0.1	-0.05	7	-0.5	-0.2
R828258	1as	0.1	99.9	1.9	77	-0.1	98.9	38.9	2070	7.59	23.8	-0.1	12.4	-0.1	39	0.1	0.1	-0.1	64	7.31	0.025	1	52	2.79	5	0.004	-20	1.67	0.055	0.05	-0.1	-0.01	16.7	-0.1	0.12	4	-0.5	-0.2
R828263	1as	0.2	51	2.7	114	-0.1	26.7	38.3	1530	9.9	10.4	-0.1	91.8	0.1	41	-0.1	-0.1	-0.1	137	3.96	0.068	2	27	2.58	1	0.006	-20	3.19	0.028	0.02	-0.1	-0.01	25.9	-0.1	0.84	10	-0.5	-0.2
R828264	1as	0.2	93.4	2.2	134	0.3	17.5	31.3	1730	8.76	27	-0.1	791	0.1	36	0.3	0.2	-0.1	29	5.68	0.057	1	21	1.7	5	0.003	-20	0.51	0.037	0.05	0.1	-0.01	10.4	-0.1	0.58	2	-0.5	-0.2
R828283	1as	0.2	152	4.4	66	-0.1	97.3	56.6	1820	7.36	32.6	-0.1	56.8	-0.1	18	-0.1	-0.1	-0.1	75	4.62	0.02	1	82	2.42	10	0.005	-20	2.23	0.09	0.11	-0.1	-0.01	16.2	-0.1	0.36	5	-0.5	-0.2
R828285	1as	0.3	32.3	1.6	60	-0.1	1.6	25.7	2070	8.66	6	-0.1	15.4	0.5	31	-0.1	-0.1	-0.1	10	5.72	0.091	6	16	1.39	7	0.012	-20	0.53	0.073	0.05	-0.1	-0.01	11.2	-0.1	-0.05	2	-0.5	-0.2
R828286	1as	0.5	15.2	1	49	-0.1	1.8	32.5	2240	9.36	16.9	-0.1	1.6	0.2	50	0.1	-0.1	-0.1	14	5.17	0.092	3	12	1.56	7	0.002	-20	0.68	0.035	0.09	-0.1	-0.01	11.5	-0.1	0.14	2	-0.5	-0.2
R828289	1a	0.2	96.7	1.8	102	-0.1	82.3	47.1	1210	7.6	49.2	-0.1	9.4	0.1	28	-0.1	-0.1	-0.1	134	5.97	0.033	2	89	3.16	32	0.086	-20	3.64	0.042	0.35	0.5	-0.01	16.3	-0.1	-0.05	9	-0.5	-0.2
R828305	1as	0.1	96.4	0.9	19	0.1	10.6	24.5	941	5.47	0.9	-0.1	696	0.4	6	-0.1	-0.1	-0.1	126	0.95	0.075	3	7	1.91	40	0.297	-20	2.02	0.112	0.26	0.1	-0.01	5.6	-0.1	0.06	13	-0.5	-0.2
R828306	1as	0.1	85.5	0.7	47	-0.1	96.2	45.7	1350	6.06	72	-0.1	41.4	-0.1	32	-0.1	-0.1	-0.1	22	8.02	0.017	-1	25	2.62	5	0.001	-20	0.54	0.06	0.05	-0.1	-0.01	12.9	-0.1	0.08	1	-0.5	-0.2
R828308	1as	0.2	37	53.4	322	0.3	17.5	28.8	919	6.47	4.1	-0.1	34.7	0.5	9	0.5	0.1	0.2	214	1.27	0.086	4	12	2.05	46	0.323	-20	2.25	0.204	0.8	2.8	-0.01	11.4	0.1	0.3	13	-0.5	-0.2
R828310	1as	0.1	120	2.2	72	0.2	108	52.1	1380	6.67	97.2	-0.1	8.5	-0.1	44	0.2	0.2	-0.1	87	8.07	0.02	2	83	2.25	11	0.023	-20	2.96	0.04	0.15	-0.1	-0.01	14.6	-0.1	0.29	5	-0.5	-0.2
R828314	1as	0.2	76.2	1.1	64	-0.1	74.4	43.4	1690	8.07	62.6	-0.1	8.2	0.1	43	-0.1	-0.1	-0.1	68	6.66	0.039	2	22	2.44	4	0.015	-20	1.13	0.054	0.04	-0.1	-0.01	15.7	-0.1	0.14	6	-0.5	-0.2
R828323	1as	0.4	47.6	1.2	44	-0.1	9.4	32.5	2120	8.72	13.5	-0.1	3.5	0.3	27	-0.1	-0.1	-0.1	29	5.27	0.102	7	25	2.15	11	0.006	-20	2.01	0.067	0.06	-0.1	-0.01	15	-0.1	0.2	6	-0.5	-0.2
R828326	1as	0.3	185	0.7	59	-0.1	4.5	28.6	2380	9.9	20.7	-0.1	19.8	0.2	26	-0.1	-0.1	-0.1	14	5.97	0.082	3	15	1.84	7	0.002	-20	0.93	0.052	0.05	-0.1	-0.01	10	-0.1	0.06	3	-0.5	-0.2
R828340	1as	0.2	19.2	0.6	60	-0.1	5.4	32.4	2230	10	18.5	-0.1	2.9	0.4	22	-0.1	-0.1	-0.1	7	3.57	0.108	3	14	1.36	8	0.001	-20	0.32	0.063	0.07	-0.1	-0.01	9	-0.1	0.19	-1	-0.5	-0.2
R828341	1as	-0.1	129	1.5	54	-0.1	93.3	42	2250	7.62	2.2	-0.1	2.7	-0.1	29	-0.1	-0.1	-0.1	56	7.13	0.039	1	67	2.67	5	0.005	-20	1.66	0.055	0.09	0.4	-0.01	17.7	-0.1	0.08	4	-0.5	-0.2
R828343	1as	0.3	90.4	0.5	66	-0.1	95.7	56.8	1500	6.75	58.2	-0.1	13	-0.1	17	-0.1	-0.1	-0.1	49	5.99	0.018	-1	67	1.84	3	0.001	-20	1.11	0.05	0.03	0.1	-0.01	12.7	-0.1	0.17	3	-0.5	-0.2
R828348	1as	-0.1	100	0.9	64	-0.1	109	43.8	1320	6.32	2.2	-0.1	2.3	-0.1	28	-0.1	-0.1	-0.1	184	6.88	0.017	1	167	3.86	2	0.009	-20	4.89	0.007	0.03	-0.1	-0.01	28.9	-0.1	0.06	11	-0.5	-0.2
R828349	1as	0.2	139	0.7	40	-0.1	131	34.1	1560	5.81	32.3	-0.1	5.4	-0.1	19	-0.1	-0.1	-0.1	27	7.79	0.021	-1	45	2.58	4	-0	-20	0.83	0.067	0.06	-0.1	-0.01	15.5	-0.1	0.08	2	-0.5	-0.2
S332953	1a	0.1	30.2	2	45	-0.1	1.1	13	669	5.22	0.5	-0.1	0.7	0.5	8	-0.1	-0.1	-0.1	41	0.95	0.1	6	9	1.43	18	0.275	-20	1.65	0.127	0.08	-0.1	-0.01	4.9	-0.1	0.05	12	-0.5	-0.2
S332954	1a	0.1	103	17.1	103	-0.1	18.6	33.9	882	10.7	1.5	-0.1	7.3	0.3	8	-0.1	-0.1	-0.1	232	1.4	0.074	3	12	2.9	11	0.199	-20	4.3	0.048	0.07	-0.1	-0.01	16	-0.1	0.06	17	-0.5	-0.2
S332955	1a	0.2	86.2	4.3	27	0.1	16.4	27.8	808	6.03	1.1	-0.1	9	0.4	10	-0.1	-0.1	0.2	196	2.28	0.076	3	15	1.84	58	0.311	259	1.97	0.228	0.35	0.4	-0.01	12.4	-0.1	0.43	14	-0.5	-0.2
S332956	1a	0.4	31.3	1.8	114	-0.1	2.4	25.3	2170	8.88	5.8	-0.1	1.8	0.2	42	-0.1	-0.1	-0.1	42	5.53	0.091	4	5	1.59	11	0.006	-20	2.66	0.027	0.06	-0.1	-0.01	14.9	-0.1	0.07	10	-0.5	-0.2
S332957	1a	-0.1	12.9	98.3	72	-0.1	42.6	37.2	1280	2.23	37.9	0.7	4.4	0.1	14	-0.1	-0.1	-0.1	132	1.42	0.011	2	67	3.89	13	0.229	625	2.78	0.194	0.07	-0.1	-0.01	14.8	-0.1	-0.05	10	-0.5	-0.2
S332976	1a	0.6	130	1.8	121	0.1	12.8	32.6	1590	9.22	17.1	-0.1	7.2	0.4	57	0.1	-0.1	-0.1	66	3.49	0.08	4	14	1.91	3	0.007	-20	2.05	0.025	0.02	-0.1	-0.01	22.1	-0.1	0.29	11	-0.5	-0.2
S332978	1as	0.4	41.7	1.1	60	-0.1	2.7	25.2	1630	8.55	22.9	-0.1	15.7	0.3	37	0.1	-0.1	-0.1	7	4.09	0.086	3	14	1.52	6	0.001	-20	0.32	0.027	0.08	0.4	-0.01	7.5	-0.1	-0.05	-1	-0.5	-0.2
S332980	1a	0.1	60.8	1	76	-0.1	98.8	56.2	1510	7.38	3.2	-0.1	5	-0.1	21	-0.1	-0.1	-0.1	182	5.17	0.017	1	114	3.11	1	0.049	-20	3.93	0.025	0.08	-0.1	-0.01	19.3	-0.1	0.12	9	-0.5	-0.2
S332987	1a	0.3	21.9	0.8	89	-0.1	1.5	30.6	1740	9.82	0.9	-0.1	-0.5	0.2	35	-0.1	-0.1	-0.1	39	4.6	0.095	6	14	2.77	8	0.004	-20	3.22	0.041	0.08	-0.1	-0.01	15.4	-0.1	0.11	9	-0.5	-0.2
