

Kiggavik Project Environmental Impact Statement

Tier 1 Appendix 1DIV

Significance Determinations

September 2014

History of Revisions

Revision Number	Date	Details of Revisions					
01	December 2011	Initial release Draft Environmental Impact Statement (DEIS)					
02	April 2012	Revised DEIS – to address comments received from the Nunavut Impact Review Board as part of their conformity determination released on January 18, 2012					
03	September 2014	FINAL Environmental Impact Statement					

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Abbreviations

COPC	Constituent of Potential Concern
e.g	example
GDP	Gross Domestic Product
GN	Government of Nunavut
KI	Key Indicator
LSA	Local Study Area
NO ₂	Nitrogen Dioxide
NTI	Nunavut Tunngavik Incorporated
PM ₁₀	Particulate matter less than 10 microns (µm) in diameter
PM _{2.5}	Particulate matter less than 2.5 microns (µm) in diameter
RAA	Regional Assessment Area
TSP	Total Suspended Particulate Matter
VC	Valued Component
WTP	Water Treatment Plant

1 Introduction

The overall objective of the environmental assessment is to identify the potential residual environmental effects resulting from the Project and to determine the significance of such effects. This Technical Appendix provides a description of how significance was determined as well as the summary tables of Project residual environmental effects for each of the assessment volumes where significance was determined.

1.1 Environmental Effects Criteria

Where possible, the following characteristics are described quantitatively for each Valued Component (VC) to assist in the assessment of residual environmental effects. Where these residual environmental effects cannot be defined quantitatively, they are described using qualitative terms. If qualitative descriptions are used, definitions are provided for each VC or Key Indicator (KI), as appropriate, in the scoping section of the environmental assessment (Tier 2 Document) for that VC or KI.

- **Direction:** the ultimate long-term trend of the environmental effect (e.g., positive, neutral or adverse)
- *Magnitude:* the amount of change in a measurable parameter or variable relative to the baseline case (i.e., low, moderate, high)
- **Geographical Extent:** the geographic area within which an environmental effect of a defined magnitude occurs (site-specific, local, regional, territorial, national, international)
- *Frequency:* the number of times during the Project or a specific Project phase that an environmental effect may occur (i.e., once, sporadically, regular, continuous)
- Duration: this is typically defined in terms of the period of time that is required until the VEC returns to its baseline condition or the environmental effect can no longer be measured or otherwise perceived (i.e., short term, medium term, long term, permanent)
- **Reversibility:** the likelihood that a measurable parameter for the VEC will recover from an environmental effect (i.e., reversible, irreversible)
- **Ecological or socio-economic context:** the general characteristics of the area in which the Kiggavik Project is located (i.e., undisturbed, disturbed, urban setting)

1.2 Significance of Residual Project Environmental Effects

Significance of a residual Project environmental effect is determined based on standards or thresholds that are specific to the valued component (VC), key indicator (KI) and/or the measurable parameters used to assess the environmental effect. Standards are recognized federal and territorial regulatory requirements or industry objectives that are applicable to the VC, and that reflect the limits

of an acceptable state for that component. Where standards, guidelines or regulatory requirements do not specifically exist, thresholds are defined for the measurable parameters for an environmental effect on a VC based on resource management objectives, community standards, scientific literature, or ecological processes (e.g., desired states for fish or wildlife habitats or populations). Determination of whether a residual environmental effect is considered to be significant or not significant is based on a comparison of the predicted change in the VC or measurable parameter to the defined threshold or standard. This includes an indication of the likelihood that a residual environmental effect on a VC will occur based on probability of occurrence (i.e., based on past experience) and level of scientific uncertainty.

Determination of significance also includes a discussion of the confidence of the prediction with respect to:

- the characterization of environmental effects, and
- the success of Project design features, mitigation measures, and environmental protection measures in effectively reducing the environmental effect.

Prediction confidence for the environmental effect and the success of mitigation measures is ranked as low, moderate or high. Environmental effects are rated as either *significant* or *not significant*.

2 Significance Determination

- 2.1 Project Residual Effects
- 2.1.1 Atmospheric
- 2.1.1.1 Atmospheric Air Quality

Table 2.1-1 Summary of Project Residual Environmental Effects to Air Quality

	Mitigation / Compensation Measures	Res		nvironm aracteri		ffects			_		
Project Phase		Direction	Magnitude	Geographic Extent	Frequency	Reversibility	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring	
Change in Ambient Air Concentrations of Constituents of Potential Concern - Preferred Option											
Construction – Quarries	General mitigation measures – Tier 2, Volume 4, Part 1, Section 6.1.3	No residual effects					n/a			Complaints response procedure and monitoring, if complaints history warrants action. See Appendix 4C.	
Construction – Mine Development Area	General mitigation measures – Section Tier 2, Volume 4, Part 1, Section 6.1.3	No residual effects								Complaints response procedure and monitoring, if complaints history warrants action. See Appendix 4C.	
Operation – Mine Development Area		•					•				
24-hr TSP	General and activity-specific	Α	М	L	I	R	NS	n/a	n/a	Implement dust management plan and	
	measures – Tier 2, Volume 4, Part 1, Section 6.1.3		Н	F*	I	R	NS	n/a	n/a	ambient air monitoring program as required. See Appendix 4C.	
24-hr PM ₁₀	General and activity-specific	Α	Н	L	I	R	NS	n/a	n/a		
	measures – Section 6.1.3		Н	F*	S	R	NS	n/a	n/a		
24-hr PM _{2.5}	General and activity-specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	A	Н	F*	I	R	NS	n/a	n/a		

Table 2.1-1 Summary of Project Residual Environmental Effects to Air Quality

		Res		nvironm aracteri		ffects				
Project Phase	Project Phase Measures Magnitude Geographic Extent Frequency Frequency		Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring				
24-hr Uranium	Design, general and activity- specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	А	Н	F*	I	R	NS	n/a	n/a	
1-hr NO ₂	Design, general and activity- specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	A	Н	F*	S	R	NS	n/a	n/a	Implement ambient air monitoring program as required. See Appendix 4C.
24-hr NO ₂	Design, general and activity- specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	А	Н	F*	I	R	NS	n/a	n/a	
Other COPCs	Design, general and activity- specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	No residual effects					n/a			Implement ambient air monitoring program as required. See Appendix 4C.
Operation - Winter Road	Design, general and activity- specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	No residual effects					n/a			Complaints response procedure and monitoring, if complaints history warrants action. See Appendix 4C.
Operation - Baker Lake Dock and Storage Facility							•			

Table 2.1-1 Summary of Project Residual Environmental Effects to Air Quality

		Res	idual En Cha	vironme		fects			_	
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Frequency	Reversibility	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
1-hr NO ₂	Design, general and activity- specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	А	Н	F*	I	R	NS	n/a	n/a	Implement ambient air monitoring program as required. See Appendix 4C.
24-hr NO ₂	Design, general and activity- specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	A	М	F*	I	R	NS	n/a	n/a	Implement ambient air monitoring program as required. See Appendix 4C.
Final Closure	Design, general and activity- specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	No res	sidual eff	ects	1	1	n/a	1	1	Complaints response procedure and monitoring, if complaints history warrants action. See Appendix 4C.
Post-Closure	Design, general and activity- specific measures – Tier 2, Volume 4, Part 1, Section 6.1.3	No residual effects					n/a			Complaints response procedure and monitoring, if complaints history warrants action. See Appendix 4C.
Change in Ambient Air Co	ncentrations of Constituents of Po	otential	Concer	n - Othe	r Optio	ns				
Operation - All-Season Road	General mitigation measures – Tier 2, Volume 4, Part 1, Section 6.1.3	No res	No residual effects			n/a			Complaints response procedure and monitoring, if complaints history warrants action. See Appendix 4C.	

Table 2.1-1 Summary of Project Residual Environmental Effects to Air Quality

			Residual Environmental Effects Characteristics											
	Project Phase Mitigation / Con Measur		ion	Direction	Magnitude	Geographic Extent	Frequency	Reversibility	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring		
KE	Υ		Dui	ation:		1	I		1	S	gnificance:			
Ma	agnitude:		ST	Short ter	m: Less	than on	e year (growing	season)	S	S Significant			
L M	than 25% greater than the criterion.	d COPC concentrations are	LT P	Medium the end of Long term Permane	of projed m: Beyo	t decom	missioni	ng		L . B: L	Low probab	ssional judgment oility of occurrence		
	Threshold.		116	quency: Infrague	ot: occu	re loce th	nan 1% (of the tin	ne (no		M Medium probability of occurrence			
Н	High: The predicted COI more than 100% greater Threshold.		Infrequent: occurs less than 1% of the time (no more than 4 days per year or 88 hours per year) Sporadic: Occurs less than 3.5% of the time (no							P . Ba	H High probability of occurrence Prediction Confidence: Based on scientific information and statistical analysis,			
Ge	eographic Extent:		R						-	· I Pi	=	Igment and effectiveness of mitigation		
F F* L R	-		C Rev	more than 12 days per year or 305 hours per year or 305 hours per year or 15% of the time (not than 55 days per year or 1300 hours per year). Continuous: the effect occurs more than 15% time. versibility: Reversible Irreversible					year)	the H	of confidence evel of confidence of confidence able			

2.1.1.2 Atmospheric – Noise and Vibration

Table 2.1-2 Summary of Project Residual Environmental Effects for Noise

			Residual Environmental Effects Characteristics								Prediction	
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Socio- Economic Context	Significance	Likelihood	tion Confidence	Recommended Follow-up and Monitoring
Change in Noise Lev	els – Preferred Option											
Construction – Dock and Storage Facility	Community complaint/ response procedures; Equipment maintenance; Exhaust mufflers; Other operational and administrative measures	A	М	L	S	R	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action
Construction – Winter Road	Community complaint/ response procedures; Equipment maintenance; Exhaust mufflers; Other operational and administrative measures	A	L	L	S	R	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action

Table 2.1-2 Summary of Project Residual Environmental Effects for Noise

				Residu		ronmenta		ts	(0)		Prediction	
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Socio- Economic Context	Significance	Likelihood	ction Confidence	Recommended Follow-up and Monitoring
Construction – Mine Development Area	Community complaint/ response procedures; Equipment maintenance; Exhaust mufflers; Other operational and administrative measures	A	N	L	S	R	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action
Operations - Kiggavik Project	Community complaint/ response procedures; Equipment maintenance; Exhaust mufflers; Other operational and administrative measures	A	L	L	L	С	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action
Change in Noise Lev	vels – Other Options		•	•		•	•				•	
Construction – All-Season Road	Community complaint/ response procedures; Equipment maintenance; Exhaust mufflers; Other operational and administrative measures	A	М	L	S	R	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action

Table 2.1-2 Summary of Project Residual Environmental Effects for Noise

		Residual Environmental Effects Characteristics		Predi								
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Socio- Economic Context	Significance	Likelihood	diction Confidence	Recommended Follow-up and Monitoring
Operations – All-Season Road	Community complaint/ response procedures; Equipment maintenance; Exhaust mufflers; Other operational and administrative measures	A	L	L	L	R	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action

