MEMORANDUM

File:	**2015-QIA**
To:	**Qikiqtani Inuit Association**
Attention:	**Stephen Williamson Bathory, Director of Major Projects (QIA)**
Subject:	**2016 Comprehensive Security Estimate, Update**
Author:	**Jamie VanGulck, Ph.D., P.Eng.** **Colin Lussier-Purdy, M.Sc.**
Page Total:	**11 + Appendices**
Date:	**January 8, 2016**

At the request of the Qikiqtani Inuit Association (QIA), ARKTIS Solutions Inc. (ARKTIS) submits this *Memorandum* that provides an update to the 2016 Comprehensive Security Estimate,[1] as a result of new information provided during the 2016 Annual Security Review (ASR) for Baffinland Iron Mines Corporation's (BIMC) Mary River Project (Project).

This *Memorandum* is organized as follows:

1. Updates to Security Estimate
2. Outstanding Differences with BIMC's Security Estimate
3. Recommended Future Tasks
4. Summary

Should you have any questions about the contents herein, please contact Dr. Jamie VanGulck, P.Eng. at 867.446.4129 / vangulck@arktissolutions.com.

[1] ARKTIS (2015) Baffinland Iron Mines Corporation, Mary River Project, QIA 2016 Comprehensive Security Estimate Report. December 2, 2015.

1.0 UPDATES TO SECURITY ESTIMATE

The sections below describe changes made to the reclamation security estimate since the December 2, 2015, filing.

1.1 Explosives and Ammonium Nitrate

On December 13, 2015,[1] BIMC provided updated quantities (Table 1) for pre-packaged explosives and ammonium nitrate (AN) using the expected peak inventory on site, which will occur at the end of December 2015. BIMC also changed the unit rate for offsite disposal of AN from the unit rate of $2.37/kg for disposal of explosives to $358/m^3 for disposal of hazardous materials. BIMC has provided the rationale that AN is labelled under the Transport and Dangerous Goods (TDG) Regulations as UN1942 or UN2067 and Class 5.1 (Oxidizer); not as explosives. The QIA has confirmed this rationale after review of the TDG Regulations and finds it acceptable.

The QIA has updated the reclamation security estimate to reflect the increased quantities for pre-packaged explosives and AN, as well as the new unit rate for disposal of AN. **As a result of these changes, the security estimate has decreased by $2,756,000.**

Table 1. Updates to the reclamation security costs for explosives and AN.

Item	Quantity (kg)		Unit Rate		Total ($)		Difference ($)
	BIMC	QIA	BIMC	QIA	BIMC	QIA	
Pre-packaged Explosives	716,519	716,519	$2.37/kg	$2.37/kg	$1,698,150	$1,698,150	$0
Ammonium Nitrate[1]	1,874,000 (2,343 m^3)	1,874,000 (2,343 m^3)	$358/m^3	$358/m^3	$838,615	$838,615	$0
				TOTAL	**$2,537,000**	**$2,537,000**	**$0**

Notes:
[1] Assume Bulk Density of 800 kg/m^3 as listed in the Dyno Nobel technical specifications.[2]

1.2 Tote Road on Crown Land

As outlined in Indigenous and Northern Affairs Canada's (INAC) 2016 security estimate and discussed during the 2016 ASR Teleconference,[3] approximately 7 km of the Tote Road is on Crown Land. Rather than allocating a percentage of the reclamation cost for the total Tote Road to this section as done by INAC, the QIA has completed a more detailed review (Appendix A).

The QIA has updated the reclamation security estimate to reflect the section of the Tote Road located on Crown Land. 0.5 bridges, 0.5 container crossings, and 16 culverts were removed from the QIA security estimate for IOL, resulting in a $156,100 reduction in Direct Costs (Table 2).

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[1] BIMC December 13, 2015, email to the QIA titled, "Baffinland Iron Mines Corporation – Supplementary Information."

[2] Dyno Nobel (n.d.) Ammonium Nitrate, Industrial Grade, Technical Information.

[3] December 17, 2015, 2016 ASR Teleconference for BIMC's Mary River Project, between the NWB, QIA, BIMC and INAC.

Table 2. Items removed from the reclamation security costs to account for the section of Tote Road on Crown Land.