R828262	1a	0.4	207	136	279	0.7	19.6	69.7	700	7.54	4.4	-0.1	101	0.4	12	0.4	0.7	0.6	95	0.99	0.083	5	16	2.05	22	0.204	-20	2.09	0.23	0.26	0.6	-0.01	11	0.1	1.59	11	1.7	-0.2
R828270	1a	0.4	495	38.6	1170	0.8	4.9	79.1	777	8.52	-0.5	-0.1	12.1	0.6	12	1.9	-0.1	0.3	59	0.77	0.113	5	14	2.28	49	0.208	-20	2.45	0.201	0.47	0.3	0.02	12.8	0.1	1.17	15	1.2	-0.2
R828275	1a	0.3	34.4	4.1	49	-0.1	3.5	17.9	774	7.96	0.9	-0.1	-0.5	0.6	8	-0.1	-0.1	-0.1	88	1.04	0.107	7	8	1.74	9	0.227	-20	2.14	0.139	0.06	0.1	-0.01	9.9	-0.1	0.07	15	-0.5	-0.2
R828287	1a	0.3	22.2	56.9	70	-0.1	25.2	32.6	890	10.1	24.2	-0.1	1.3	0.5	9	-0.1	-0.1	-0.1	134	1.14	0.093	5	20	2.4	83	0.194	-20	3.37	0.148	0.78	1.2	-0.01	13.3	0.1	-0.05	16	-0.5	-0.2
R828292	1a	0.2	20.3	1.9	57	-0.1	2.2	26.4	2310	9.23	45.7	-0.1	17.9	0.2	51	-0.1	-0.1	-0.1	9	5.83	0.097	2	17	1.48	7	0.001	-20	0.55	0.035	0.07	-0.1	-0.01	10.1	-0.1	0.53	2	-0.5	-0.2
R828293	1a	0.2	27	0.6	60	-0.1	2.7	30.6	2160	10.3	5.5	-0.1	0.9	0.3	54	-0.1	-0.1	-0.1	6	5.58	0.091	3	12	1.33	7	-0	-20	0.27	0.04	0.04	-0.1	-0.01	11.8	-0.1	0.21	-1	-0.5	-0.2
R828295	1a	0.3	184	2.2	40	-0.1	19.6	16.7	585	4.5	1.1	-0.1	15.3	0.4	20	-0.1	-0.1	-0.1	181	1.09	0.061	4	29	1.45	22	0.174	222	1.48	0.223	0.19	-0.1	-0.01	4.7	-0.1	-0.05	8	-0.5	-0.2
R828296	1a	-0.1	117	26.1	176	-0.1	93.6	35	3560	5.65	-0.5	-0.1	220	0.1	30	0.2	-0.1	-0.1	176	0.69	0.02	1	149	3.79	90	0.239	125	3.64	0.422	0.75	-0.1	-0.01	15.7	-0.1	-0.05	11	-0.5	-0.2
R828307	1a	0.1	95.4	0.5	93	-0.1	74	45.6	1850	10.6	9	-0.1	39.7	0.1	16	-0.1	-0.1	-0.1	91	4.96	0.046	2	70	2.72	5	0.008	-20	3.86	0.05	0.05	-0.1	-0.01	20.9	-0.1	0.1	10	-0.5	-0.2
R828309	1a	0.2	106	1	106	-0.1	29.4	45.5	880	12.2	0.8	-0.1	0.8	0.3	28	-0.1	-0.1	-0.1	215	4.11	0.069	3	27	2.32	2	0.016	-20	5.36	0.014	0.03	-0.1	-0.01	29.8	-0.1	0.23	18	-0.5	-0.2
R828311	1a	0.2	151	0.5	32	-0.1	22.6	21.8	1620	8.12	0.8	-0.1	4.3	0.5	7	-0.1	-0.1	-0.1	168	1.07	0.065	3	19	2.79	27	0.425	-20	3	0.169	0.13	0.5	-0.01	11	-0.1	-0.05	15	-0.5	-0.2
R828313	1a	0.2	111	1.2	53	-0.1	110	44.8	2050	7.41	76.9	-0.1	53.6	-0.1	28	0.1	-0.1	-0.1	26	7.82	0.014	-1	30	2.27	6	0.004	-20	0.54	0.083	0.05	-0.1	-0.01	14.3	-0.1	0.09	1	-0.5	-0.2
R828322	1a	0.4	54.5	20	33	0.2	1.9	24.2	743	6.18	2.1	-0.1	23.5	0.4	10	-0.1	-0.1	0.1	54	2.22	0.094	4	16	1.56	43	0.209	-20	1.78	0.185	0.23	1.2	-0.01	6.6	0.8	0.73	13	-0.5	-0.2
R828325	1a	0.3	29.2	1	113	-0.1	3	26.2	2250	10	-0.5	-0.1	-0.5	0.3	28	-0.1	-0.1	-0.1	67	5.01	0.085	4	17	1.8	7	0.015	-20	3.25	0.028	0.02	-0.1	-0.01	20.3	-0.1	0.09	14	-0.5	-0.2
R828327	1a	0.2	93.1	4.9	110	-0.1	44.3	46	1610	9.73	15.4	-0.1	10.1	0.2	28	-0.1	-0.1	-0.1	167	6.66	0.055	4	30	2.61	13	0.065	-20	3.49	0.039	0.04	-0.1	-0.01	19	-0.1	0.14	12	-0.5	-0.2
R828345	1a	0.2	128	9.9	51	-0.1	105	39.5	709	3.81	3.6	-0.1	0.6	-0.1	23	-0.1	0.2	-0.1	64	1.89	0.019	-1	121	2.39	1	0.174	-20	2.42	0.036	0.01	0.1	-0.01	2.1	-0.1	0.16	4	-0.5	-0.2
R828346	1a	0.5	44.8	0.8	33	-0.1	2.2	16.7	2000	4.82	-0.5	-0.1	3.4	0.4	39	-0.1	-0.1	-0.1	14	5.75	0.091	5	16	1.86	14	0.004	-20	0.98	0.064	0.08	-0.1	-0.01	10.9	-0.1	0.08	3	-0.5	-0.2
R828276	1a	0.3	313	5.2	56	-0.1	26.1	17.3	302	4.44	1.2	-0.1	5.4	0.4	24	0.1	-0.1	-0.1	273	1.2	0.07	4	36	1.04	17	0.16	71	1.58	0.229	0.16	-0.1	-0.01	3	-0.1	-0.05	8	-0.5	-0.2
R828277	1a	0.3	264	5.5	87	-0.1	24.7	17.1	431	4.1	0.6	-0.1	7.6	0.4	27	-0.1	0.2	-0.1	254	1.1	0.07	5	53	0.86	32	0.211	149	1.6	0.238	0.2	-0.1	-0.01	3.2	-0.1	-0.05	8	-0.5	-0.2
R828278	1a	0.3	206	2.4	75	-0.1	27.4	20.4	681	4.63	3.6	-0.1	74.9	0.4	20	-0.1	-0.1	-0.1	217	1.02	0.063	4	47	1.37	41	0.222	90	1.84	0.245	0.38	-0.1	-0.01	6.3	-0.1	-0.05	8	-0.5	-0.2
R828280	1a	0.1	91.5	14	158	-0.1	83.9	42.9	2250	7.3	0.7	-0.1	8.2	0.2	22	0.1	-0.1	-0.1	205	0.65	0.027	1	158	2.88	124	0.271	-20	3.5	0.455	1.02	0.2	-0.01	16.7	-0.1	-0.05	11	-0.5	-0.2
R828303	1a	0.3	35.3	5	121	-0.1	1.4	30.7	1750	10.5	7.1	-0.1	-0.5	0.4	35	0.1	0.4	-0.1	43	4.95	0.099	4	15	1.56	5	0.004	-20	2.63	0.029	0.08	-0.1	-0.01	16.8	-0.1	0.06	12	-0.5	-0.2
S332951	11c	0.3	291	15.1	130	0.2	27.1	16.4	298	3.65	1.6	-0.1	8.6	0.4	32	0.3	0.2	-0.1	254	0.96	0.066	4	36	0.51	27	0.228	-20	1.33	0.239	0.15	-0.1	-0.01	1.6	-0.1	-0.05	6	-0.5	-0.2
S332952	11c	0.3	279	5.8	86	0.1	21.2	15.5	297	3.79	1.2	-0.1	6.1	0.4	38	0.2	0.1	-0.1	245	1.14	0.063	4	62	0.48	29	0.188	-20	1.73	0.301	0.18	-0.1	-0.01	1.7	-0.1	-0.05	7	-0.5	-0.2
S332986	11c	0.4	298	2	56	-0.1	19.5	14.1	266	3.61	0.5	-0.1	10.8	0.4	29	-0.1	-0.1	-0.1	247	1.1	0.071	5	31	0.55	23	0.177	40	1.52	0.278	0.18	-0.1	-0.01	2.5	-0.1	-0.05	7	-0.5	-0.2
R828256	11c	0.4	310	12.4	173	0.1	29.2	16.9	299	4.45	0.6	-0.1	58.5	0.4	24	0.4	-0.1	-0.1	244	1.29	0.071	5	48	1.33	13	0.162	270	1.56	0.206	0.14	-0.1	-0.01	3.2	-0.1	-0.05	8	-0.5	-0.2
R828284	11c	0.3	305	1.8	62	-0.1	20.7	15.4	285	4.36	0.5	-0.1	6.2	0.4	26	-0.1	-0.1	-0.1	286	1.01	0.073	5	30	0.53	25	0.184	101	1.47	0.248	0.19	-0.1	-0.01	2.2	-0.1	-0.05	8	-0.5	-0.2
R828294	11c	0.4	253	3.1	77	-0.1	30.2	19	703	4.1	1.4	-0.1	6.5	0.3	24	-0.1	-0.1	-0.1	228	1.14	0.06	4	51	1	37	0.16	38	1.58	0.227	0.24	-0.1	-0.01	4.2	-0.1	-0.05	7	-0.5	-0.2