Table 2.1-3 Summary of Project Residual Environmental Effects for Vibration

				Residu		ronmenta cteristics		i			Prediction	
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Socio-Economic Context	Significance	Likelihood	ction Confidence	Recommended Follow-up and Monitoring
Change in Vibration	Levels – Preferred Option											
Construction – Dock and Storage Facility	Community complaint/ response procedures; Equipment maintenance; Other operational and administrative measures	N	N	L	S	R	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action
Construction – Preferred Winter Road	Community complaint/ response procedures; Equipment maintenance; Other operational and administrative measures	N	N	L	S	R	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action
Construction – Mine Development Area	Community complaint/ response procedures; Equipment maintenance; Other operational and administrative measures	N	N	L	S	R	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action

Table 2.1-3 Summary of Project Residual Environmental Effects for Vibration

				Residu		ronmenta cteristics		3	4		Prediction	
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Socio-Economic Context	Significance	Likelihood	ction Confidence	Recommended Follow-up and Monitoring
Operations - Kiggavik Project	Equipment maintenance; Other operational and administrative measures	N	N	L	L	С	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action
Change in Vibration	Levels – Other Options											
Construction – All-Season Road	Community complaint/ response procedures; Equipment maintenance; Operational and administrative measures	N	N	L	S	R	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action
Operations – All-Season Road	Community complaint/ response procedures; Equipment maintenance; Operational and administrative measures	N	N	L	L	С	R	N	N	L	Н	Complaints response procedure and monitoring, if complaint history warrants action

Table 2.1-4 Definitions of Criteria Used in the Description of Residual Effects for Noise and Vibration

Direction	Magnitude (see Tier 2, Volume 4, Part 2, Tables 4.8-6 and 4.8-8)	Geographic Extent	Duration	Reversibility	Frequency	Likelihood	Socio-Economic Context
Positive an improvement in noise and vibration levels Adverse a deterioration in noise and vibration levels Neutral no notable change in noise and vibration levels	Negligible an effect on noise and vibration levels that is below the threshold of perception Low an effect on noise and vibration levels that is around the threshold of perception Moderate an effect on noise and vibration levels that is above the threshold of perception and is therefore detectable, but does not pose a serious problem to human health High an effect on noise and vibration levels that is above the threshold of perception and poses a serious problem (e.g., noise	Project footprint the effect is confined to the project footprint Local the effect occurs within the local assessment area (LSA) Regional the effect extends beyond the local assessment area (RAA)	Short Term less than 2 years in duration Medium Term between 2 and 20 years Long Term more than 20 years to a maximum of 10 years following decommissioning and abandonment Permanent effects that persist more than 10 years after decommissioning and abandonment are considered to be permanent	Reversible the VEC will recover from an environmental effect Not Reversible the VEC will not recover from an environmental effect	Once Sporadic Regular (i.e., occurs on a regular basis and at regular intervals) Continuous	L: Low probability of occurrence. M: medium probability of occurrence. H: High probability of occurrence.	Negligible: No implications to human health, wellbeing or quality of life Level I: No implications to human health, wellbeing or quality of life but some changes in annoyance / disturbance levels; potential effects on individuals within populations Level II: Implications to human health, well-being or quality of life; potential population level effects

2.1.2 Aquatics

2.1.2.1 Water Quality

Table 2.1-5 Summary of Project Residual Environmental Effects and Significance Determinations for Water Quality

		Env		Resid	lual Env	ironmer	ntal Effe	cts Characte	eristics				
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow- up and Monitoring
	ity: Treated effluent disch			avik and	Sissons	WTP ma	ay affect	surface water	er quality	in the red	eiving e	nvironmer	nt. This potential alteration to
Construction		N	-	-	-	-	-	-	-	N	М	Н	Wastewater and effluent
Operation	Design of WTP	Υ	N	L	L	MT	R	R	U				quality monitoring; water quality monitoring in
Decommissioning and Abandonment		Y	N	L	L,	MT	R	R	U				receiving environment.
													ggavik Project area. in water quality have the
Construction		Υ	N	L	L	ST	R	R	U	N	L	Н	Dust emission levels and
Operation	Dust control on roads and during the pit mining	Y	N	L	L	MT	R	R	U				deposition monitoring; water quality monitoring in lakes for metals, radionuclide, and TSS

Table 2.1-5 Summary of Project Residual Environmental Effects and Significance Determinations for Water Quality

		Env		Resid	dual Env	ironmen	ital Effe	cts Characte	ristics				
Project Phase	Mitigation/ Compensation Measures	Residual ironmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow- up and Monitoring
Decommissioning		Υ	N	L	L	ST	R	R	U				concentrations.
	lity: The release of air em- -sensitive lakes, which in												0 ₄ ²⁻ and NO ₃ ⁻ can lead to a
Construction		N	-	-	-	-	-	-	-	N	L	Н	Lakes and streams
Operation	Scrubbers on sulphuric acid plant; NOx control systems.	Y	N	L	L	MT	С	R	U				monitored to confirm acid deposition and lake acidification are not increasing above
Decommissioning		N	-	-	-	-	-	-	-				acceptable levels.

Table 2.1-5 Summary of Project Residual Environmental Effects and Significance Determinations for Water Quality

		Env		Resid	lual Env	ronmer	ntal Effec	cts Character	ristics				
	Mitigation/ compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow- up and Monitoring
KEY Direction: P Positive N Negative Magnitude: Use quantitative measure; or L Low: Water quality generally meet applicable benchmarks measureable change from b conditions; TSS <55mg/L M Moderate: Water quality with of benchmarks; TSS 55-148 H High: Water quality expected benchmarks by a factor great >148mg/L Geographic Extent: Use quantitative measure; or S Site-specific: area of lake or L Local assessment area R Regional assessment area	y expected to so or no passeline Phin a factor of 5 mg/L and to exceed ater than 5; TSS	post-closu Permaner Frequency: Use quantitativ Occurs or Occurs sp Coccurs or intervals. Continuou Reversibility:	n: water of during of erm: water of during of erm: water of the change o	quality retopperations er quality s during fi quality reto e in water ure; or	returns to inal closur urns to ba quality ular interva	e seline als.	U Und affer D Dev prevor h N/A Not Signification Not Prediction Based of analysis, of mitigate L Low M Modern Market Development of the same of the sa	nificant : Significant fon Confidence n scientific infor , professional ju	relatively activity as been s ad by huma ment is still activity as a distribution and activity activity as a distribution and activity as a distribution and activity activity as a distribution and activity activity as a distribution and activity activity activity activity as a distribution and activity activity activity as a distribution and activity activity as a distribution activity activity as a distribution activity activit	ubstantial an develop Il present d statistic nd effectiv	ly pment	L Low M Medi H High Cumulati Y Pote othe proje N Effect inter-	professional judgment probability of occurrence um probability of occurrence probability of occurrence probability of occurrence ve Effects Intial for effect to interact with r past, present or foreseeable ects or activities in RAA ct will not or is not likely to act with other past, present or seeable projects or activities in

2.1.2.2 Sediment Quality

Table 2.1-6 Summary of Project Residual Environmental Effects and Significance Determinations for Sediment Quality

		Re		Residu	ıal Envir	onmenta	l Effects	Characte	eristics			Pre	
Project Phase	Mitigation/ Compensation Measures	sidual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	ediction Confidence	Recommended Follow- up and Monitoring
Change in sediment qu Changes in surface wate sediment can have an ef	r can subsequently affe	ct the sec	liment thr	ough pro	cesses si	uch as de	position of	of settling	solids, a	dsorption	and diffu	usion. Co	
Construction		N	-	-	-	-	-	-	-	N	L	Н	Monitoring to confirm
Operation	Design of WTP	Υ	N	L	L	LT	С	R	U				metals and radionuclide concentrations in sediment
Decommissioning and Abandonment		N	-	-	-	-	-	-	-				rates are not increasing above predicted levels.

Table 2.1-6 Summary of Project Residual Environmental Effects and Significance Determinations for Sediment Quality

		Re		Resid	ual Enviro	nmenta	I Effects	Characte	eristics			Pr	
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow- up and Monitoring
KEY Direction: P Positive N Negative Magnitude: Use quantitative measure; o N Negligible: No discernit sediment quality. L Low: Project will measus sediment quality but the be within the range of n M Medium: Project will aff quality to the extent that parameters exceed sed guidelines (<ccme (="" affect="" exceed="" extent="" h="" high:="" pe="" project="" qualit="" sediment="" sever="" that="" the="" to="" will="">CCME PEL) CCME = Canadian Council of Mignyironment PEL = probable effects levels</ccme>	In the second state of the	baseline permaner per	re measure dessment a dessessment de measure de measure	of lake or some of lake or some or som	eturns to erations y returns to al closure eturns to	R I Envi U D N/A Sign S N Prec Base analy effec L M	Reversibility: Reversible Irreversible Index of the Irreversible Index of the Irreversible Index of the Irreversible Irrev	de Context: de: Area readifected by disturbed disturbed ent or hum able cant difficience: difficient of confider evel of co	elatively or y human acts s been sub by human an develop action and s gment and n nce nfidence	ctivity stantially oment is	L L M N H F Cumu Y I	I on profes ow probab Medium pro High probab Mative Effe Potential fo past, prese activities in Effect will r with other p	or effect to interact with other ent or foreseeable projects or

2.1.2.3 Aquatic Organisms and Fish Habitat

Table 2.1-7 Summary of Project Residual Environmental Effects and Significance Determinations for Aquatic Organisms and Fish Habitat

		Envir			Residua		onmenta teristics		3	<u>s</u>	_	Predic	
Project Phase	Mitigation Measures	Residual nvironmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	ignificance	Likelihood	ction Confidence	Recommended Follow- up and Monitoring
	: Treated effluent discharg C in aquatic biota (e.g., aq							lants (W	TP) may	affect su	rface wat	er quality	. These changes can affect
Construction		N	-	-	-	-	-	-	-	N	L to	Н	An Environmental Effects Monitoring (EEM) program
Operation	Design of the WTPs.	Υ	N	L	L	MT	С	R	U		141		will be conducted to
Decommissioning and Abandonment		Y	N	L	L	MT	С	R	U				determine whether effluent discharge from the WTP is having quantifiable effects.