Item	Quantity (No.)	Unit Rate	Total ($)
Bridges	0.5	$251,552.72	$125,800
Container Crossings[1]	6	$2,437.53	$15,700
Culverts	16	$978.78	$14,600
		TOTAL	**$156,100**

Notes:
[1] KM 62 Container Crossing has an estimated 12 sea cans based on aerial photos. Quantity is based on number of sea cans.

1.3 Heavy Equipment

The 2016 Comprehensive Security Estimate provided on December 2, 2015, contained an error in the number of pieces of Heavy Equipment to be removed from the security estimate with the adoption of BIMC's SAP Mechanical Equipment List.

The QIA has updated the reclamation security estimate with the correction to the quantity in Heavy Equipment (Table 3). As a result of these changes, the security estimate has increased by $1,132,300.

Table 3. Summary of the correction to the net quantity of Heavy Equipment in the security estimate with the adoption of BIMC's Mechanical Equipment List.

Item	Quantity (No.)	Unit Rate	Total ($)
Heavy Equipment (December 2, 2015)	-56	$41,937.03	-$2,348,500
Heavy Equipment (January 6, 2016)	-29	$41,937.03	-$1,216,200
		DIFFERENCE	**$1,132,300**

1.4 Changes to Indirect Costs as a Result of Updates

As a result to the reductions in the security estimate associated with the Tote Road on Crown Land, the following Indirect Costs have been reduced:

- Mobilization of Workers Required for Reclamation
- Worker Accommodation & Camp Operations
- Mobilization and Demobilization of Equipment and Materials by Sealift
- Fuel for Reclamation Mobile Equipment
- Engineering Fees
- Supervision, Project Management & Contract Administration
- Contingency

2.0 OUTSTANDING DIFFERENCE WITH BIMC'S SECURITY ESTIMATE

The following section discusses differences between BIMC's and the QIA's security estimates that remain outstanding.

2.1 Grade & Recontour

Grade and recontour costs in BIMC's and the QIA's security estimates differ by over $1 million, which can be attributed to the following items:

- Abandoned Tote Road alignments.
- Large road cuts along the Tote Road to reduce post-closure health and safety concerns.
- Unidentified disturbed areas along the Tote Road
- Unidentified high priority disturbed areas along the Tote Road

The QIA has completed an initial examination of the Tote Road survey data provided by BIMC,[4,5] however it is the QIA's position that as-built drawings of the upgraded Tote Road be provided.

Additionally, the QIA notes that BIMC has not included a line item for proposed 2016 upgrades to the Tote Road or large road cuts along the Tote Road.

The QIA's and BIMC's security estimates have a large difference in the updated area for unidentified disturbed areas along the Tote Road. Both BIMC and the QIA have updated the areas based on the same 2015 Tetra Tech EBA report.[6] Where the QIA has used the same methods as established in 2014 by BIMC and the QIA, which includes doubling the number of borrow sources to account for those not listed in the Tetra Tech EBA report, BIMC has elected to not double the number of borrow sources. It is the QIA's position that the same methods be used as established in 2014 unless BIMC can provide a suitable rationale for the new area calculation methods.

2.2 Excavation and Hauling Contaminated Soil

The QIA has included a cost for excavating and hauling contaminated soil to the landfarm prior to treatment. BIMC's position is that any known contaminated soil on site will be stockpiled at the landfarm prior to closure and therefore no costing for excavation or hauling is required in the security estimate. It is the QIA's opinion that BIMC's position is not conservative and is therefore not acceptable to the QIA.

2.3 Demobilization of 3rd Party Equipment

It is the QIA's position that the 3rd party equipment left on site at the time of closure requires backhaul, as it is not BIMC's equipment to landfill. BIMC has included a cost to landfill this equipment, and also maintains the position that the cost to backhaul any 3rd party equipment is already satisfactorily covered in the Indirect Costs for Mobilization and Demobilization of equipment; BIMC's position is that the reclamation cost for this equipment is being double counted within the BIMC security estimate.

2.4 Inflation

During a January 7, 2016, teleconference between the QIA and BIMC,[7] BIMC raised concerns regarding the use of the Nunavut inflation rate for the reclamation security estimate, as the majority of the workforce,

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[4] BIMC's December 13, 2015, IGLU upload to the QIA titled, "Tote Road_Orphaned Roads_20151201 (2)."

[5] BIMC's January 5, 2016, IGLO upload to the QIA titled, "Tote Road Orphaned Roads_20160104."

[6] Tetra Tech EBA (2015) Inspection of the Milne Inlet Tote Road and Associated Borrow Sources. March 2015.