WASTE ROCK SAMPLES

SAMPLE #	ROCK CODE	Mo	Cu	Pb	Zn	Ag	Ni	Co	Mn	Fe	As	U	Au	Th	Sr	Cd	Sb	Bi	V	Ca	P	La	Cr	Mg	Ba	Ti	B	Al	Na	K	W	Hg	Sc	Tl	S	Ga	Se	Te
		ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	%	ppm	ppm	ppb	ppm	ppm	ppm	ppm	ppm	ppm	%	%	ppm	ppm	%	ppm	%	ppm	%	%	%	ppm	ppm	ppm	ppm	%	ppm	ppm	ppm
R828298	11c	0.3	310	2.2	78	0.1	16.3	13.8	318	3.52	-0.5	-0.1	4.8	0.4	36	-0.1	-0.1	-0.1	245	0.95	0.068	5	32	0.38	29	0.212	-20	1.43	0.264	0.16	-0.1	-0.01	1.8	-0.1	-0.05	7	-0.5	-0.2
R828299	11c	0.4	330	4.4	70	-0.1	14.5	17.1	276	4.28	-0.5	-0.1	12.6	0.4	36	-0.1	-0.1	-0.1	304	1.05	0.085	5	29	0.38	43	0.199	-20	1.46	0.252	0.21	-0.1	-0.01	1.5	-0.1	-0.05	8	-0.5	-0.2
R828300	11c	0.3	272	2.8	54	-0.1	17.6	16.8	231	4.16	-0.5	-0.1	10.1	0.4	27	-0.1	-0.1	-0.1	293	1.04	0.078	5	33	0.46	23	0.169	43	1.42	0.233	0.15	-0.1	-0.01	1.4	-0.1	-0.05	7	-0.5	-0.2
R828301	11c	0.3	292	3.8	60	-0.1	16.9	14.6	270	3.89	-0.5	-0.1	15.1	0.4	29	-0.1	-0.1	-0.1	267	1.01	0.069	4	33	0.49	24	0.165	-20	1.42	0.254	0.17	-0.1	-0.01	1.7	-0.1	-0.05	7	-0.5	-0.2
R828302	11c	0.4	317	2.8	68	0.1	15.2	14.4	285	3.78	-0.5	-0.1	7.7	0.4	36	-0.1	-0.1	-0.1	259	1.09	0.074	4	34	0.45	26	0.195	-20	1.6	0.278	0.16	-0.1	-0.01	1.7	-0.1	-0.05	7	-0.5	-0.2
R828304	11c	0.4	311	2.8	66	-0.1	17.4	14.1	295	3.71	-0.5	-0.1	7.2	0.4	31	-0.1	-0.1	-0.1	258	1.05	0.072	4	34	0.46	29	0.181	49	1.53	0.279	0.16	-0.1	-0.01	2.1	-0.1	-0.05	7	-0.5	-0.2
R828324	11c	0.4	337	1.3	65	-0.1	16.6	14.1	399	3.78	0.5	-0.1	5.5	0.4	32	-0.1	-0.1	-0.1	282	1.07	0.071	5	36	0.59	33	0.19	-20	1.57	0.291	0.17	-0.1	-0.01	2.7	-0.1	-0.05	7	-0.5	-0.2
R828328	11c	0.5	295	8.4	28	0.2	15.2	27	968	6.84	2.7	-0.1	5.9	0.4	8	-0.1	0.1	0.2	142	1.28	0.076	4	8	1.92	11	0.285	28	2.25	0.233	0.09	0.3	-0.01	10.3	-0.1	0.22	13	-0.5	-0.2
R828329	11c	0.4	293	2.4	57	-0.1	22.5	18.3	305	4.36	0.7	-0.1	7.7	0.4	38	-0.1	-0.1	-0.1	295	1.14	0.073	5	30	0.58	31	0.185	-20	1.79	0.301	0.19	-0.1	-0.01	1.8	-0.1	-0.05	8	-0.5	-0.2
R828330	11c	0.4	340	2	64	-0.1	18.1	17.6	307	4.44	-0.5	-0.1	7.5	0.5	46	-0.1	-0.1	-0.1	297	1.46	0.068	5	62	0.46	29	0.205	-20	2.29	0.396	0.18	-0.1	-0.01	2.2	-0.1	-0.05	9	-0.5	-0.2
R828333	11c	0.3	315	1.9	72	-0.1	31.3	19.4	341	4.31	0.5	-0.1	5.8	0.3	33	-0.1	-0.1	-0.1	272	0.93	0.06	4	50	0.66	28	0.186	-20	1.49	0.251	0.17	-0.1	-0.01	1.6	-0.1	-0.05	7	-0.5	-0.2
R828334	11c	0.3	308	2.9	71	-0.1	20.7	17.4	339	4.21	0.7	-0.1	7.7	0.5	44	-0.1	-0.1	-0.1	267	1.14	0.082	5	39	0.55	32	0.185	29	1.7	0.297	0.17	0.1	-0.01	2	-0.1	-0.05	8	-0.5	-0.2
R828335	11c	0.3	354	1.9	60	-0.1	20.8	17.3	302	3.99	0.7	-0.1	8	0.4	48	-0.1	-0.1	-0.1	276	1.17	0.08	4	32	0.48	33	0.203	-20	1.76	0.303	0.18	-0.1	-0.01	1.8	-0.1	-0.05	7	-0.5	-0.2
R828337	11c	0.4	8.6	1	4	0.3	9.4	5.3	33	0.48	6.9	-0.1	1060	-0.1	2	-0.1	-0.1	-0.1	2	0.11	-0	-1	120	0.04	1	0.001	-20	0.06	0.008	-0.01	-0.1	-0.01	0.4	-0.1	0.28	-1	-0.5	-0.2
R828344	11c	0.4	339	13.2	83	-0.1	18.5	16.9	320	4.21	0.7	-0.1	8.6	0.5	46	-0.1	-0.1	-0.1	293	1.19	0.08	5	32	0.47	35	0.193	-20	1.74	0.303	0.17	0.1	-0.01	2	-0.1	-0.05	9	-0.5	-0.2
R828351	11c	0.6	671	11.8	222	0.4	6.3	22.8	852	6.53	0.5	0.1	4.1	0.7	14	0.5	-0.1	-0.1	173	0.85	0.142	9	53	0.41	63	0.185	-20	0.89	0.158	0.4	-0.1	-0.01	3.3	0.1	0.05	11	-0.5	-0.2