Table 2.1-7 Summary of Project Residual Environmental Effects and Significance Determinations for Aquatic Organisms and Fish Habitat

		R. Environ			Residua		nmental teristics			S	_	Predictio	
Project Phase	Mitigation Measures	Residual onmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	tion Confidence	Recommended Follow- up and Monitoring
Change in fish habitat: habitat.	Instream construction associ	ciated wit	h severa	l Project	develop	ment act	vities is	expected	to result	in the pe	ermanent	alteration	n or destruction of fish
Construction	Installation of culverts; use of turbidity curtain; completion of fish salvage.	N	N	L	L	ST	0	R	U	N	L	Н	None.
Operation		N	-	-	-	-	-	-	-				
Decommissioning		N	N	L	L	ST	0	R	D				

Table 2.1-7 Summary of Project Residual Environmental Effects and Significance Determinations for Aquatic Organisms and Fish Habitat

	Enviro			Residua		onmental teristics	l Effects		တ္	Г	Prediction	
Project Phase Mitigation M	Effe	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	tion Confidence	Recommended Follow- up and Monitoring
Negative	Duration: Use quantitative ST Short term: baseline co MT Medium ter baseline co period LT Long term: baseline po P Permanent permanent Frequency: Use quantitative O Occurs onc S Occurs spo R Occurs on a intervals. C Continuous Reversibility: R Reversible I Irreversible	fish habitat nditions du n: fish habi nditions du ish habitat st-closure alteration in oxicologica measure; c e. adically at	or SI returning operated or SI returning final of SI returning fish habital risk	tions eturns to closure s to tat or	U U A A D D D D D D D D D D D D D D D D	onmental Indisturbed dversely a leveloped: reviously developmentill present lot Applica icance: ignificant on scienti is, profess veness of ow level o loderate le ligh level o	d: Area rel ffected by Area has disturbed to hit or huma ble ant fidence: fic informational judg mitigation f confidence: evel of con	human a been sub by human an develop ation and ment and ce afidence	ctivity stantially oment is	Base L M H Cum	Low probate Medium per High probate Potential past, presactivities Effect will with other	for effect to interact with other sent or foreseeable projects or

2.1.2.4 Fish Populations and Fish Health

Table 2.1-8 Summary of Project Residual Environmental Effects and Significance Determinations for Fish Populations and Fish Health

		Resi			Residua	al Enviro Charact		l Effects				Predictio	
Project Phase	Mitigation/ Compensation Measures	Direction Residual Environmental Effect (Y/N)		Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	ction Confidence	Recommended Follow-up and Monitoring
of fish, especially the swim	Change in Fish Populations: The detonation of explosives (blasting) in or near water results in pressure change and vibration which can physically damage the internal organs of fish, especially the swim-bladder. The shock waves can also kill or injure fish eggs and larvae. Changes in fish behaviour have also been observed as a result of noise produced by detonation of explosives.												
Construction	Use of smaller charge sizes during the open water and/or incubation season; complete program outside of sensitive time periods.	N	N	L	L	ST	S	R	U	N	L	Н	Monitoring programs to calibrate and refine the ground vibration and IPC models.
Operation		N	N	L	L	ST	S	R	U				
Decommissioning and Abandonment		N	-	-	-	-	-	-	-				

Table 2.1-8 Summary of Project Residual Environmental Effects and Significance Determinations for Fish Populations and Fish Health

		Resi			Residu		nmenta teristics	l Effects				Predic	
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	diction Confidence	Recommended Follow-up and Monitoring
	cions: The release of COPC from ther ecological receptors (includ											er is critic	al for evaluating the
Construction		N	-	-	-	-	-	-	-	N	М	Н	An Environmental
Operation	Design of the WTPs	N	N	L	L	MT	С	R	U				Effects Monitoring (EEM) program will be
Decommissioning		N	N	L	L	MT	С	R	U				instituted to determine whether effluent discharge from the WTP is having quantifiable effects on fish populations.

Table 2.1-8 Summary of Project Residual Environmental Effects and Significance Determinations for Fish Populations and Fish Health

		Resi			Residu	al Enviro Charact		Effec	cts			Predic	
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	diction Confidence	Recommended Follow-up and Monitoring
health in waterbodies in the L Low: The Project will affect waterbodies in the LAA, but of variability. M Moderate: The Project will a in waterbodies in the LAA a range of variability. The effe assessment area (RAA). H High: The Project will affec	ish abundance, distribution and health ir these effects will be within the natural ratifect fish abundance, distribution and health the effects will be beyond the natural cts do not extend to the regional the fish abundance, distribution and health the RAA, and the effects will be beyond	Us ST ba MT to LT ba P I he he C S C S R R R R R	seline cond Medium te baseline co Long term: seline post- Permanent alth equency: e quantitati Occurs onc Occurs spoi	: fish abund itions during erm: fish ab nditions during fish abund closure alteration in the measure e. The measure a regular bar egular bar itions during the measure e.	dance, distrig operations undance, di ring final clo ance, distrib fish abund e; or	stribution ar sure period oution and h ance, distrib	nd health re ealth return oution and	n to turn	Environmental U Undisturbed: adversely affec D Developed: A previously distu development o present N/A Not Applica Significance: S Significant N Not Significa Prediction Con Based on scier statistical analy and effectivene L Low level of o M Moderate lev H High level of	Area relative de la viere de l	nan activity een substar uman evelopment ation and sional judgr ation	ntially is still	Likelihood: Based on professional judgment L Low probability of occurrence M Medium probability of occurrence H High probability of occurrence Cumulative Effects Y Potential for effect to interact with other past, present or foreseeable projects or activities in RAA N Effect will not or is not likely to interact with other past, present or foreseeable projects or activities in RAA

2.1.3 Terrestrial

2.1.3.1 Terrestrial – Terrain, soils and vegetation

2.1.3.1.1 Terrain

Table 2.1-9 Summary of Project Residual Environmental Effects for Change in Terrain

		Resic		R		l Enviro			ts				
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
	Change in Permafrost Conditions and Terrain Stability: Stripping and/or burial of vegetation, organic soil zone, and underlying overburden materials; change in slope, change in surface drainage patterns and subsurface flow, and blasting will affect thaw depth and ground-ice content.												
	Minimize the Project footprint disturbance area	Y	А	L	S	LT	С	R	D	N	N/A	Н	Establishment of ground temperature and thaw depth monitoring system
	Salvage vegetation, soils and overburden materials												around the mine and mine affected areas; and along the embankment of roads; routine visual field observation
Construction	Confine activities within the boundaries of Project work area												of terrain slopes

Table 2.1-9 Summary of Project Residual Environmental Effects for Change in Terrain

		Resic		R		l Enviro Charac		al Effec s	ets				
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Operation	Avoid surface disturbance in ground-ice rich areas												Monitoring of soil moisture and ground-ice content
Final closure													Monitoring of surface and subsurface
Post closure	Not required												groundwater system
Change in Lar	ndforms: Stripping and/or burial of s	urficial ma	iterials v	will affec	ct comm	on dep	ositiona	l landfo	rms and	their al	bundan	ce and dis	tribution
	Minimize the Project footprint disturbance area	Υ	А	L	S	LT	0	1	D	N	N/A	Н	Quantify Project footprint on an annual basis
Construction	Avoid or reduce the use of glaciofluvial deposits												
	Salvage surficial materials												
Operation	Avoid surface disturbance in soft and problematic areas												
Final closure													

Table 2.1-9 Summary of Project Residual Environmental Effects for Change in Terrain

		Resid		R		l Enviro Charac			ts				
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
N Neutral: no of A Adverse: reconstruction on L Low: Effect of within the rall permafrost of M Moderate: E and outside change in permafrost of the country o	provement relative to baseline conditions change relative to baseline duction relative to baseline duction relative to baseline duction relative to baseline duction relative to baseline condition permafrost, terrain stability or landforms. On one or more of the measurable parameters ange of natural variation or baseline values; no condition, terrain stability or landforms. Affect on one or more of the measurable parameter ange of natural variation or baseline valuer and condition, terrain stability or landform on one or more of the measurable parameters ange of natural variation or baseline values, at condition, terrain stability or landforms is evicent. Int: (i.e., within the Project Footprint) Within the LAA)	is detectable change in neters is dete es, but unlike ns. s is detectabl and hence a c dent.	ectable ely to e and	th. MT Mat LT Lc of Frequence S Sp int C Cc th. Reversi R Re iff I Irr	nort term: e end of c edium terr the end of c edium terr the end o ong term: the Project nce: occur oc	change no onstruction m: change in change of final clos change exct. rs once the cours r le interval occurs report occurs cours cou	n. e no longe sure. etends bey roughout more than s. eatedly at ontinuous	r detectate yond the li the Project once, but regular ly through er human e, but	at D N N N S S N N P S S S S S S S S S S S S	Not Dis	ed sturbed e: eant spificant Confidence entific info alysis, pro d effective vel of conf	e: ormation and fessional ness of idence f confidence	Likelihood: Of a significant effect occurring N/A Not Applicable L Low probability of occurrence M Medium probability of occurrence H High probability of occurrence Cumulative Effects Y Potential for effect to interact with other past, present or foreseeable projects or activities N Effect will not or is not likely to interact with other past, present or foreseeable projects or activities

2.1.3.1.2 Soils

Table 2.1-10 Summary of Project Residual Environmental Effects on Soils

		R ₄ Environ		R			onment teristic	al Effec	ets				
Project Phase	Mitigation/ Compensation Measures	Residual onmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in soil qu	Change in soil quality: Air emissions from Project components will affect soil quality.												
Construction	All industrial machinery and equipment (including the diesel-powered generators) will meet federal air emission standards	Y	A	L	L	LT	С	R	ND	N	NA	Н	Monitoring of air emissions from static emissions sources associated with the Project (e.g., acid plant).
Operation	Use of low sulphur diesel fuel.												Monitoring of soil permanent sampling plots located around the mine sites and access roads for
Final Closure	Scrubbers installed on mill												
Post Closure	stacks to remove particulates and contaminants before discharge into the atmosphere.												changes in soil quality.
Change in soil qu	Change in soil quality: Dust created by Project activities will affect soil quality.												
Construction	Avoid blasting on days when	N	Α	L	L	LT	С	R	ND	N	N/A	Н	Dust deposition monitoring around
Operation	winds are excessive.												the mine sites as well as the access

Table 2.1-10 Summary of Project Residual Environmental Effects on Soils

		Envir		R	esidual		onment teristic		ts				
Project Phase	Mitigation/ Compensation Measures	Residual ronmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Final Closure	Dust suppression in the mine												roads.
Post Closure	site area by spraying water or other approved substance on travel area.												
Change in soil qu	ality: Soil compaction due to vehicula	r moveme	ent will	affect s	soil qual	ity.	•	•	•	l	1	•	
Construction Operation	Vehicular travel on the winter road will occur during frozen ground conditions, thereby preventing soil compaction.	Y	A	L	S	MT	С	R	ND	N	N/A	Н	During reclamation and revegetation, identify areas where soil compaction is evident and implement mitigation measures to de-compact soils,
	Scarification of areas to be												allowing better seed germination conditions.
Final Closure	reclaimed during final closure will loosen compacted soils.												
Change in soil qu	Lantity: Site clearing during Project co	nstruction	will af	fect soil	l quantit	y.		<u> </u>					
Construction	Activities confined within the work area boundaries.	Y	Α	L	S	MT	0	R	ND	N	N/A	Н	Environmental monitor on-site during construction.
	Topsoil stripping and salvage.												
Change in soil qu	antity: Soil burial due to the placeme	nt of mate	rials o	n undist	turbed a	reas du	ring Pro	oject co	nstructio	n will a	ffect so	il quanti	ty.