[7] January 7, 2016, teleconference between the QIA and BIMC.

equipment, and materials will come from elsewhere in Canada. BIMC instead proposed that a Canada wide inflation rate would be more appropriate.

The QIA has therefore adopted a Canada wide inflation rate for use in the 2016 Comprehensive Security Estimate using the Bank of Canada inflation calculator.[8] The inflation rate used in the revised security estimate is 1.36%. The calculator has used the consumer price indexes for Canada from November 2014 and November 2015 to calculate the inflation rate.

BIMC has not applied any adjustment for inflation despite using unit costs developed in 2014. It is the QIA's position that the reclamation security estimate should include an adjustment for inflation.

3.0 RECOMMENDED FUTURE TASKS

The QIA has adopted BIMC's Mobile and Mechanical Equipment SAP Lists as the full list of equipment on site, and BIMC's classification of light, medium, and heavy mobile and mechanical equipment as a place holder for the present. The SAP Lists have yet to be fully verified against the classifications used previously by the QIA, however this is an activity that will be completed for future security estimates.

The QIA proposes collaborating with BIMC to develop a classification for light, medium, and heavy mobile and mechanical equipment for the 2017 ASR.

The QIA has adopted BIMC's reclamation cost for Short Term Care & Maintenance, Closure Monitoring & Reporting as a place holder for the time being. Under the CPL, BIMC requires the QIA's approval of the Interim Closure and Reclamation Plan (ICRP); to-date BIMC has only received a conditional approval for this plan.[9]

The reclamation cost associated with the ICRP will be reviewed after the QIA's full acceptance of the ICRP.

4.0 SUMMARY

Table 4, **Notes:**
Yellow cells with red text indicate a difference (BIMC – QIA = Difference) of greater than $100,000.

[8] http://www.bankofcanada.ca/rates/related/inflation-calculator/

[9] QIA's October 23, 2015, letter to BIMC titled, "Baffinland Iron Mines Corporation's Interim Mine Closure and Reclamation Plan – Conditional Approval."

Table 5, and Table 6 provide a summary of the updated 2016 reclamation security estimate. The total costs associated with the 2016 ASR as estimated by BIMC and the QIA are now closer. However, there is still approximately $1.5 million dollar difference between BIMC and the QIA for the following two Direct Cost items, which subsequently impacts the associated Indirect Costs:

- Grade and Recontour
- Grade and Recontour Significant Disturbed Areas

The QIA's 2016 Comprehensive Security Estimate is **$52,719,000**. The current amount of security held by the QIA is **$47,517,500**. Therefore, the amount of security posted by BIMC should be increased by **$5,201,500**. BIMC's 2016 Security Estimate is approximately **$45,372,000**, which is **$7,347,000** less than the QIA security estimate.

Table 4. Updated Direct Costs for the QIA 2016 Comprehensive Security Estimate.

Direct Costs										
Area	Item	BIMC		QIA		BIMC	QIA	BIMC	QIA	Difference
		Qty	Unit	Qty	Unit	Unit Cost	Unit Cost	Direct Cost	Direct Cost	Direct Cost
Site Works	Fill Application	-5,908	m^2	-3,457	m^2	$44.37	$43.31	-$262,100	-$149,700	-$112,400
	Grade and Re-Contour	161,082	m^2	780,804	m^2	$1.81	$1.93	$291,600	$1,509,700	-$1,218,100
	Grade and Re-Contour of Building Footprints	-	-	-	-	-	-	-	-	-
	Liner Removal	-30,563	m^2	-1,333	m^2	$3.50	$3.41	-$107,000	-$4,500	-$102,500
	Grade and Re-contour Significant Disturbed Areas	73,838	m^2	179,187	m^2	$2.72	$2.90	$200,800	$519,600	-$318,800
	Culvert Removal	-	-	-16	ea.	-	$978.78	$0	-$15,700	$15,700
	Bridge Removal	-	-	-0.5	ea.	-	$251,552.72	$0	-$125,800	$125,800
	Timber Cribbing	-2,786	m^2	-7,686	m^2	$20.78	$20.60	-$57,900	-$158,300	$100,400
	Precast Foundations	-2,267	m^2	-4,682	m^2	$38.47	$36.54	-$87,200	-$171,100	$83,900
	Slab on Grade	-1,041	m^2	-3,380	m^2	$33.11	$28.16	-$34,500	-$95,200	$60,700
Mobile Equipment	Light Mobile Equipment	44	ea.	11	ea.	$941.09	$938.16	$41,400	$10,300	$31,100
	Medium Mobile Equipment	30	ea.	2	ea.	$1,494.13	$1,559.26	$44,800	$3,100	$41,700
	Heavy Mobile Equipment	98	ea.	73	ea.	$2,618.87	$2,251.31	$256,600	$164,300	$92,300
Buildings (Contaminated)	Modular Buildings	-3,107	m^2	-596	m^2	$143.42	$184.43	-$445,600	-$109,900	-$335,700
	Fold Away Building	-1,895	m^2	-4,682	m^2	$142.41	$143.71	-$269,900	-$672,900	$403,000
	Soft Walled Building (Tent)	-	-	-	-	-	-	-	-	-
	ISO Shipping Containers	-	-	-	-	-	-	-	-	-
	Other Buildings	-	-	-	-	-	-	-	-	-
Buildings (Not Contaminated)	Modular Buildings	-8,963	m^2	-7,686	m^2	$59.38	$61.47	-$532,200	-$472,500	-$59,700
	Fold Away Building	-	-	-	-	-	-	-	-	-
	Soft Walled Building (Tent)	-	-	-	-	-	-	-	-	-
	Temporary Construction Warehouses and Office Allowances	-	-	-	-	-	-	-	-	-