R828352	11c	0.5	623	5.9	112	0.2	8.6	22.5	593	6.04	-0.5	0.1	4.4	0.7	16	0.2	-0.1	-0.1	224	0.89	0.133	9	36	0.6	63	0.181	-20	1.02	0.178	0.39	-0.1	-0.01	3.4	-0.1	-0.05	10	-0.5	-0.2
R828358	11c	0.4	287	2	64	0.1	19.7	14.6	252	3.63	0.6	-0.1	10.7	0.5	34	-0.1	-0.1	-0.1	266	1.24	0.071	5	70	0.49	29	0.178	-20	1.72	0.318	0.17	-0.1	-0.01	2.1	-0.1	-0.05	8	-0.5	-0.2
R828360	11c	0.3	277	4	57	0.1	22.2	16	274	4.19	-0.5	-0.1	7.3	0.4	28	0.1	-0.1	-0.1	289	1.26	0.071	4	47	0.86	22	0.187	32	1.59	0.266	0.16	-0.1	-0.01	3.3	-0.1	-0.05	8	-0.5	-0.2
R828361	11c	0.3	262	2	69	-0.1	30.7	17.6	323	3.56	-0.5	-0.1	5.2	0.3	36	-0.1	-0.1	-0.1	262	1.17	0.058	3	50	0.53	23	0.282	-20	1.73	0.327	0.13	-0.1	-0.01	2	-0.1	-0.05	7	-0.5	-0.2
R828362	11c	0.3	279	2.4	81	0.1	39.4	20.9	399	4.02	-0.5	-0.1	6.4	0.3	37	-0.1	-0.1	-0.1	300	1.16	0.059	3	45	0.76	29	0.271	-20	1.74	0.336	0.15	-0.1	-0.01	2.4	-0.1	-0.05	8	-0.5	-0.2
R828363	11c	0.3	374	0.9	57	-0.1	20.3	20.2	364	4.7	-0.5	-0.1	39.4	0.4	25	-0.1	-0.1	-0.1	327	1.11	0.084	5	34	0.98	21	0.191	-20	1.42	0.289	0.16	-0.1	-0.01	6.2	-0.1	-0.05	9	-0.5	-0.2
R828290	12q	0.2	27.1	1.2	9	-0.1	19.4	9.5	385	1.46	15.8	-0.1	363	-0.1	7	-0.1	-0.1	-0.1	9	1.54	0.008	-1	92	0.66	7	0.001	-20	0.25	0.02	0.03	-0.1	-0.01	4.1	-0.1	0.16	-1	-0.5	-0.2
R828291	12q	0.3	35.3	2.1	10	-0.1	21.3	10.4	281	1.4	23.9	-0.1	241	-0.1	8	-0.1	0.1	-0.1	4	1.54	0.005	-1	87	0.47	3	-0	-20	0.1	0.017	0.02	-0.1	-0.01	2.1	-0.1	0.29	-1	-0.5	-0.2
R828320	12q	0.9	26.6	1.4	8	0.6	12.3	11.6	341	1.47	18.6	-0.1	3170	-0.1	6	-0.1	-0.1	-0.1	4	1.11	0.005	-1	88	0.47	2	0.002	-20	0.11	0.02	0.01	-0.1	-0.01	1.8	-0.1	0.82	-1	-0.5	0.2
R828321	12q	0.3	10	2.4	7	-0.1	4.7	4	162	0.35	5.7	-0.1	207	-0.1	5	-0.1	-0.1	-0.1	-2	0.89	-0	-1	96	0.09	1	-0	-20	0.04	0.016	-0.01	-0.1	-0.01	0.4	-0.1	0.14	-1	-0.5	-0.2
R828331	12q	0.3	61.3	0.8	3	0.8	15.9	9.4	111	1.13	21.6	-0.1	4880	-0.1	2	-0.1	-0.1	0.1	4	0.31	0.008	-1	86	0.14	1	0.003	-20	0.1	0.016	0.01	-0.1	-0.01	1.1	-0.1	0.92	-1	-0.5	-0.2
R828332	12q	0.3	9.9	0.8	3	-0.1	3.9	2.5	35	0.38	1.9	-0.1	56.2	-0.1	2	-0.1	-0.1	-0.1	3	0.12	-0	-1	110	0.07	-1	-0	-20	0.07	0.008	-0.01	-0.1	-0.01	0.5	-0.1	0.1	-1	-0.5	-0.2
R828336	12Q	0.5	22.5	2.6	6	0.1	10.6	11.6	60	0.89	12.8	-0.1	330	-0.1	4	-0.1	-0.1	0.1	6	0.27	0.002	-1	178	0.09	3	0.006	-20	0.12	0.019	0.02	-0.1	-0.01	0.8	-0.1	0.54	-1	-0.5	-0.2
R828338	12Q	0.3	233	4.1	47	-0.1	25.3	18.3	292	4.38	0.6	-0.1	7	0.4	38	-0.1	-0.1	-0.1	276	1.29	0.075	5	54	0.96	18	0.189	-20	1.95	0.334	0.14	0.1	-0.01	2	-0.1	-0.05	8	-0.5	-0.2
R828347	12Q	0.4	2.8	2.6	7	-0.1	3.5	0.6	35	0.23	-0.5	-0.1	0.9	-0.1	2	-0.1	-0.1	-0.1	-2	0.12	-0	-1	144	0.02	2	-0	-20	0.03	0.007	-0.01	-0.1	-0.01	0.2	-0.1	-0.05	-1	-0.5	-0.2
R828350	12q	0.4	152	2.1	6	-0.1	9.1	10.5	108	0.92	15.2	-0.1	80.8	-0.1	4	-0.1	-0.1	-0.1	3	0.53	-0	-1	149	0.13	1	-0	-20	0.05	0.01	-0.01	-0.1	-0.01	0.6	-0.1	0.66	-1	-0.5	-0.2
R828356	12q	0.6	127	2.3	7	-0.1	5.5	2.3	232	0.49	2.8	-0.1	117	-0.1	5	-0.1	-0.1	-0.1	2	0.56	0.002	-1	164	0.26	2	0.001	-20	0.05	0.022	-0.01	-0.1	-0.01	0.9	-0.1	0.08	-1	-0.5	-0.2
R828357	12q	0.5	287	1.2	10	0.3	9.6	10.8	395	2.3	10.9	-0.1	1530	-0.1	6	-0.1	-0.1	-0.1	10	1.3	0.017	1	133	0.65	3	-0	-20	0.58	0.026	0.03	-0.1	-0.01	3.9	-0.1	0.36	2	-0.5	-0.2