Table 2.1-10 Summary of Project Residual Environmental Effects on Soils

		Envir		R	esidual (nment teristic		ts	(0		_	
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Construction	Activities confined within the work area boundaries.	Y	Α	L	S	LT	0	R	ND	N	N/A	Н	Environmental monitor on-site during construction.
Change in soil qu	ality: Soil compaction due to vehicula	r moveme	ent will	affect s	oil quali	ty.	I	I	1		I	1	
Change in soil qu	antity: Soil movement during Project	constructi	on will	affect s	oil quan	tity.							
Construction	Construction plan during topsoil stripping and salvage.	Y	A	L	S	ST	0	R	ND	N	N/A	Н	Environmental monitor on-site during construction.
	Using equipment to transport soils to overburden pile rather than pushing soils.												
Change in soil qu	antity: Soil erosion until site stabilizat	ion, or ve	getatio	n establ	ishmen	and pr	oliferati	on on d	isturbec	areas	will affe	ct soil q	uantity.
Construction	Erosion control structures to	Υ	Α	L	S	МТ	S	R	ND	N	N/A	Н	Monitoring of site, overburden piles,
Operation	prevent migration of materials off-site.												and culverts along access roads for erosion potential and occurrence.
Final Closure													
Post Closure													

Table 2.1-10 Summary of Project Residual Environmental Effects on Soils

	Envi		R	esidual C		onmenta teristics		ts	40			
Project Phase Mitigation/ Compens Measures	Residual Environmental Effect (Y/N) sation	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Direction: P Positive N Neutral A Adverse Magnitude: N Negligible: no measurable change in soil quality or soil quantity L Low: effect is detectable but no measurable change in soil quality or soil quantity. M Moderate: effect is detectable and outside the range of natural variation, but is unlikely to change soil quality or soil quantity. H High: a change in either soil quantity or soil quality will occur, preventing reclaiming the landscape to meet end land use goals. Geographic Extent: S Site specific: (i.e., within Project Footprint) L Local (i.e., within the LAA) R Regional (i.e., extends beyond the LAA but within the RAA)	Duration: ST Short term: chan at the end of cor MT Medium term: chan life of the Project Frequency: O Once. S Sporadically: occur at unpredictable R Regularly: occur intervals C Continuous: occur throughout the P Reversibility: R Reversible I Irreversible	structic sange n end of ge exte t curs mo interva s repea	on o longer final clo nds beyonds beyone than also tedly at	sure ond the once, but regular	N N/// Sig S N Pre Baa	disturb develop still pre Not Dis disturb A Not Ap gnificand Signific Not Sig ediction sed on so alysis, pre ectivenes Low lev	bed: area ed previ pment, cosent. Sturbed: ed by hu plicable ee: cant gnificant Confide cientific i ofession: so of mitical evel of coate level	h has bee ously by or human area has iman act ince: nformatical judgme	human develop not bee ivity.	oment is	Of N/A L M H	a significant effect occurring A Not Applicable Low probability of occurrence Medium probability of occurrence High probability of occurrence Imulative Effects Potential for effect to interact with other past, present or foreseeable projects or activities Effect will not or is not likely to interact with other past, present or foreseeable projects or activities

2.1.3.1.3 Vegetation

 Table 2.1-11
 Summary of Project Residual Environmental Effects: Vegetation

		Envir		R			onment teristic	al Effec s	ts				
Project Phase	Mitigation/ Compensation Measures	Residual vironmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in vege	etation abundance and community diversi	ty: Site cle	earing a	and veg	etation l	burial d	uring co	nstructi	on will a	affect ve	egetatio	n abund	dance and community diversity
Construction	Activities confined within the work area boundaries.	Υ	Α	L	S	LT	0	R	ND	N	N/A	Н	Environmental monitoring during construction.
Change in vege	etation quality: Dust created by Project ac	tivities will	affect	vegetat	ion qua	lity							
Construction	Dust suppression by spraying water or other approved substance on mine site travel areas.	Y	A	L	L	LT	С	R	ND	N	N/A	М	Monitoring of vegetation permanent sampling plots located around the mine sites and access roads for
Operation	Avoid blasting on days when winds are excessive.	Υ	Α	М	L	LT	С	R	ND				changes in vegetation abundance and community diversity.
Final Closure	Reduced speed limits in dust-prone areas.	Y	A	L	L	LT	С	R	ND				Dust deposition monitoring around the mine sites as well as the access roads.

Table 2.1-11 Summary of Project Residual Environmental Effects: Vegetation

		Envir		R		Enviro Charac		al Effec s	ts				
Project Phase	Mitigation/ Compensation Measures	Residual onmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in vege	etation quality: Air emissions from Project	compone	nts will	affect v	egetatio	n qualit	y						
Construction	All industrial machinery and equipment (including the diesel-	Υ	Α	L	R	LT	С	R	ND	N	N/A	М	Monitoring of vegetation at locations around the mine sites and
Operation	powered generators) will meet federal air emission standards.												access roads for changes in vegetation quality.
	Use of low sulphur diesel fuel.												
Final Closure													Monitoring of air emissions from
	Scrubbers installed on mill stacks to												static emissions sources associated with the Project (e.g.,
Post Closure	remove particulates and contaminants before discharge into the atmosphere.												acid plant).

Table 2.1-11 Summary of Project Residual Environmental Effects: Vegetation

		Envir		R			onment teristic	al Effec s	ts				
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
abundance quality. L Low: effect i natural varia M Moderate: e of natural va to change v diversity, or H High: effect natural varia change in v diversity, or Geographic Ext S Site-specific L Local (i.e., v	no measureable change in vegetation and community diversity, or vegetation as detectable but within the range of the sticon or baseline values. Iffect is detectable and outside the range unation or baseline values, but is unlikely egetation abundance and community vegetation quality is detectable and outside the range of the tion or baseline values leading to a egetation abundance and community vegetation quality. If the stick is the range of the tion or baseline values leading to a egetation abundance and community vegetation quality. If the stick is the	MT Medium detectal LT Long to the life Frequency: O Once. S Sporad but at the life R Regular interval C Continu	able at the formal term: characteristically: of the Figure 1. It is a substitution of the figure 1. It is a	he end of change r he end of ange exte	construited to longer in the l	sure ond once, regular	D D d d d d is N N N d N/A N Signii S S N N Prediction Based statistiand ef L L M M M	primenta isturbed: sturbed pevelopme still pres ot Disturb sturbed by the sturbed	area ha: previouslent, or hu ent. ped: area py human able cant infidence tific infor sis, profe ss of mit of confide evel of c	s been s y by hur iman de a has no n activity :: mation a essional igation ence confidence	nan velopme t been '. and judgmel	ally (Cumulative Effects Potential for effect to interact with other past, present or foreseeable projects or activities

2.1.3.2 Terrestrial - Wildlife

2.1.3.2.1 Caribou and Muskox

Table 2.1-12 Summary of Residual Environmental Effects for Change in Mortality to Caribou

				Residua		onmenta teristics	I Effects	;				
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in Caribou	Mortality Risk — All-Season Road	Option		l .	I			<u>I</u>	I .	I		
Construction		N	N	L	MT	С	R	U	N	N/A	Н	None recommended
Operation	Road closures. Private access. Multi-party management speed limits, use of convoys	N	N	L	MT	С	R	U	N	N/A	М	Road check-point monitoring, HHS
Final Closure	Road closures; private access; multi-party management	N	N	L	MT	С	R	U	N	N/A	М	Road check-point monitoring, HHS
Change in Caribou	Mortality Risk—Winter Road Optio	n	•	•			•	•	•	•	•	
All Project Phases		N	N	L	MT	С	R	U	N	N/A	М	Continued monitoring (collar studies) of herd distribution during winter road operation, HHS

Table 2.1-12 Summary of Residual Environmental Effects for Change in Mortality to Caribou

KEY

Direction:

Positive Positive

N Negative

Magnitude:

- N Negligible: No anticipated effect on wildlife species
- L Low: Observable effect on wildlife species but not likely to affect the species' sustainability in the Project area
- M Moderate: Observable effect on wildlife species but not likely to affect the species' sustainability in the region
- H High: Measurable effect on wildlife species but that will likely affect the species' sustainability in the region

Geographic Extent:

- S Site-specific
- L Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the RAA
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- O Once: Effect occurs once
- S Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- I Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- D Developed: Area has been substantially previously disturbed by human development or human development is still present

N/A Not Applicable

Significance:

- S Significant
- N Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- L Low probability of occurrence
- M Medium probability of occurrence
- H High probability of occurrence

Table 2.1-13 Summary of Residual Environmental Effects for Change in Habitat Availability for Caribou and Muskox

				Residual Environmenta	I Effect	s Chara	cteristic	cs				
Project Phase	Mitigation/ Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow- up and Monitoring
Change in Carib	ou and Muskox H	labitat -	– Mine v	with All-Season Road Option								
Construction	Dust	N	М	R	MT	С	R	U	N	N/A	М	Contribution to GN-led
Operation	management; Minimize	N	М	R	MT	С	R	U	N	N/A	М	collaring program
Final Closure	Project footprint; Progressive reclamation	N	М	R	MT	С	R	U	N	N/A	М	None required
Change in Carib	ou and Muskox H	labitat -	– Mine v	with Winter Road Option	•		•		•	•	•	
Construction	Dust	N	М	R	МТ	С	R	U	N	N/A	М	Collaring program
Operation	management; Minimize	N	М	R	МТ	С	R	U	N	N/A	М	Collaring program
Final Closure	Project footprint; Progressive reclamation	N	М	R	MT	С	R	U	N	N/A	М	None required

Table 2.1-13 Summary of Residual Environmental Effects for Change in Habitat Availability for Caribou and Muskox

KEY

Direction:

Positive Positive

N Negative

Magnitude:

- N Negligible: No anticipated effect on wildlife species
- L Low: Observable effect on wildlife species but not likely to affect the species' sustainability in the Project area
- M Moderate: Observable effect on wildlife species but not likely to affect the species' sustainability in the region
- H High: Measurable effect on wildlife species but that will likely affect the species' sustainability in the region

Geographic Extent:

- S Site-specific
- L Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the RAA
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- O Once: Effect occurs once
- S Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- I Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- D Developed: Area has been substantially previously disturbed by human development or human development is still present

N/A Not Applicable

Significance:

- S Significant
- N Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- Low probability of occurrence
- Medium probability of occurrence
- H High probability of occurrence

Table 2.1-14 Summary of Project Residual Environmental Effects for Change in Movement of Caribou and Muskox

			R	esidual (Enviro Charac			cts				
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in Caribou and Mu	skox Movement — All-Season Road	Option	1	•	•	•		•		•		
Construction, Operation, Final Closure	Temporary road closures, road design, snow management	N	М	L	МТ	С	R	U	N	N/A	М	Continued monitoring (collar studies)
Change in Caribou and Mu	skox Movement — Winter Road Opt	ion										
Construction, Operation, Final Closure	Temporary road closures	N	М	L	ST	R	R	U	N	N/A	М	Continued monitoring (collar studies)

Table 2.1-14 Summary of Project Residual Environmental Effects for Change in Movement of Caribou and Muskox

KEY

Direction:

- P Positive
- N Negative

Magnitude:

- N Negligible: No anticipated effect on wildlife species
- L Low: Observable effect on wildlife species but not likely to affect the species' sustainability in the Project area
- M Moderate: Observable effect on wildlife species but not likely to affect the species' sustainability in the region
- H High: Measurable effect on wildlife species but that will likely affect the species' sustainability in the region

Geographic Extent:

- S Site-specific
- L Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the RAA
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- O Once: Effect occurs once
- S Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- Undisturbed: Area relatively or not adversely affected by human activity
- D Developed: Area has been substantially previously disturbed by human development or human development is still present

N/A Not Applicable

Significance:

- S Significant
- N Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- L Low probability of occurrence
- M Medium probability of occurrence
- H High probability of occurrence

Other Projects, Activities and Actions:

Human disturbance associated with Meadowbank Mine, various exploration operations, and various regional communities

2.1.3.2.2 Wolves

Table 2.1-15 Summary of Residual Environmental Effects for Change in Habitat Availability for Wolves