Direct Costs										
Area	Item	BIMC		QIA		BIMC	QIA	BIMC	QIA	Difference
		Qty	Unit	Qty	Unit	Unit Cost	Unit Cost	Direct Cost	Direct Cost	Direct Cost
	ISO Shipping Containers	-	-	-	-	-	-	-	-	-
	Other Buildings	0	m^2	283	m^2	-	$41.35	$0	$11,700	-$11,700
Bulks	Piping	-	-	-	-	-	-	-	-	-
	Cable	-	-	-	-	-	-	-	-	-
Packaged Facilities	Incinerator	-	-	-	-	-	-	-	-	-
	Potable Water	-1	ea.	-1	ea.	$9,975.93	$9,422.75	-$10,000	-$9,400	-$600
	Sewage Treatment Plant	-1	ea.	-1	ea.	$11,035.58	$10,772.79	-$11,000	-$10,800	-$200
	Truck Wash Facility	-	-	-	-	-	-	-	-	-
Mechanical Equipment	Light Equipment	-81	ea.	-81	ea.	$1,980.80	$1,784.11	-$160,400	-$144,500	-$15,900
	Medium Equipment	-100	ea.	-85	ea.	$4,261.34	$4,276.14	-$426,100	-$363,500	-$62,600
	Heavy Equipment	-29	ea.	-29	ea.	$41,205.45	$41,937.03	-$1,195,000	-$1,216,200	$21,200
	Light Tanks	-7	ea.	-	-	$2,148.33	-	-$15,000	$0	-$15,000
	Medium Tanks	-3	ea.	-	-	$7,387.31	-	-$22,200	$0	-$22,200
	Light Diesel Tanks	1	ea.	-	-	$3,693.66	-	$3,700	$0	$3,700
	Medium Mobile Diesel Tanks	1	ea.	2	ea.	$10,481.00	$9,141.50	$10,500	$18,300	-$7,800
	Medium Diesel Tanks	-	-	-	-	-	-	-	-	-
	Large Diesel Tanks	-	-	-	-	-	-	-	-	-
	Largest Diesel Tanks	-	-	-	-	-	-	-	-	-
	Miscellaneous Items	-13	ea.	0	ea.	$529.83	$80.21	-$6,900	$0	-$6,900
	Reclaim Conveyor	-	-	-	-	-	-	-	-	-
	Consumables	550	beds	550	beds	$700.80	$700.80	$385,400	$385,400	$0
Not Included by BIMC	Contaminated Soil (Excavate)	0	m^2	4,973	m^3	$0.00	$30.79	$0	$153,100	-$153,100
	Airstrip Lighting	-	-	-	-	-	-	-	-	-
	Container Water Crossings	-	-	-6	ea.	-	$2,437.53	$0	-$14,600	$14,600
	Sea Containers	-	-	-	-	-	-	-	-	-
							SUB-TOTAL DIRECT COSTS	-$2,408,000	-$959,000	-$1,449,000

Notes:
Yellow cells with red text indicate a difference (BIMC – QIA = Difference) of greater than $100,000.