1a = mafic metavolcanic, 1as = altered mafic metavolcanic, 11c = diabase, 12q = quartz vein

Attachment 4– Laboratory Results – Shake Flask Extraction Results

WASTE ROCK SAMPLES

SAMPLE #	LOGIC DESCRIPT	Sample Weight	Volume Used	pH	EC	SO4	Acidity to pH4.5	Acidity to pH8.3	Total Alkalinity	Bicarbonate	Carbonate	Hydroxide
	ROCK CODE	g	ml	pH Units	uS/cm	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
R828279	1a	250	750	9.67	732	16.7	-0.5	-0.5	46	45	5.4	-0.5
S332958	1a	250	750	8.37	627	1.2	-0.5	0.7	16	19	-0.5	-0.5
S332979	1a	250	750	8.42	626	3.4	-0.5	1.2	30	37	-0.5	-0.5
S332999	1a	250	750	9.24	145	4.3	-0.5	-0.5	26	32	-0.5	-0.5
S333000	1a	250	750	8.46	1670	11.1	-0.5	1.5	13	16	-0.5	-0.5
R828265	12q	250	750	8.63	333	5.7	-0.5	-0.5	14	17	-0.5	-0.5
R828312	12q	250	750	8.9	124	5.6	-0.5	-0.5	16	19	-0.5	-0.5
R828342	12q	250	750	8.54	400	3.9	-0.5	-0.5	23	28	-0.5	-0.5

SAMPLE #	LOGIC DESCRIPT	Dissolved Chloride	Nitrate-N	Nitrate	Nitrite-N	Total Ammonia	Total Dissolved Solids	Hardness CaCO3
	ROCK CODE	mg/L	mg/L	mg NO3/L	mg/L	mg/L	mg/L	mg/L
R828279	1a	188	1.2	5.316	0.08	0.739	350	9.63
S332958	1a	176	3.2	14.176	0.05	2.69	340	211
S332979	1a	170	5.7	25.251	-0.05	4.36	390	211
S332999	1a	25.6	1.3	5.759	-0.05	0.94	72	25.4
S333000	1a	656	5.1	22.593	-0.05	3.16	1100	397
R828265	12q	106	0.5	2.215	-0.05	0.318	210	125
R828312	12q	19.9	2	8.86	-0.05	0.793	60	33.9
R828342	12q	131	1.2	5.316	-0.05	0.956	250	142

SAMPLE #	GEOLOGIC DESCRIPTION	Dissolved Aluminum (Al)	Dissolved Antimony (Sb)	Dissolved Arsenic (As)	Dissolved Barium (Ba)	Dissolved Beryllium (Be)	Dissolved Bismuth (Bi)	Dissolved Boron (B)	Dissolved Cesium (Cs)	Dissolved Cadmium (Cd)	Dissolved Calcium (Ca)	Dissolved Chromium (Cr)
	ROCK CODE	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
R828279	1a	0.204	0.00021	0.00108	0.00592	-0.00001	-0.000005	0.159	0.000055	-0.000005	2.55	-0.0001
S332958	1a	0.348	0.000098	0.000033	0.00419	-0.00001	-0.000005	0.07	0.00133	-0.000005	76.2	-0.0001
S332979	1a	0.245	0.000254	0.000463	0.00292	-0.00001	-0.000005	-0.05	0.000408	-0.000005	71.9	-0.0001
S332999	1a	0.508	0.000271	0.000099	0.000499	-0.00001	-0.000005	-0.05	0.000187	-0.000005	7.9	-0.0001
S333000	1a	0.097	0.000229	0.000144	0.0331	-0.00001	-0.000005	0.093	0.000802	-0.000005	137	-0.0001
R828265	12q	0.164	0.000519	0.000214	0.00321	-0.00001	-0.000005	-0.05	0.000073	-0.000005	44.2	0.00019
R828312	12q	0.185	0.000501	0.00124	0.00201	-0.00001	-0.000005	-0.05	0.000066	-0.000005	11.5	0.00032
R828342	12q	0.135	0.00047	0.00029	0.00172	-0.00001	-0.000005	-0.05	0.000146	-0.000005	50.1	-0.0001

SAMPLE #	GEOLOGIC DESCRIPTION	Dissolved Cobalt (Co)	Dissolved Copper (Cu)	Dissolved Lanthanum (La)	Dissolved Iron (Fe)	Dissolved Lead (Pb)	Dissolved Lithium (Li)	Dissolved Magnesium (Mg)	Dissolved Manganese (Mn)	Dissolved Phosphorus (P)	Dissolved Molybdenum (Mo)	Dissolved Nickel (Ni)
	ROCK CODE	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
R828279	1a	0.000054	0.000058	-0.00005	0.0343	0.000038	0.00348	0.792	0.00169	0.0053	0.000491	-0.00002
S332958	1a	0.000022	-0.00005	-0.00005	0.0056	0.000031	0.00177	5.14	0.00371	-0.002	0.00031	0.000055
S332979	1a	0.000046	-0.00005	-0.00005	0.0123	0.000023	0.00292	7.53	0.0131	-0.002	0.000265	0.000079
S332999	1a	0.000036	-0.00005	-0.00005	0.0064	0.00001	0.00104	1.38	0.000756	0.0053	0.000189	0.000025
S333000	1a	0.000086	-0.00005	-0.00005	0.0063	0.000018	0.00547	13.1	0.00888	0.005	0.00101	0.000045
R828265	12q	0.00008	0.000193	-0.00005	0.0852	0.00005	0.00955	3.44	0.0188	0.0036	0.001	0.000134
R828312	12q	0.000212	0.000092	-0.00005	0.181	0.000635	0.0014	1.26	0.00631	0.0056	0.00046	0.000095
R828342	12q	0.000099	-0.00005	-0.00005	0.0032	0.000295	0.00245	4.17	0.0264	-0.002	0.000885	0.00018

SAMPLE #	GEOLOGIC DESCRIPTION	Dissolved Potassium (K)	Dissolved Rubidium (Rb)	Dissolved Selenium (Se)	Dissolved Silicon (Si)	Dissolved Silver (Ag)	Dissolved Sodium (Na)	Dissolved Strontium (Sr)	Dissolved Sulphur (S)	Dissolved Tellurium (Te)	Dissolved Thallium (Tl)	Dissolved Thorium (Th)
	ROCK CODE	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
R828279	1a	5.48	0.00436	0.00038	1.86	-0.000005	132	0.0117	-10	-0.00002	0.000004	-0.000005
S332958	1a	2.42	0.0109	-0.00004	0.41	-0.000005	18.1	0.163	-10	-0.00002	0.000009	-0.000005
S332979	1a	7.58	0.0137	0.000109	0.46	-0.000005	20	0.113	-10	-0.00002	0.000018	-0.000005
S332999	1a	1.7	0.00398	0.000142	0.57	-0.000005	16.9	0.0175	-10	-0.00002	0.000004	-0.000005
S333000	1a	13.5	0.0197	0.000105	0.78	-0.000005	189	0.278	-10	-0.00002	0.000013	-0.000005
R828265	12q	2.49	0.0032	0.000321	0.75	0.000015	10.6	0.177	-10	-0.00002	0.000015	-0.000005
R828312	12q	1.14	0.00266	0.000149	1.7	0.000022	7.33	0.0256	-10	-0.00002	0.000007	-0.000005
R828342	12q	4.52	0.00671	0.000242	0.48	0.000007	14.7	0.0795	-10	-0.00002	0.000031	-0.000005