			Resid	ual Envir	onmenta	I Effects	Characte	eristics				
Project Phase	Mitigation/ Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow- up and Monitoring
Change in Wolf F	labitat — Mine with All-Season R	oad Optio	on									
Construction	Minimize Project footprint;	N	М	R	MT	С	R	U	N	N/A	М	None required
Operation	Progressive reclamation	N	М	R	MT	С	R	U	N	N/A	М	None required
Final Closure		N	М	R	MT	С	R	U	N	N/A	М	None required
Change in Wolf F	labitat — Mine with Winter Road	Option										
Construction	Minimize Project footprint;	N	М	R	MT	С	R	U	N	N/A	М	None required
Operation	Progressive reclamation	N	М	R	MT	С	R	U	N	N/A	М	None required
Final Closure		N	М	R	MT	С	R	U	N	N/A	М	None required

Table 2.1-15 Summary of Residual Environmental Effects for Change in Habitat Availability for Wolves

KEY

Direction:

Positive Positive

N Negative

Magnitude:

- N Negligible: No anticipated effect on wolf denning habitat or species
- L Low: Observable effect on wolf denning habitat or species but not likely to affect wolf sustainability in the LAA
- M Moderate: Observable effect on wolf denning habitat or species but not likely to affect wolf sustainability in the RAA
- H High: Measurable effect on wolf denning habitat or species that will likely affect wolf sustainability in the RAA

Geographic Extent:

- S Site-specific
- L Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the RAA
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- O Once: Effect occurs once
- S Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- I Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- D Developed: Area has been substantially previously disturbed by human development or human development is still present

N/A Not Applicable

Significance:

- S Significant
- Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- Low probability of occurrence
- M Medium probability of occurrence
- High probability of occurrence

2.1.3.2.3 Raptors

Table 2.1-16 Summary of Project Residual Environmental Effects for Change in Habitat Availability for Raptors

			R	esidual (nment teristic		ts			Prediction	
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	ction Confidence	Recommended Follow-up and Monitoring
Change in Raptor	Habitat — All-Season Road											
Construction	progressive reclamation; minimize Project footprint; dust	N	L	L	MT	R	R	U	N	N/A	М	None required
Operation	suppression											
Change in Raptor	Habitat —Winter Road											
Construction	progressive reclamation; minimize Project footprint; dust	N	L	L	MT	R	R	U	N	N/A	М	None required
Operation	suppression; winter road; tailings management											

Table 2.1-16 Summary of Project Residual Environmental Effects for Change in Habitat Availability for Raptors

KEY

Direction:

P Positive

N Negative

Magnitude:

N Negligible: No anticipated effect on wildlife species

- L Low: Observable effect on wildlife species but not likely to affect the species' sustainability in the LAA
- M Moderate: Observable effect on wildlife species but not likely to affect the species' sustainability in the RAA
- High: Population-level detectable change to habitat availability, productivity and health of the Peregrine Falcon tundrius population

Geographic Extent:

- S Site-specific
- L Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the RAA
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- O Once: Effect occurs once
 - Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- I Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- D Developed: Area has been substantially previously disturbed by human development or human development is still present

N/A Not Applicable

Significance:

- S Significant
- N Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- L Low probability of occurrence
- M Medium probability of occurrence
- H High probability of occurrence

Other Projects, Activities and Actions:

Human disturbance associated with Meadowbank Mine, various exploration operations, and various regional communities

Table 2.1-17 Summary of Residual Environmental Effects for Change in Raptor Nest Productivity

			Residual E	nvironme	ental Eff	ects Cha	racteris	stics				
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in Per	egrine Falcon Productivity –	- All-Se	ason Road Opti	ion	•	•	•		•	•		
Construction	Blasting outside of breeding window.	N	М	L	MT	S	R	U	N	N/A	М	Individual nest site monitoring during construction. Annual productivity monitoring.
Operation	No disturbance at nest site policy. No overflights.	N	L	L	MT	С	R	U	N	N/A	Н	Annual productivity monitoring
Change in Bre	eding Bird Habitat — All-Sea	son Ro	ad Option	1	I	1		1	I			
Construction	progressive reclamation;	N	L	L	MT	R	R	U	N	NA	М	None required
Operation	Project footprint; dust suppression											
Final Closure	None required	N	L	L	MT	R	R	U	N	NA	М	

Table 2.1-17 Summary of Residual Environmental Effects for Change in Raptor Nest Productivity

			Residual E	nvironme	ental Effe	ects Cha	ıracteri	stics				
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in Bre	eding Bird Habitat —Winter	Road C	ption					1				
Construction	progressive	N	L	L	MT	R	R	U	N	NA	М	None required
Operation	reclamation; Project footprint; dust suppression; winter road;											
Final Closure	None required	N	L	L	MT	R	R	U	N	NA	М	

Table 2.1-17 Summary of Residual Environmental Effects for Change in Raptor Nest Productivity

			Residual E	nvironm	ental Eff	ects Chai	acteri	stics				
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
L Low: Detect cause a beh wildlife spect the LAA. M Moderate: Description of the transmission of the tran	ctable change in high quality habitat ac nge that results in a behavioural change f birds, or measurable effect on wildlife ect the species' sustainability in the RAA	effect on ustainability in quality habita or observable pecies' ross the of a species that A.	MT Medi beyo LT Long Frequency: O Once S Sport not c Proje throu C C Contitution Reversibilities R Reversibilities R Reversibilities R I I I I I I I I I I I I I I I I I I	nd the end of term: Beyon term: Beyon term: Beyon term: Before terms and terms and terms and terms and terms and terms after of the terms after the t	ore than one of Project de cocurs at re e of the Project de cocurs coroject de cocurs coroject de cocurs d	e year, but no commission of the Project ccasionally be the life of the egular intervalect intinuously or to baseline end of Project or to baseline ere to baseline or to baseline to base	t t ng E t t s s s s s s s s s s s s s s s s s	not ac activit Devel substate disturt development and significance Signifi Not significance assed on scientistical analogment and itigation Low let Model	turbed: Are liversely af y oped: Are antially pre- poped: Are oped by hui oppment or oppment or oppment is opplicable or cant gnificant onfidence entific infollysis, prof	ea relative fected by a has bee eviously man human still prese e: rmation a fessional ness of fidence of confider	ely or human n nt	Likelihood of Significant Effects: Based on professional judgment L Low probability of occurrence M Medium probability of occurrence H High probability of occurrence Other Projects, Activities and Actions: Human disturbance associated with Meadowbank Mine, various exploration operations, and various regional communities.

2.1.3.2.4 Migratory Birds

Table 2.1-18 Summary of Project Residual Environmental Effects for Change in Bird Habitat Availability

			Re	sidual C	Enviro			cts				
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in Breedi	ng Bird Habitat — All-Season Road Option	on	II.	I.	II.				II.		l	
Construction	progressive reclamation; Project	N	L	L	МТ	R	R	U	N	NA	М	None required
Operation	footprint; dust suppression											
Final Closure	None required	N	L	L	MT	R	R	U	N	NA	М	
Change in Breedi	ng Bird Habitat —Winter Road Option	•	•		•			•				
Construction	progressive reclamation; Project	N	L	L	МТ	R	R	U	N	NA	М	None required
Operation	footprint; dust suppression; winter road;											
Final Closure	None required	N	L	L	МТ	R	R	U	N	NA	М	

Table 2.1-18 Summary of Project Residual Environmental Effects for Change in Bird Habitat Availability

ĸ	EΥ

Direction:

P Positive

N Negative

Magnitude:

- N Negligible: No anticipated effect on wildlife species.
- Low: Detectable change to high quality habitat that does not cause a behavioural change in birds, or observable effect on wildlife species but not likely to affect the species' sustainability in the LAA.
- M Moderate: Detectable change in the amount of high quality habitat that could result in a behavioural response of birds, or observable effect on wildlife species but not likely to affect the species' sustainability in the RAA.
- H High: A detectable change in high quality habitat across the seasonal range that results in a behavioural change of a population of birds, or measurable effect on wildlife species that will likely affect the species' sustainability in the RAA.

Geographic Extent:

- L Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the RAA
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- O Once: Effect occurs once
- S Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- Developed: Area has been substantially previously disturbed by human development or human development is still present
- N/A Not Applicable

Significance:

- S Significant
- N Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- Low probability of occurrence
- M Medium probability of occurrence
- H High probability of occurrence

Other Projects, Activities and Actions:

Human disturbance associated with Meadowbank Mine, various exploration operations, and various regional communities.

2.1.3.2.5 Species at Risk

Table 2.1-19 Summary of Project Residual Environmental Effects for Short-eared Owl — Habitat Availability

				Residua	al Enviro Charact			3				
Project Phase	Mitigation / Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in Short-ear	ge in Short-eared owl Habitat Availability –Mine + All-Season Road											
Construction	Pre-clearing nest searches; no-	N	М	L	LT	S	I	U	N	N/A	М	No disturbance buffers around
Operation	disturbance buffers; reclamation	N	М	L	MT	R	R	U	N	N/A	М	SAR breeding sites through to completion of breeding.
Final Closure		N	М	L	MT	0	1	U	N	N/A	М	
Change in Short-ear	ed owl Habitat Availability – Min	e + Win	ter Roa	d Optior	าร							
Construction	disturbance buffers;	N	М	L	LT	S	1	U	N	N/A	М	No disturbance buffers around
Operation		N	М	L	MT	R	R	U	N	N/A	М	SAR breeding sites through to completion of breeding.
Final Closure		N	М	L	MT	0	1	U	N	N/A	М	

Table 2.1-19 Summary of Project Residual Environmental Effects for Short-eared Owl — Habitat Availability

KEY

Direction:

- P Positive
- N Negative

Magnitude:

- N Negligible: No anticipated effect on wildlife species.
- L Low: Observable effect on wildlife species but not likely to affect the species' sustainability in the LAA.
- M Moderate: Observable effect on wildlife species but not likely to affect the species' sustainability in the RAA.
- H High: Measurable effect on wildlife species that will likely affect the species' sustainability in the RAA.

Geographic Extent:

- S Site-specific
- Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the RAA
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- O Once: Effect occurs once
- S Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- Developed: Area has been substantially previously disturbed by human development or human development is still present

N/A Not Applicable

Significance:

- S Significant
- N Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- L Low probability of occurrence
- M Medium probability of occurrence
- H High probability of occurrence

Other Projects, Activities and Actions:

Human disturbance associated with Meadowbank Mine, various exploration operations, and various regional communities.