Table 5. Updated Indirect Costs for the QIA 2016 Comprehensive Security Estimate.

Indirect Costs											
Area	Item	BIMC		QIA		BIMC	QIA	BIMC	QIA	Difference
		Qty	Unit	Qty	Unit	Unit Cost	Unit Cost	Indirect Cost	Indirect Cost	Indirect Cost
Off-site Disposal	Waste & Material	-	-	-	-	-	-	-	-	-
	Fuel	0	L	50,000	L	$0.10	$0.10	$0	$5,000	-$5,000
	Ammonium Nitrate	2,343	m^3	2,343	m^3	$358.00	$358.00	$838,800	$838,800	$0
	Explosives	113,519	kg	113,519	kg	$2.37	$2.37	$269,000	$269,000	$0
Soil	Contaminated Soil Treatment	334	m^3	372	m^3	$14.78	$13.45	$4,900	$5,000	-$100
Mob. & Demob.	Mobilization of Workers Required for Reclamation	-	-	-	-	-	-	-$41,000	-$160,500	$119,500
	Worker Accommodation & Camp Operations	-	-	-	-	-	-	-$224,000	-$497,500	$273,500
	Mobilization and Demobilization of Equipment and Materials by Sealift	-	-	-	-	10.0%	10.0%	-$229,000	-$95,900	-$133,100
	Backhaul Light Mobile Equipment (3rd party)	0	ea.	34	ea.	$0.00	$2,801.52	$0	$95,300	-$95,300
	Backhaul Medium Mobile Equipment (3rd party)	0	ea.	28	ea.	$0.00	$8,206.97	$0	$229,800	-$229,800
	Backhaul Heavy Mobile Equipment (3rd party)	0	ea.	25	ea.	$0.00	$15,984.36	$0	$399,600	-$399,600
	Fuel for Reclamation Mobile Equipment	0	L	-233,281	L	$0.40	$0.38	$41,000	-$88,600	$129,600
Monitoring and Reporting	Geotechnical Inspections	-	-	-	-	-	-	-$150,000	-$316,200	$166,200
	Project Environmental Site Assessment	-	-	-	-	-	-	-$90,000	-$71,580	-$18,420
	Closure & Post Closure Monitoring	-	-	-	-	-	-	-$851,000	-$851,000	$0
	Short Term Care & Maintenance, Closure Monitoring & Reporting	-	-	-	-	-	-	$3,766,000	$3,766,000	$0
Other	Engineering Fees					3.9%	3.9%	-$89,000	-$37,400	-$51,600

Indirect Costs										
Area	Item	BIMC		QIA		BIMC	QIA	BIMC	QIA	Difference
		Qty	Unit	Qty	Unit	Unit Cost	Unit Cost	Indirect Cost	Indirect Cost	Indirect Cost
	Supervision, Project Management & Contract Administration					9.4%	9.4%	-$216,000	-$90,100	-$125,900
	Contingency					12.5%	15.0%	-$339,000	-$256,900	-$82,100
							SUB-TOTAL INDIRECT COSTS	$2,690,700	$3,143,000	-$452,000

Notes:
Yellow cells with red text indicate a difference (BIMC – QIA = Difference) of greater than $100,000.

Table 6. Summary of the total updated costs for the QIA 2016 Comprehensive Security Estimate.

Total Costs			
Item	BIMC	QIA	Difference
2016 ASR SUB-TOTAL DIRECT COSTS	-$2,408,000	-$959,000	-$1,449,000
2016 ASR SUB-TOTAL INDIRECT COSTS	$2,690,700	$3,143,000	-$452,000
2016 ASR TOTAL ADJUSTMENT	$282,700	$2,184,000	-$1,901,000
2015 TOTAL RECLAMATION SECURITY ESTIMATE	$45,089,000	$49,831,000	-$4,742,000
2016 TOTAL RECLAMATION SECURITY ESTIMATE	$45,372,000	$52,015,000	-$6,643,000
INFLATION ADJUSTMENT (1.36%)	$0	$704,000	-$704,000
INLFATION ADJUSTED 2016 TOTAL RECLAMATION SECURITY ESTIMATE [b]	$45,372,000	$52,719,000	-$7,347,000