SAMPLE #	GEOLOGIC DESCRIPTION	Dissolved Tin (Sn)	Dissolved Titanium (Ti)	Dissolved Tungsten (W)	Dissolved Uranium (U)	Dissolved Vanadium (V)	Dissolved Zinc (Zn)	Dissolved Zirconium (Zr)	Dissolved Mercury (Hg)
	ROCK CODE	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
R828279	1a	-0.0002	0.00105	0.000431	-0.000002	0.0185	-0.0001	-0.0001	-0.00005
S332958	1a	-0.0002	-0.0005	0.000063	0.000003	-0.0002	0.00034	-0.0001	-0.00005
S332999	1a	-0.0002	-0.0005	0.00006	-0.000002	0.00065	-0.0001	-0.0001	-0.00005
S333000	1a	-0.0002	-0.0005	0.000327	0.00001	0.00044	0.00011	-0.0001	-0.00005
R828265	12q	-0.0002	-0.0005	0.000492	0.000007	0.00026	0.00019	-0.0001	-0.00005
R828312	12q	-0.0002	0.00239	0.00122	0.000009	0.00093	0.0002	0.00032	-0.00005
R828342	12q	-0.0002	-0.0005	0.000252	0.000031	-0.0002	-0.0001	-0.0001	-0.00005

1a = mafic metavolcanic, 1as = altered mafic metavolcanic, 11c = diabase, 12q = quartz vein

Appendix C – 2016 Doris Waste Rock, Ore and Infrastructure Seep Monitoring

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Memo

To:	Shelley Potter, TMAC	**Client:**	TMAC Resources Inc.
From:	Eduardo Marquez Lisa Barazzuol	**Project No:**	1CT022.009
Cc:	Oliver Curran, TMAC John Roberts, TMAC	**Date:**	March 27, 2017
Subject:	2016 Doris Waste Rock, Ore and Infrastructure Seep Monitoring		

1 Introduction

In 2015, TMAC Resources re-initiated mining and construction activities at Doris. Prior to this, mining and quarry development had stopped in 2011 and 2012, respectively. As part of the verification, monitoring and management plans for the Hope Bay Project (the Project), TMAC monitors seepage downstream of the Doris North infrastructure, pads, roads, and waste rock. SRK has been tasked with the completion of the seep surveys and annual reports from 2009 to 2016, except for 2015, when TMAC conducted the sampling. Seepage monitoring of waste rock was last conducted in 2015 (SRK 2016) and quarry rock in 2014 (SRK 2015).

This report presents the results of the 2016 freshet seep survey. The 2016 seepage program was completed in accordance with conditions outlined in Part D "Conditions applying to Construction and Operations" Item 20 of Water Licence 2AM-DOH1323 Amendment No. 1(Nunavut Water Board 2016), *the Quarry A, B & D Management and Monitoring Plan, Revision 01* (SRK 2010)[1] and the Waste Rock and Ore Management Plan, Hope Bay Project, Nunavut (TMAC 2016).

This memo presents the results of the 2016 freshet seep survey and complies with Item 21 of the Water Licence cited above. It includes seepage monitoring of the waste rock stockpiles and infrastructure constructed between fall of 2015 to mid-2016 using Quarry 2 rock, including:

- Tailings Impoundment Area (TIA) access road up to the dyke access,
- Airstrip expansion,
- Pad T expansion,
- Mill pad expansion, and
- Temporary explosives berm by the North Dam.

[1] Update submitted to NWB in February 2017.

2 Methods

2.1 Seep Survey and Sample Collection

The seep survey was carried out between June 11 and June 16, 2016 by SRK Consulting. Seep survey locations were established opportunistically by walking the toes of the waste rock stockpile, infrastructure, roadways, building pads, and berms (Attachment A). Additionally, three reference points in the tundra, not subject to mine influences, were sampled. The samples used as reference points were collected at approximately the same points as the 2010-2014 seep surveys (in the vicinity of the Doris-Windy Road, Attachment A).

Field measurements were taken at all locations where water was observed flowing into and out of construction rock material including seeps where precipitation runoff and snowmelt came into contact with rock along the roadways, building pads and berms. Electrical conductivity (EC), pH, temperature, oxidation-reduction potential (ORP) and flow rates (where possible) were measured at each of these locations at the time of monitoring. The toe of the waste rock stockpile was surveyed for seepage, however none was observed.

A total of 14 seepage sites and 3 reference sites were established. As per the water license, a minimum of 10% of the total sample set, including any sites with elevated conductivity, were submitted to a laboratory for an extended analytical suite. A total of 13 samples were collected and analyzed. In addition, one duplicate sample and one field blank was collected and submitted for laboratory analysis, and one travel blank was included in sample shipments as part of SRK's quality assurance/quality control (QA/QC) program.

2.2 Laboratory Analysis

Fifteen samples, including a duplicate and field blank, were collected by SRK and submitted to ALS Environmental Labs in Vancouver, BC where they were analyzed for pH, conductivity, sulphate, acidity, alkalinity, chloride, fluoride, nitrate, nitrite, phosphorus, ammonia, total dissolved solids (TDS), total suspended solids (TSS) and low level dissolved metals including mercury and selenium. All samples were filtered and preserved in the field, as required.

2.3 Quality Assurance

QA/QC review of all data was conducted by SRK and deemed overall acceptable with some minor concerns over the data quality. As mentioned before, a field duplicate, field blank and travel blank were collected.

Ion balances ranged from -3.3 to 7.7% for the seep samples. These were deemed acceptable as they comply with SRK's criteria of ±10%.

Most of the field blank parameters were below detection limits indicating that appropriate field filtration and sampling methods were employed. The exception to this was barium which was equivalent to 10 times the detection limit. Barium was re-analyzed and the elevated concentration

was confirmed. This concentration was at least an order of magnitude lower than the measured concentrations in the seep samples.

The field duplicate results were within ±27% relative percent difference (RPD) for all parameters with measured concentrations above ten times the detection limit, except for acidity, nitrate and zinc concentrations. The percentage RPDs for acidity, nitrate and zinc were 190%, -68% and 170%, respectively. It was unclear why acidity was relatively high in the original sample 16-AIRSTR-02 (130 mg/L as $CaCO_3$) relative to the duplicate 16-AIRSTR-03 (3.3 mg/L as $CaCO_3$) despite having the same pH (7.6) and similar concentrations of major and trace elements (with the exception of zinc and nitrate). This likely reflects an analytical error. Within the duplicate pair, zinc and nitrate concentrations were below ten times the detection limit (and within analytical uncertainty) in one sample and slightly above ten times the detection limit in the other. This could indicate natural variability in zinc within the seeps or be analytical error. Variability of zinc concentrations in field duplicates has been documented previously (SRK 2015).

In addition, laboratory and field values of pH and electric conductivity (EC) were compared, as well as total dissolved solids (TDS) and lab conductivity. Conductivity values were near parity for all samples except 16-AIRSTR-02 which had a considerably higher field EC relative to the lab EC. The sample's conductivity was re-measured in the lab and the value was confirmed. Values of pH were slightly higher in the lab than in the field for all samples. For all samples, TDS demonstrated a strong positive correlation with lab conductivity.

3 Results and Discussion

Attachment A presents maps of the seepage sample locations. The proposed alignment of the airstrip, TIA access road and Pad T are presented in Attachment A as the as-built drawings were not available. Compared to previous years, there were fewer seepage sites observed due to peak freshet occurring earlier than the seepage survey. Seepage was not observed at the temporary explosives berm (Figure 2) or within the waste rock stockpile. Pad T and the mill pad are within the Doris mine area, therefore contact water from these areas were sampled downstream of the pollution control pond (Figure 4). The majority of the contact water that bypasses the pollution control pond is collected at collection sumps downstream. A complete set of field observations and measurements is provided in Attachment B. Attachment C contains the laboratory water chemistry results.