2.1.4 Marine

2.1.4.1 Marine Mammals

Table 2.1-20 Summary of Project Residual Environmental Effects: Marine Mammals

		Env		Resid	ual Enviro	nmental	Effects	Characte	eristics				
Project Phase	Mitigation/ Compensation Measures	Residual nvironmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Change in Mortality: Pro	ject-related shipping l	nas the pot	tential to	collide	with marin	ne mamr	nals	JI.	1	JI.	ı	•	
Construction:	See section 6.2.1.3 for a complete list	Y	А	L	R	ST	R	R	U	N	N/A	Н	MMOs on board vessels in the LAA
Operation:	See section 6.2.1.3 for a complete list	Y	А	L	R	ST	R	R	U				Record all incidents of
Final Closure: Decommissioning and Abandonment	See section 6.2.1.3 for a complete list	Y	A	L	R	ST	R	R	U				vessel-mammal collisions
Residual environmental effects for all phases		Y	А	L	R	ST	R	R	U				
Change in Behaviour: P	roject-related underwa	ter noise o	due to s	hipping	has the po	tential to	change	behavio	our of ma	rine mai	mmals	•	
Construction	See section 6.2.2.4 for a complete list	Y	А	М	R	ST	S	R	U	N	N/A	М	MMOs on board vessels in the LAA
Operation:	See section 6.2.2.4 for a complete list	Y	А	М	R	ST	S	R	U				 Follow up monitoring

Table 2.1-20 Summary of Project Residual Environmental Effects: Marine Mammals

		En		Resid	ual Enviro	nmental	Effects	Characte	eristics				
Project Phase	Mitigation/ Compensation Measures	Residual vironmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Final Closure: Decommissioning	See section 6.2.2.4 for a complete list	Υ	Α	М	R	ST	S	R	U				program in the RAA
Residual environmental effects for all phases		Υ	А	М	R	ST	S	R	U				

Table 2.1-20 Summary of Project Residual Environmental Effects: Marine Mammals

		En		Resid	ual Enviro	nmental	Effects	Characte	eristics				
Project Phase	Mitigation Compensati Measures	ion ≨ ⊈ §	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
KEY		Duration:		•			nmental C			•	Likeliho		
Direction: P Positive A Adverse Magnitude: Use quantitative measure; or L Low: effect is within the revariance or less than refe M Moderate: effect is at or set the range of natural variation or reference criteria H High: effect exceeds upper variation or reference criteria Use quantitative measure; or S Site-specific: effect is limited project footprint L Local: effect is limited to assessment Area (LAA) R Regional: effect is limited Assessment Area (RAA)	erence criteria slightly above ition or reference er limit of natural eria ited to the		Hours to mem: Months Years: permane measure; ce. pradically a a regular b.	days s nt		D Do prode st N/A No Signifi S Si N No Predic Based analysi effectiv L Lc M M	ndisturbed dversely affeveloped: A eviously disvelopmen ill present of Application Confication Confica	fected by I Area has be sturbed by t or human ole ant dence: ic informate ic informate onal judgn nitigation confidence;	human act been subst y human n developn tion and st nent and e idence	ivity antially nent is	N/A not L Low M Mec H High Cumulat Y Pote pass actin N Effe	dium probability tive Effects ential for effet, present or vities in RSA act will not or	of occurrence ility of occurrence of occurrence ect to interact with other foreseeable projects or is not likely to interact with ent or foreseeable projects

2.1.4.1 Marine Fish

Table 2.1-21 Summary of Project Residual Environmental Effects: Marine Fish

		ш		Resid	lual Envir	ronmenta	l Effects	Characte	ristics			Pre	
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	ediction Confidence	Recommended Follow-up and Monitoring
Change in Behaviour: P	Project-related underwate	er noise du	e to shi	pping ha	s the pot	ential to	change t	he behav	iour of m	arine fish			
Construction:	See section 6.2.2.4 for a complete list	Y	А	L	S	ST	R	R	U	N	N/A	Н	None
Operation:	See section 6.2.2.4 for a complete list	Y	А	L	S	ST	R	R	U				
Final Closure: Decommissioning	See section 6.2.2.4 for a complete list	Υ	А	L	S	ST	R	R	U				
Residual environmental effects for all phases		Y	А	L	S	ST	R	R	U				

Table 2.1-21 Summary of Project Residual Environmental Effects: Marine Fish

	<u> </u>		Resid	lual Envi	ronmenta	Effects (Characte	ristics			Pr	
Mitigation Project Phase Compensati Measures	on 꽃림법	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
KEY Direction: P Positive A Adverse Magnitude: Use quantitative measure; or L Low: effect is within the range of natural variance or less than reference criteria M Moderate: effect is at or slightly above the range of natural variation or reference criteria H High: effect exceeds upper limit of natural variation or reference criteria Geographic Extent: Use quantitative measure; or S Site-specific: effect is limited to the Project footprint L Local: effect is limited to the Local Assessment Area (LAA) R Regional: effect is limited to the Regional Assessment Area (RAA)	Duration: Use quantitative me ST Short term: Ho MT Medium term: I LT Long term: Yea P Permanent: pe Frequency: Use quantitative me O Occurs once. S Occurs sporad R Occurs on a re intervals. C Continuous. Reversibility: R Reversible I Irreversible	urs to da Months ars rmanent asure; o	r rregular in		U Undis adve D Dever previous deversall p N/A Not A Significal S Signi N Not S Prediction Based on analysis, p effectivene L Low I M Model	ously distured open or resent open or resent open open open open open open open open	ea relativel ed by hum a has beer rbed by hu human de nce: Iformation I judgment ation Ifidence of confiden	an activity substantia man velopment	O N. L M H H C Y	Low pro Medium High pro Medium High pro Mumulative Potentia past, pro activities Effect w with other	plicable bability of c probability bability of c Effects I for effect esent or for s in RSA ill not or is	occurrence occurrence to interact with other reseeable projects or not likely to interact esent or foreseeable

2.1.5 Human Health

Table 2.1-22 Summary of Project Residual Environmental Effects: Human Health (Members of the Public)

		ZJ		Res	idual Env	rironment	al Effects	Characte	eristics			_	
Project Phase	Mitigation/ Compensation Measures	Residual Environmental Effect (Y/N)	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Exposure of Members of t	he Public to CAC: Levels	of Criter	ia Air Co	ontaminan	ts may af	fect individ	luals that	are residir	ng at the k	Kiggavik d	amp		
Construction		N								N	L	М	Implement ambient air monitoring program as
Operation	General mitigation (see atmospheric environment)	Υ	N	М	S	МТ	S	R	N/A				required
Final Closure		N											
Post Closure		N											

Table 2.1-22 Summary of Project Residual Environmental Effects: Human Health (Members of the Public)

KEY

Direction:

- P Positive
- N Negative

Magnitude:

- N Negligible: The predicted exposures are at or below the selected threshold.
- L Low: The predicted exposures are within a factor of 2 of the selected threshold.
- M Moderate: The predicted exposures are within a factor of 5 of the selected threshold
- H High: The predicted exposures are greater than a factor of 5 of the selected threshold

Geographic Extent:

- S Site-specific: Within Project Boundaries
- L Local: Within 10km from the site
- R Regional: Baker Lake

Duration:

Use quantitative measure; or

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of project decommissioning
- LT Long term: Beyond the life of the project
- P Permanent

Frequency:

Use quantitative measure; or

- O Occurs once.
- S Occurs sporadically at irregular intervals.
- R Occurs on a regular basis and at regular intervals.
- C Continuous.

Reversibility:

- R Reversible
- Irreversible

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- D Developed: Area has been substantially previously disturbed by human development or human development is still present
- N/A Not Applicable

Significance:

- S Significant
- N Not Significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood:

Based on professional judgment

- L Low probability of occurrence
- M Medium probability of occurrence
- H High probability of occurrence

Cumulative Effects

- Y Potential for effect to interact with other past, present or foreseeable projects or activities in RSA
- N Effect will not or is not likely to interact with other past, present or foreseeable projects or activities in RSA

2.1.6 Socio-Economic

2.1.6.1 Traditional Culture

Table 2.1-23 Summary Impact Matrix, Cumulative Effects on Traditional Culture

	EC	Potentia Projec Effect	ct	;	Potential for Significant nulative Effects	Mitigation/ Er	hancement	C	riteria for Mo	re than Add	itive Cumı	ulative Effects	3
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Cumulative P	roject Effects, T	raditional (Culture)									
Resource abundance	Harvesting, food security, values and knowledge	Negative	No	Yes	More negative, where a large number of projects starts to affect resource abundance	Mitigation for biological cumulative effects	Land use planning, mitigation for biological cumulative effects	Negative (more negative)	Not determined	Commun- ities	Long	Not determined	High

Table 2.1-23 Summary Impact Matrix, Cumulative Effects on Traditional Culture

	ĒC	Potential for Project Effects		Potential for Significant Cumulative Effects		Mitigation/ En	hancement	Criteria for More than Additive Cumulative Effects							
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence		
Access to caribou in western Kivalliq	Harvesting, food security, values and knowledge	Negative	Yes	Yes	More negative, where increased access starts to affect caribou abundance										
Increased access to harvested resources in western Kivalliq	Harvesting, food security, values and knowledge	Positive	Yes	Yes	No	n/a									
Facilitation of harvesting	Harvesting, food security, values and knowledge	Positive	Yes	Yes	No	n/a									

Table 2.1-23 Summary Impact Matrix, Cumulative Effects on Traditional Culture

Effect	EC	Potential for Project Effects		Potential for Significant Cumulative Effects		Mitigation/ Enhancement		Criteria for More than Additive Cumulative Effects							
	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence		
Demotivation for traditional harvesting and thus food security	Harvesting, food security, values and knowledge	Negative	Yes	Yes	More negative, where there is movement away from	Workforce management measures to accommodate traditional culture, support for community	Programs in support of traditional culture								
Reduction in shared harvest availability for the more vulnerable	Food security, values and knowledge	Negative	Yes	Yes	traditional culture as a result of increased exposure to English			Negative (more negative)	Not determined	Commun- ities	Long	Not determined	High		
Reduced use of Inuktitut	Language	Negative	Yes	Yes	language large mining	wellbeing initiatives									
Loss of Inuktitut	Language	Negative	No	Yes	project environments										

Table 2.1-23 Summary Impact Matrix, Cumulative Effects on Traditional Culture

Effect	EC	Potential for Project Effects		Potential for Significant Cumulative Effects		Mitigation/ Enhancement		Criteria for More than Additive Cumulative Effects							
	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence		
Reduced traditional values and knowledge	Harvesting, food security, values and knowledge, language	Negative	Yes	Yes											
Loss of traditional values and knowledge	Harvesting, food security, values and knowledge, language	Negative	No	Yes											
Preservation and access to sites of cultural heritage	Values and knowledge, cultural heritage sites	Positive	Yes	No	No			1	n/a			1			

2.1.6.2 Individual, Family and Community Wellbeing

Table 2.1-24 Summary Impact Matrix, Cumulative Effects on Individual, Family and Community Wellbeing

	SEC	Potenti Project E		Potential for Significant Cumulative Effects		Mitigation/ Enhancement		Criteria for More than Additive Cumulative Effects						
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence	
Cumulative Project Effe	ects, Individual, F	amily and (Commun	ity Wellbeir	ng									
Overall health status	Health	Positive	Yes	Yes	No			n/a						
Infectious and chronic disease rates	Health	Positive	Yes	Yes	No				n/a					
Substance abuse and gambling)	Health, family function	Negative	No	Yes	No				n/a					
Diet	Health	Positive/ negative	No	Yes	No n/a									
Inappropriate sexual behaviours			No	Yes	No	n/a								
Increases in STI rates Health		Negative	Yes	Yes	No	n/a								

Table 2.1-24 Summary Impact Matrix, Cumulative Effects on Individual, Family and Community Wellbeing

	SEC	Potential for Project Effects		Potential for Significant Cumulative Effects		Mitigation/ Enhancement		Criteria for More than Additive Cumulative Effects						
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence	
Overall better functioning families in response to economic security and personal self esteem	Family function	Positive	Yes	Yes	No	n/a								
Poor management of incomes and stressors, leading to domestic violence, divorce, children at risk, suicide etc.	Health, family function	Negative	No	Yes	No		n/a							
Increased household economic security with savings	economic security with Savings,		Yes	Yes	No	n/a								
Increased rates of crime and nuisance public behaviours Public security, public health and safety		Negative	Yes	Yes	No				r	n/a				

Table 2.1-24 Summary Impact Matrix, Cumulative Effects on Individual, Family and Community Wellbeing