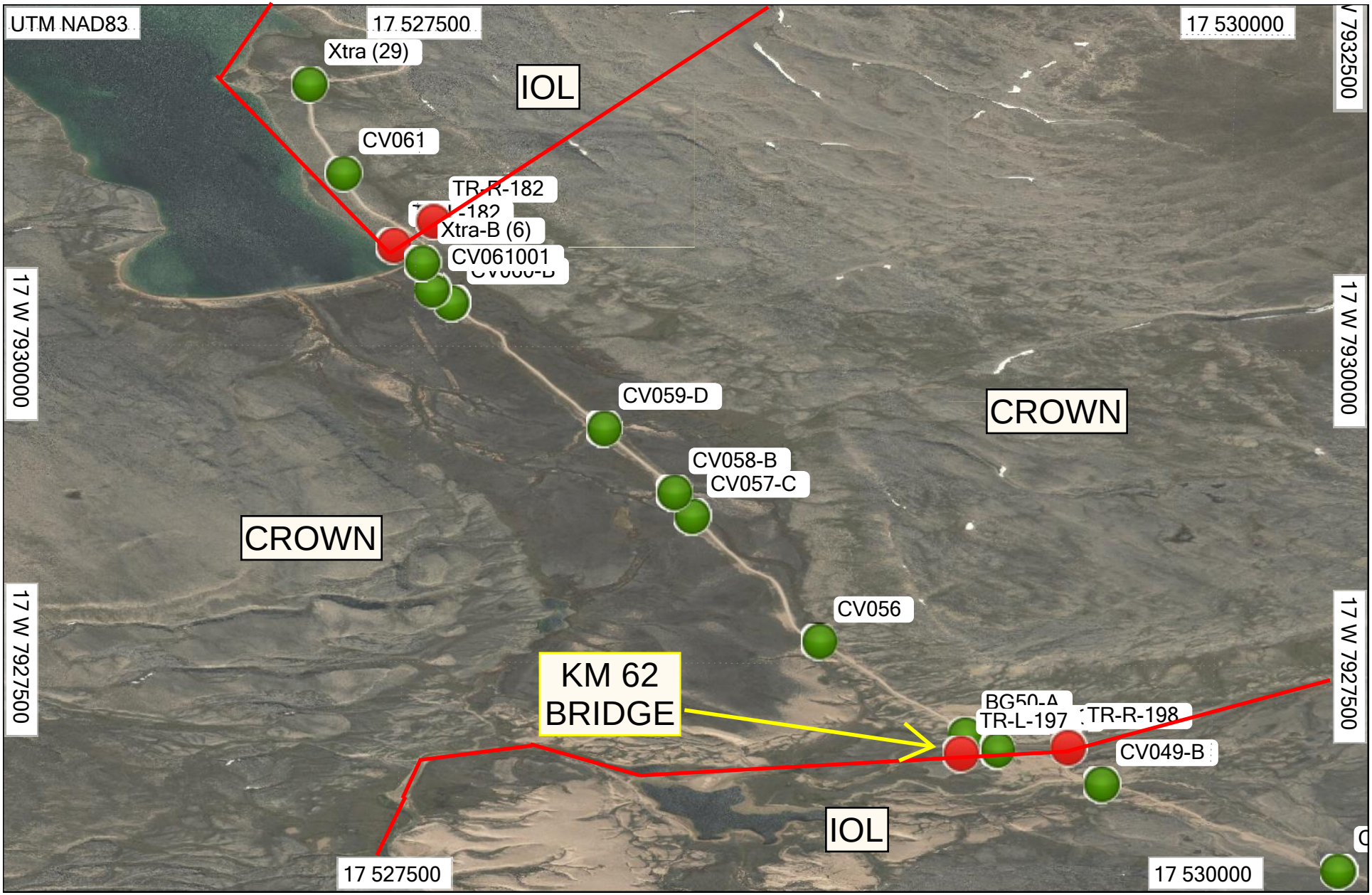
Notes:

Yellow cells with red text indicate a difference (BIMC – QIA = Difference) of greater than $100,000.

[a] BIMC values may differ slightly from BIMC's 2016 Marginal Closure and Reclamation Financial Security Estimate due to rounding.

[b] The current amount of security held by the QIA is $47,517,500. The amount of security posted by BIMC should be increased by $5,201,500.

APPENDIX A – MAP OF THE TOTE ROAD ON CROWN LAND



Worldwide Autoroute DEM Basemap,NR

0 km 0.75 km 1.5 km 2.25 km 3 km

MN TN -38.7° 2010-01-01

Culvert Locations

Land Lease Survey Locations