3.1 Field Measurements

- The maps presented in Attachment A include information on electric conductivity values and pH measured in the field. The field data are summarized as follows (Table 1):
- The pH at all sites was neutral to near-neutral (6.8 to 7.9).
- The sample collected within the Waste Rock Influenced Area (16-DC-02) had the highest level of conductivity (6,800 µS/cm). This sample was collected from the berm downstream of Pad G.

- An additional sample with a high EC value was 16-TLA-02 (1,400 µS/cm), which was collected along the TIA access road. The conductivity of the other seepage sample collected along the TIA access road was 390 µS/cm (mean 910 µS/cm).
- The mean conductivity of the samples collected along the airstrip was 370 µS/cm, while the mean value of the reference samples was 240 µS/cm. The reference points were measured as representative of conditions outside the influence of mining operations.

Table 1: Mean Values for Field Conductivity and pH Measurements

Site Area	No. of Samples	Conductivity (µS/cm)	pH
		Mean[1]	
Waste Rock Influenced Area	1	6800	7.9
Tail Access Road	2	910	7.7
Airstrip	13	370	7.6
Reference Points	3	240	7.2

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[1]Statistic could not be calculated based on the one sample taken at the Waste Rock Influenced area.

3.2 Laboratory Data

A summary of water quality analyses for the 2016 seep samples is presented Table 2. The samples were collected in areas where Quarry 2 rock had been placed up until the time of the survey. Complete results are presented in Attachment C. All parameters were compared to the CCME water quality guidelines for the protection of aquatic life to screen for elevated parameters (dissolved). Comparisons to these criteria were used solely for screening purposes and are not directly applicable because the seep locations do not support aquatic life.

3.2.1 Windy Road Area (Reference)

Consistent with previous years, three reference samples were taken in the Windy Road area and submitted for laboratory analysis (Table 2). The lab pH values ranged from 7.5 to 8.0, while lab electric conductivity was measured between 70 and 230 µS/cm. None of the parameter concentrations listed in Table 2 were above the guideline.

3.2.2 Waste Rock Influenced Area

One sample from the Waste Rock Influenced Area (WRIA) in the Doris Camp was submitted for laboratory analysis (Table 2). Lab pH for this samples was 7.8. Relative to the CCME guidelines, the sample contained elevated concentrations for total ammonia, chloride, nitrate, arsenic, copper, and selenium. Total ammonia concentration for this sample was almost four times as high as the guideline value, chloride was almost 20 times as high, nitrate was almost 40 times as high, while arsenic, copper and selenium were between two to four times their respective guidelines. The sulphate concentration, which indicates the occurrence of sulphide oxidation was low (170 mg/L).

Table 2: Summary of Laboratory Results of 2016 Seep Samples

Area	Sample ID	Field pH	Lab pH	Field EC	Lab EC	ORP	Total Hardness	TDS	Total Ammonia	Cl	NO_3	SO_4	Al	As	Cd	Cu	Fe	Pb	Hg	Ni	Se	Tl	Zn
		s.u.	s.u.	µS/cm	µS/cm	mV	mg $CaCO_3$/L	mg/L	mg N/L	mg/L	mg N/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
	CCME guideline*	*6.5-9*	*6.5-9*	-	-	-	-	-	*4***	*120 mg/L*	*3 mg N/L*	-	*0.1*	*0.005*	*0.00037****	*0.004****	*0.3*	*0.007****	*0.000026*	*0.15****	*0.001*	*0.0008*	*0.03*
Reference (Windy Road)	16-REF-001	6.8	7.5	82	70	150	27	35	0.0069	6.9	<0.0050	<0.30	0.052	0.0002	<0.0000050	0.00088	0.18	<0.000050	<0.0000050	0.0026	<0.000050	<0.000010	0.0044
	16-REF-002	7.3	8.0	370	230	80	93	120	0.009	28	<0.0050	0.74	0.019	0.00031	<0.0000050	0.0013	0.097	<0.000050	<0.0000050	0.0027	0.000064	<0.000010	0.002
	16-REF-003	7.3	7.9	250	190	63	52	96	0.0052	29	<0.0050	3.6	0.02	0.00011	<0.0000050	0.00091	0.12	<0.000050	<0.0000050	<0.00050	<0.000050	<0.000010	0.0022
Waste Rock Influenced Area	16-DC-02	7.9	7.8	6800	7400	180	2000	4300	**38**	**2100**	**110**	170	0.0095	**0.0091**	0.00022	**0.011**	0.047	<0.00025	<0.0000050	0.0066	**0.0039**	0.00012	<0.0050
TIA Access Road	16-TLA-01	7.5	7.5	390	350	150	170	190	0.0098	39	0.03	1.3	0.072	0.00025	0.000011	0.0028	0.19	<0.000050	0.0000054	0.0034	<0.000050	<0.000010	0.0048
	16-TLA-02	7.9	8.0	1400	1300	150	180	740	**14**	**190**	**51**	16	**0.14**	0.00067	0.000024	**0.0077**	0.14	0.00024	0.000007	0.002	0.00048	0.000057	0.0024
Airstrip	16-AIRSTR-01	7.4	7.6	670	630	110	220	370	0.017	48	<0.0050	25	0.022	0.0011	<0.0000050	0.0021	**0.39**	<0.000050	<0.0000050	0.0018	0.00013	<0.000010	0.0029
	16-AIRSTR-02	7.2	7.6	120	650	29	250	370	0.048	50	<0.0050	21	0.044	0.0017	0.0000065	0.0026	**4.1**	0.000077	0.0000059	0.0029	0.00013	<0.000010	0.015
	16-AIRSTR-03	7.2	7.6	120	630	29	240	360	0.057	48	0.01	22	0.05	0.0016	<0.0000050	0.003	**3.2**	0.000079	<0.0000050	0.0024	0.00016	<0.000010	0.0013
	16-AIRSTR-05	7.7	8.0	530	500	130	190	270	0.05	54	**3.4**	16	0.0079	0.00041	0.0000076	**0.0061**	0.06	<0.000050	<0.0000050	0.0015	0.00031	<0.000010	0.0028
	16-AIRSTR-06	7.7	8.0	470	440	130	170	240	0.015	42	2.9	16	0.0089	0.00042	0.0000066	**0.0069**	0.029	<0.000050	<0.0000050	0.0018	0.00033	<0.000010	0.0052
	16-AIRSTR-07	7.7	8.3	490	440	130	170	250	0.011	42	**3.2**	17	0.0057	0.00053	0.0000061	**0.0071**	0.027	<0.000050	<0.0000050	0.0013	0.0004	<0.000010	0.005
	16-AIRSTR-12	7.7	8.2	340	300	18	100	160	0.34	32	1.6	7.9	0.013	0.00033	<0.0000050	0.0019	0.1	<0.000050	<0.0000050	0.0015	0.000094	<0.000010	<0.0010

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*Comparisons to CCME water quality guidelines for the protection of aquatic life are intended for screening purposes and are not directly applicable because the seepage sites do not support aquatic life.

Values in bold indicates value exceeds respective water quality guideline for the parameter.

**Guideline for ammonia is pH and temperature dependent. Seepage waters had an average temperature of 5.2ºC at time of sampling and an average pH of 7.6. This guideline value is approximate.

***Guideline calculated based on the average hardness of the seepage samples of 330 mg $CaCO_3$ mg/L

3.2.3 TIA Access Road Area

Two samples from the TIA access road area were submitted for laboratory analysis (Table 2). The pH values for these samples were 7.5 and 8.0. As previously mentioned, electric conductivity of sample 16-TLA-02 was relatively high compared to most other samples collected in 2016, with the exception of the sample from the WRIA. Concentrations of most parameters listed in Table 2 were higher in sample 16-TLA-02 compared to sample 16-TLA-01. Chloride levels in sample 16-TLA-02 are about 60% higher than the CCME guideline. TMAC confirmed that calcium chloride drilling brines are not used in the quarries and that all construction rock was sourced from Quarry 2. Therefore, the source of chloride in sample 16-TLA-02 is undefined. Ammonia and nitrate concentrations in sample 16-TLA-02 are 3.5 and 17 times higher than the CCME guidelines, respectively and indicate flushing of ammonia-based explosives residues. Aluminum and copper concentrations at 16-TLA-02 are slightly above and the same order of magnitude of the respective guidelines. Sulphate concentrations were low (<20 mg/L).