	SEC	Potenti Project E		Potent Signif Cumu Effe	icant lative	Mitigat Enhance		Criter	ia for Mo	re than A	dditive C	umulativ	e Effects
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Increased incidence of crime and nuisance public behaviours and consequent lower sense of wellbeing	Public security, public health and safety	Negative	Yes	Yes									
Worker and public health and safety related to mining	Public health and safety	Positve	Yes	Yes	No				n	ı/a			
Public health and safety related to traffic	Public health and safety	Negative	No	Yes	No				n	ı/a			
Safety on the land	Public health and safety	Positive	Yes	Yes	No			n/a					
Perceptions of harm	Public health and safety	Negative	Yes	Yes	No		n/a						
Social cohesion	Social cohesion and participation	Positive/ negative	Yes	Yes	No				n	ı/a			

Table 2.1-24 Summary Impact Matrix, Cumulative Effects on Individual, Family and Community Wellbeing

_	VSEC	Potenti Project E		Potent Signif Cumu Effe	icant lative	Mitigat Enhance		Criter	ia for Mo	re than A	dditive C	umulativ	e Effects
Effect	Related V	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Participation	Social cohesion and participation	Positve	Yes	Yes	No				n	ı/a			
Social conflict	Social cohesion and participation	n and Positive/ Yes Yes No n/a											

2.1.6.3 Public Infrastructure and Services

Table 2.1-25 Summary Impact Matrix, Cumulative Effects on Public Infrastructure and Services

	ËC	Potentia Project E			ntial for Significant ımulative Effects		itigation/ ancement	Cri	iteria for More	than Additi	ve Cum	ulative Effect	s
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Cumulative Proje	ct Effects, Publ	ic Infrastru	cture a	nd Serv	/ices								
Increase in demand for health services	Social infrastructure and services	Positive	Yes	Yes	No	n/a							
Increase in demand for counseling services	Social infrastructure and services	Positive	No	Yes	No	n/a							
Decrease in demand for social assistance	Social infrastructure and services	Positive	Yes	Yes	No	n/a							
Increase in demand for policing	Policing	Positive	Yes	Yes	No	n/a							

Table 2.1-25 Summary Impact Matrix, Cumulative Effects on Public Infrastructure and Services

	Ü	Potentia Project E			ntial for Significant umulative Effects		itigation/ nancement	Cr	iteria for More	than Additi	ve Cum	ulative Effect	s
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Increase in demand for private housing	Housing	Positive	Yes	Yes	More positive, where the availability of many jobs with multiple mining projects gives people more confidence in security of employment	None	Project sequencing	Positive (more positive)	Not determined	Commun- ities	Long	Not determined	High
Increase in demand for social housing	Housing	Positive	Yes	Yes	No	n/a							
Increased costs for governments	Social infrastructure and services, policing, housing, other infrastructure and services	Negative	No	Yes	No	n/a							

Table 2.1-25 Summary Impact Matrix, Cumulative Effects on Public Infrastructure and Services

	SEC	Potentia Project E			ntial for Significant Imulative Effects		tigation/ ancement	Cri	iteria for More	than Additi	ve Cum	ulative Effect	s
Effect	Related VS	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Effects on increased demand for services on the more vulnerable		Negative	Yes	Yes	No	n/a							

2.1.6.4 Non-traditional Land Use and Land Use Planning

Table 2.1-26 Summary Impact Matrix, Cumulative Effects on Non-Traditional Land Use and Land Use Planning

	SEC		for Project ects	Sig Cur	ential for nificant nulative ffects	Mitiga Enhanc		C	criteria for Mo	re than Additiv	e Cumula	tive Effects		
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence	
Cumulative Pro	ject Effects, l	and Use ar	nd Planning											
Increase in uranium mining as a land use	Mining, tourism, commercial harvesting	Positive	Yes	Yes	No				n/a	1				
Disincentive to tourism as a result of expanded uranium mining	Tourism	Negative	Not determined	Yes	More negative	Mitigation for biological cumulative effects	Land use planning	Not determined	Not determined	Communities	Long	Not determined	High	
Development of tourism as a result of shared use of infrastructure	Tourism	Positive	No	Yes	No n/a									

Table 2.1-26 Summary Impact Matrix, Cumulative Effects on Non-Traditional Land Use and Land Use Planning

	VSEC		for Project fects	Sig Cur	ential for nificant nulative ffects	Mitiga Enhand		C	riteria for Mo	re than Additiv	e Cumula	tive Effects	
Effect	Related V	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Effects on land use in Baker Lake	Land use in Baker Lake	Positive	Yes	Yes	No				n/a	1			
Effects on shipping into Baker Lake	Landuse in Baker Lake	Negative	No	Yes	No				n/a	1			

2.1.6.1 Economy of Nunavut

Table 2.1-27 Summary Impact Matrix, Cumulative Effects on the Economy of Nunavut

	EC	Potentia Projed Effect	ct		otential for Significant Julative Effects	Mitigation/ E	nhancement	Crite	ria for More t	han Additi	ve Cum	ulative Effect	s
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Cumulative F	Project Effec	ts, Econom	y of N	unavu	t								
Contribution to GDP	Economic effects, fiscal effects	Positive	Yes	Yes	Less positive, where there is		As for						
Contribution to employment and labour income	Economic effects, fiscal effects	Positive	Yes	Yes	constrained ability in labour force to take advantage of	As for AREVA's mitigation and enhancement for the local	government mitigation and enhancement for the local	Negative (less positive)	Not determined	Nunavut	Long	Not determined	High
Contribution to revenues of GN and NTI	Fiscal effects	Positive	Yes	Yes	employment opportunities	study area	study area						

Table 2.1-27 Summary Impact Matrix, Cumulative Effects on the Economy of Nunavut

	EC	Potentia Projec Effect	ct	,	otential for Significant Julative Effects	Mitigation/ E	nhancement	Crite	ria for More t	han Additi	ve Cum	ulative Effec	ts
Effect	Related VSEC	Direction	Significance	Additive	More, or Less, than Additive	AREVA	Governments	Direction	Magnitude	Geographic Extent	Duration	Likelihood	Significance Prediction Confidence
Reversal of economic effects in Nunavut	Economic effects, fiscal effects	Negative	Yes	Yes	Less negative, where there is increased availability of alternative employment			Positive (less negative)					
Economic effects in the rest of Canada	Economic effects, fiscal effects	Positive	Yes	Yes	No				n/a				

Table 2.1-28 Summary Impact Matrix

		Re		Residu	al Environmen	tal Effec	cts Characteri	stics	S	_	0 -	
Valued Socio- Economic Component	Mitigation/ Enhancement Measures	Residual Effect	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Effects on Cor	mmunity Econom	nies										
Employment		Yes	Positive	High								
Education and training	Preferential	Yes	Positive	High								
Contracting	hiring and	Yes	Positive	High								Operations
Economic growth and diversification	contracting, education and training, work force	Yes	Positive	Medium	Communities	Long	Continuous	In part	Yes	Very likely	High	Operations, collaborative monitoring
Incomes	management	Yes	Positive	High								
Population change		Yes	Positive	Medium								
Effects on Tra	ditional Culture											
Harvesting	Work force	Yes	Positive/ negative	Medium		_		_	_			
Food security	management measures	Yes	Positive/ negative	Medium	Communities	Long	Continuous	No	Yes	Very likely	Medium	Collaborative monitoring
Language		Yes	Negative	Medium								

Table 2.1-28 Summary Impact Matrix

		Re		Residu	ıal Environmen	tal Effec	ts Characteri	stics	S		0 -	
Valued Socio- Economic Component	Mitigation/ Enhancement Measures	Residual Effect	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Values and knowledge		Yes	Negative	Medium								
Cultural heritage sites		No	n/a									
Effects on Ind	ividual, Family aı	nd Comm	unity Wellb	eing								
Health		Yes	Positive	Medium								
Family function		Yes	Positive	Medium	Communities	Long	Continuous	No	No	Likoly	Medium	
Savings		Yes	Positive	Medium	Communities	Long	Continuous	INO	INO	Likely	iviealum	
Public security	Work force management	Yes	Negative	Medium								Collaborative
Public health and safety	measures, contributions to communities	No	n/a									monitoring
Social cohesion and participation		Yes	Positive/ negative	Medium	Communities	Long	Continuous	No	Yes	Likely	Medium	

Table 2.1-28 Summary Impact Matrix

		Re		Residu	al Environmen	tal Effec	cts Characteri	stics	S	_	0 -	
Valued Socio- Economic Component	Mitigation/ Enhancement Measures	Residual Effect	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring
Effects on Pul	olic Infrastructure	and Serv	/ices									
Social infrastructure and services		Yes	Positive	Medium								
Policing		Yes	Positive	Medium								
Housing		Yes	Positive	Medium								Collaborative
Other infrastructure and services	None practical	Yes	Positive	Medium	Communities	Long	Continuous	No	Yes	Likely	Medium	monitoring
Institutional capacity and governance		Yes	Positive	Medium								
Effects on No	n-Traditional Lan	d Use and	I Land Use	Planning								
Mining		Yes	Positive	Medium	Nunavut and Kivalliq	Long	Continuous	No	Yes	Likely	Medium	
Commercial harvesting	None required	No	n/a									None
Tourism	None required	Yes	Negative	Low	Nunavut and Kivalliq	Long	Continuous	No	Yes	Likely	Medium	
Land Use in Baker Lake		No	n/a									Collaborative monitoring

Table 2.1-28 Summary Impact Matrix

		Residual Effect		Residu	al Environmen	tal Effec	ts Characteri	S	_	0 -			
Valued Socio- Economic Component	Mitigation/ Enhancement Measures		Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Significance	Likelihood	Prediction Confidence	Recommended Follow-up and Monitoring	
Effects on the Economy of Nunavut													
Economic effects	None required	Yes	Positive	High	Nunavut	Long	Continuous	In nort	Yes	Very	High	None	
Fiscal effects		Yes	Positive	High				part		likely			

2.2 Assessment of Cumulative Environmental Effects

2.2.1 Screening for Potential Cumulative Effects

Cumulative environmental effects are only assessed if the following criteria are met for the residual Project effect under consideration:

- The Project will result in a measurable, demonstrable or reasonably-expected residual environmental effect on a component of the biophysical or socio-economic environment,
- The Project-specific residual environmental effect on the component will likely act in a cumulative fashion with the environmental effects of other past or future projects or activities that are likely to occur (i.e., Is there overlap of environmental effects?), and
- There is a reasonable expectation that the Project's contribution to cumulative environmental
 effects will be substantive, measurable or discernible such as that it will affect the viability or
 sustainability of the resource.

If, based on these criteria, there is potential for cumulative environmental effects, the effect is assessed further to determine if it is likely to shift the component to an unacceptable state. Where there is no potential for the environmental effect of the Project to spatially or temporally overlap with similar effects of other project and activities, justification for not carrying these environmental effects forward to the assessment of cumulative environmental effects is provided.

2.2.2 Significance of Residual Cumulative Environmental Effects

The significance of cumulative environmental effects is determined using standards or thresholds that are specific to the VC, KI and/or measurable parameters used to assess the Project environmental effect. Determinations of significance are made for:

- the significance of the total residual cumulative environmental effect; and
- the significance of the contribution of the Project to the total residual cumulative environmental effect.