3.2.4 Airstrip Area

Seven samples from the Airstrip area were submitted for laboratory analysis (Table 2). The pH values ranged from 7.6 to 8.3. Conductivity ranged between 300 to 650 µS/cm. Sulphate concentrations were low (<30 mg/L). Nitrate, copper and iron concentrations for two to three samples (depending on parameter) were slightly above but the same order of magnitude as their respective CCME guideline.

3.3 Comparison to Previous Surveys

Samples collected in 2016 were compared to samples collected in 2015, or 2014 if these were not available, from the similar seepage sites. This was done in order to assess the geochemical evolution of seepage in the Waste Rock Influenced Area and the reference points. The values are presented in Table 3. Samples from the TIA Access Road area were not available for comparison since infrastructure did not exist in this area prior to 2016. No comparable samples were taken at the Airstrip in 2014 and 2015.

3.3.1 Windy Road Area (Reference)

All samples collected at reference sites in 2016 showed similar concentrations to those observed in 2014, generally within two times of the concentrations reported in 2014.

3.3.2 Waste Rock Influenced Area

Consistent with previous years, conductivity, ammonia, nitrate and chloride concentrations indicated flushing of salts from drilling brines and explosives residues from the waste rock stockpile. Electric conductivity, total dissolved solids (TDS), and chloride concentrations in 2016 were between four to 19 times higher than the previous two years, and nitrate was up to 30 times higher than in 2015. The increase of these parameters reflects the re-initiation of mining and placement of new waste rock on surface. Sulphate levels were low (170 mg/L) and slightly higher than in previous years. In the absence of primary sulphate minerals, sulphate concentrations indicate flushing of secondary minerals generated by sulphide oxidation within the pile.

Arsenic and selenium concentrations in 2016 were approximately seven times higher, and up to 14 times higher in the case of selenium, than levels in 2014 and 2015 whereas copper levels were about twice as high.

Peak freshet occurred prior to the seepage survey. An increase in the loading of chloride, nitrate and ammonia is expected after placement of new waste rock in the stockpile, however it is possible that occurrence of freshet prior to the seepage survey resulted in lower flows at the time of sample collection, resulting in higher arsenic, copper and selenium concentrations. Further monitoring will establish trends in these parameter concentrations.

Table 3: Comparison of Water Quality Results from Samples Taken at the Same Location in 2014, 2015 and 2016

Seepage Site	Year	Sample ID	pH	EC	Total Hardness	Total Dissolved Solids	Total Ammonia	Chloride	Nitrate (as N)	Sulfate	Aluminum	Antimony	Arsenic	Cadmium	Copper	Iron	Lead	Manganese	Molybdenum	Nickel	Selenium	Uranium	Zinc
REF-001	2016	16-REF-001	7.5	70	27	35	0.0069	6.9	<0.0050	<0.30	0.052	<0.00010	0.0002	<0.0000050	0.00088	0.18	<0.000050	0.0016	0.00023	0.0026	<0.000050	0.00002	0.0044
	2014	14-REF-001	8.1	54	21	58	<0.005	4	<0.005	<0.5	0.051	<0.0001	0.00014	<0.00001	0.0014	0.14	<0.00005	0.00051	0.00016	0.0022	<0.0001	0.000014	0.0046
REF-002	2016	16-REF-002	8	230	93	120	0.009	28	<0.0050	0.74	0.019	<0.00010	0.00031	<0.0000050	0.0013	0.097	<0.000050	0.0019	0.00017	0.0027	0.000064	0.000027	0.002
	2014	14-REF-002	7.9	100	31	74	<0.005	17	0.0053	2.9	0.018	<0.0001	<0.0001	<0.00001	0.0009	0.04	<0.00005	0.0005	0.00008	0.001	<0.0001	<0.00001	0.0027
REF-003	2016	16-REF-003	7.9	190	52	96	0.0052	29	<0.0050	3.6	0.02	<0.00010	0.00011	<0.0000050	0.00091	0.12	<0.000050	0.0074	<0.000050	<0.00050	<0.000050	<0.000010	0.0022
	2014	14-REF-003	8	70	26	48	<0.005	5.9	<0.005	2.1	0.013	<0.0001	<0.0001	0.00002	0.0012	0.032	<0.00005	0.0015	<0.00005	<0.0005	<0.0001	<0.00001	0.0014
DC-02/ DC-08	2016	16-DC-02	7.8	7400	2000	4300	38	2100	110	170	0.0095	<0.00050	0.0091	0.00022	0.011	0.047	<0.00025	0.17	0.0055	0.0066	0.0039	0.0022	<0.0050
	2015	15-DC-08	7.9	510	140	330	1.3	110	3.6	12	0.032	0.00018	0.0011	0.0000072	0.0066	0.025	<0.00005	0.064	0.00077	0.00062	0.00027	0.00025	0.0012
	2014	14-DC-08	7.9	1700	310	910	2.5	490	5.1	43	0.017	0.00029	0.0014	0.000022	0.0049	0.084	<0.00005	0.056	0.0038	0.0011	0.00054	0.00053	0.0012

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Notes:

All metal concentrations are dissolved.

4 Conclusions and Recommendations

The scope of the 2016 Hope Bay seep monitoring survey included the airstrip expansion, Pad T expansion, mill pad reconstruction, temporary explosives berm by the North dam, the TIA access road up to the dyke access, the downstream area of the waste rock pile (also referred to as the waste rock influenced area) and the toe of the waste rock stockpile (e.g. within the stockpile). These sites represented areas affected by placement of waste rock and Quarry 2 rock in 2015 to mid-2016. Seepage samples were taken in all areas except downstream of the temporary explosives berm and within the waste rock stockpile. SRK recommends that the temporary explosives berm be inspected for seepage in 2017.

The results of the 2016 sampling program indicate that there are no major issues with respect to metal leaching and acid rock drainage in seepage associated with infrastructure at Hope Bay. Seepage from areas impacted by waste rock had elevated levels of ammonia, chloride, nitrate, arsenic, copper and selenium concentrations in comparison to seeps from the infrastructure areas. Chloride levels are attributed to flushing of drilling brines and nitrate and ammonia levels to blasting residues from the waste rock. It is possible that occurrence of freshet prior to the seepage survey resulted in lower flows at the time of sample collection, resulting in higher concentrations, particularly for arsenic, copper and selenium. Further monitoring will establish trends in these parameter concentrations. The majority of this seepage is captured in the water management system implemented at Doris and directed to the TIA.

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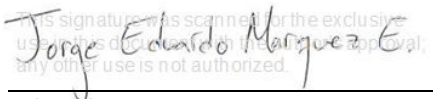

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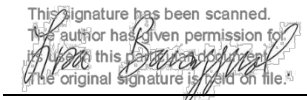
Reviewed by:



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5 References

Nunavut Water Board (2016) Water Licence No. 2AM-DOH1323 – Amendment No. 1. Issued on November 4, 2016.

SRK (2010). *Quarry A, B & D Management and Monitoring Plan, Revision 01*. Technical report prepared for Hope Bay Mining Ltd. by SRK, April 2010.

SRK (2015) 2014 Hope Bay Seepage Monitoring Program. Prepared for TMAC Resources. SRK Project No. 1CT022.001. March 2015.

SRK (2016) 2015 Doris Waste Rock and Ore Seep Monitoring. Prepared for TMAC Resources. SRK Project No. 1CT022.009. April 2016.

TMAC 2016. Waste Rock and Ore Management Plan, Hope Bay Project, Nunavut. Prepared by TMAC Resources, August 2016

Attachment A – Maps of 2016 Sampling Locations