The determination of residual cumulative environmental effects includes a discussion of the confidence of the prediction based on scientific certainty relative to:

- quantifying or estimating the environmental effect (i.e., quality and/or quantity of data, understanding of the effects mechanisms), and
- the effectiveness of the proposed mitigation measures.

As for residual Project environmental effects, prediction confidence for the cumulative environmenta effect and the success of mitigation measures is ranked as low, moderate or high.

2.2.3 Air Quality

Table 2.2-1 Summary of Residual Cumulative Environmental Effects on Air Quality

Cumulative Environmental Effect Case Change in Air Quality – Preferred Option Change in Air Quality – Preferred Option Change in Air Quality – Preferred Option Ambient 1-hour NO2 Concentration (Project Case) Ambient 24-hour NO2 Cumulative Effect with Project (Project Case) Meadowbank General and activity-specific measures – Tier 2, Volume 4, part 1, Section 6.2.2.2 Ambient 24-hour NO2 Cumulative Effect with Project Concentration Case Mitigation and Compensation Measures Meadowbank General and activity-specific measures – Tier 2, Volume 4, part 1, Section 6.2.2.2 Ambient 24-hour NO2 Cumulative Effect with Project Concentration Case Meadowbank General and activity-specific measures – Tier 2, Volume 4, part 1, Section 6.2.2.2			Des	dual	nce				
Ambient 1-hour NO2 Cumulative Effect with Project (Project Case) Ambient 24-hour NO2 Cumulative Effect with Project (Project Case) Ambient 24-hour NO2 Cumulative Effect with Project NO2 Concentration Meadowbank General and activity-specific measures – Tier 2, Volume 4, part 1, Section 6.2.2.2 Meadowbank General and activity-specific measures – Tier 2, NS NS NS NS NS NS NS NS NS NS NS NS NS NS N	Environmental Cas	Activities and	Case	Compensation	Magnitude	Geographic Extent Frequency Reversibility			Significar
NO2 Concentration Effect with Project (Project Case) Ambient 24-hour NO2 Effect with Project NO2 Concentration Cumulative Effect with Project Meadowbank General and activity-specific measures – Tier 2, Volume 4, part 1, Section 6.2.2.2 Meadowbank General and activity-specific measures – Tier 2, NS NS	Change in Air Quality – Prefe	d Option	ity – Preferred O						
NO ₂ Effect with activity-specific measures – Tier 2,	NO ₂ Effect with Project		Effect with Project	activity-specific measures – Tier 2, Volume 4, part 1,	Н	F*	I	R	NS
(Project Case) Volume 4, part 1, Section 6.2.2.2	NO ₂ Effect with Project		Effect with Project	activity-specific measures – Tier 2, Volume 4, part 1,	М	F*	I	R	NS
KEY Magnitude: L Low: The predicted COPC concentrations are less than 25% greater than the Indicator Threshold criterion. M Moderate: The predicted COPC concentrations are less than 100% greater than the Indicator Threshold. H High: The predicted COPC concentrations are more than 100% greater than the Indicator Threshold. H High: The predicted COPC concentrations are more than 100% greater than the Indicator Threshold. Geographic Extent: F Footprint: Effect confined to the project footprint L Local: Effect extends beyond the LAA but within the RAA Magnitude: ST Short term: Less than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) MT Medium term: More than one year (growing season) Influed Influe	Magnitude: L Low: The predicted COPC concentrations are less the 25% greater than the Indic Threshold criterion. M Moderate: The predicted Concentrations are less the 100% greater than the Ind Threshold. H High: The predicted COPC concentrations are more the 100% greater than the Ind Threshold. Geographic Extent: F Footprint: Effect confined project footprint F* Footprint: Effect confined from the project footprint L Local: Effect confined to the LAA R Regional: Effect extends I	ST Short term:	are less than an the Indicator ion. predicted COPC are less than an the Indicator cted COPC are more than an the Indicator are transported to the ct confined to the offined to the ct extends beyond	son) More than one beyond the end of missioning eyond the life of the ccurs less than 1% of more than 4 days per urs per year) curs less than 12 days o more than 12 days o hours per year) urs less than 15% of more than 55 days soo hours per year) the effect occurs	S Si N No Likelil Based L Lo M M H Hi Predic Based statisti judgme L Lo M M H Hi	gnificant of Significant of Significant on profesow probabledium profesom con scient analysent and electron con scient and ele	ssional joility of cobability of cobability of coffidence confidence confidence if confidence from the confidence of confidence	occurrence of occurrence: rmation a essional ness of mence confidence	ce rrence ce and nitigation

2.2.4 Terrestrial

Table 2.2-2 Summary of Residual Cumulative Environmental Effects on Caribou and Muskox

				Re	sidual (Cumulat Cha	ive Env	<u>S</u>	0.7	_	Proposed			
Cumulative Environmental Effect	Case	Other Projects, Activities and Actions	Mitigation and Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Prediction Confidence	Likelihood	Follow-up and Monitoring Programs
Changes in Mortality Risk	Cumulative Effect with Project (Future Case)	Meadowbank Mine access road, harvesting activities across ranges		N	N	N	MT	R	R	D	N	М	N/A	Agency responsibility
	Project Contribution to Cumulative Effect	Unintended harvester access		N	N	N	MT	R	R	U	N	М	N/A	Private road, road closure, access management
Changes in Habitat Availability	Cumulative Effect with Project (Future Case)	Meadowbank Mine, various exploration operations, and various regional communities	Dust management; Minimize Project footprint; Progressive reclamation	N	L	N	LT	С	R	D	N	М	N/A	Contribution to collaring program
	Project Contribution to Cumulative Effect	NA	NA	N	L	N	LT	С	R	U	N	М	N/A	Quantify Project footprint on an annual basis

Table 2.2-2 Summary of Residual Cumulative Environmental Effects on Caribou and Muskox

KEY

Direction:

- P Positive
- N Negative

Magnitude:

- N Negligible: No anticipated effect on wildlife species.
- L Low: Observable effect on wildlife species but not likely to affect the species' sustainability in the LAA.
- M Moderate: Observable effect on wildlife species but not likely to affect the species' sustainability in the RAA.
- H High: Measurable effect on wildlife species that will likely affect the species' sustainability in the RAA.

Geographic Extent:

- S Site specific
- L Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the RAA
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- O Once: Effect occurs once
- S Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- D Developed: Area has been substantially previously disturbed by human development or human development is still present

N/A Not Applicable

Significance:

- S Significant
- N Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- L Low probability of occurrence
- M Medium probability of occurrence
- H High probability of occurrence

Other Projects, Activities and Actions:

Human disturbance associated with Meadowbank Mine, various exploration operations, and various regional communities.

Table 2.2-2 Summary of Residual Cumulative Environmental Effects on Migratory Birds

				Res	sidual C	umulat Cha	ve Envi racteris		Ø	0.7				
Cumulative Environmental Effect	Case	Other Projects, Activities and Actions	Mitigation and Compensation Measures	Magnitude Direction		Geographic Extent Magnitude		Frequency	Reversibility	Environmental Context	Significance	Prediction Confidence	Likelihood	Proposed Follow- up and Monitoring Programs
Changes in Habitat Availability	Cumulative Effect with Project (Future Case)	Meadowbank Mine, various exploration operations, and various regional communities	Dust management; Minimize Project footprint; Progressive reclamation	N	N	L	LT	С	R	D	N	Н	N/A	None
	Project Contribution to Cumulative Effect	NA	NA	N	N	L	LT	С	R	D	N	Н	N/A	NA

Table 2.2-2 Summary of Residual Cumulative Environmental Effects on Migratory Birds

KEY

Direction:

- P Positive
- N Negative

Magnitude:

- N Negligible: No anticipated effect on wildlife species.
- Low: Observable effect on wildlife species but not likely to affect the species' sustainability in the LAA.
- M Moderate: Observable effect on wildlife species but not likely to affect the species' sustainability in the RAA.
- H High: Measurable effect on wildlife species that will likely affect the species' sustainability in the RAA.

Geographic Extent:

- S Site specific
- L Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the RAA
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- O Once: Effect occurs once
- S Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- I Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- D Developed: Area has been substantially previously disturbed by human development or human development is still present

N/A Not Applicable

Significance:

- S Significant
- N Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- L Low probability of occurrence
- M Medium probability of occurrence
- H High probability of occurrence

Other Projects, Activities and Actions:

Human
disturbance
associated
with
Meadowbank
Mine, various
exploration
operations,
and various
regional
communities.

Table 2.2-3 Summary of Residual Cumulative Environmental Effects on Species at Risk — Short-eared Owl Habitat Availability

					ual Cu cterist	mulativ ics	e Envir	onmen	tal Effe	cts	(A)			Proposed	
Cumulative Environmental Effect	Case	Other Projects, Activities and Actions	Mitigation and Compensation Measures	Direction	Magnitude	Geographic Extent	Duration	Frequency	Reversibility	Environmental Context	Significance	Prediction Confidence	Likelihood N/A	Proposed Follow-up and Monitoring Programs	
Changes in Habitat	Cumulative Effect with Project (Future Case)	Meadowbank Mine, various exploration operations, and various regional communities	Dust management; Minimize Project footprint; Progressive reclamation	N	N	L	LT	С	R	D	N	Н	N/A	None	
Availability	Project Contribution to Cumulative Effect	NA	NA	N	N	L	LT	С	R	D	N	Н	N/A	NA	

Table 2.2-3 Summary of Residual Cumulative Environmental Effects on Species at Risk — Short-eared Owl Habitat Availability

KEY

Direction:

- P Positive
- N Negative

Magnitude:

- N Negligible: No anticipated effect on wildlife species.
- L Low: Observable effect on wildlife species but not likely to affect the species' sustainability in the LAA.
- M Moderate: Observable effect on wildlife species but not likely to affect the species' sustainability in the RAA.
- H High: Measurable effect on wildlife species that will likely affect the species' sustainability in the RAA.

Geographic Extent:

- S Site-specific
- L Local: Effect confined to the LAA
- R Regional Effect extends beyond the LAA but within the
- T Territorial: Effect extends beyond the RAA but within Nunavut
- N National: Effect extends beyond Nunavut but within Canada

Duration:

- ST Short term: Less than one year
- MT Medium term: More than one year, but not beyond the end of Project decommissioning
- LT Long term: Beyond the life of the Project

Frequency:

- Once: Effect occurs once
- S Sporadically: Effect occurs occasionally but not consistently throughout the life of the Project
- R Regularly: Effect occurs at regular intervals throughout the life of the Project
- C Continuous: Effect occurs continuously throughout the Project

Reversibility:

- R Reversible: Will likely recover to baseline conditions after or before the end of Project decommissioning
- Irreversible: Unlikely to recover to baseline conditions after the end of Project decommissioning

Environmental Context:

- U Undisturbed: Area relatively or not adversely affected by human activity
- D Developed: Area has been substantially previously disturbed by human development or human development is still present

N/A Not Applicable

Significance:

- S Significant
- N Not significant

Prediction Confidence:

Based on scientific information and statistical analysis, professional judgment and effectiveness of mitigation

- L Low level of confidence
- M Moderate level of confidence
- H High level of confidence

Likelihood of Significant Effects:

Based on professional judgment

- L Low probability of occurrence
- M Medium probability of occurrence
- H High probability of occurrence

Other Projects, Activities and Actions:

Human disturbance associated with Meadowbank Mine, various exploration operations, and various regional communities.