



MEADOWBANK GOLD PROJECT
Draft Environmental Impact Statement

PART 2: APPENDICES

December 2004

CUMBERLAND

RESOURCES LTD.



MEADOWBANK GOLD PROJECT

Draft Environmental Impact Statement

PART 1: REPORT

PART 2: APPENDICES

December 2004

APPENDIX A

List of Consultants, Organizations & References

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APPENDIX B

Environmental Assessment Impact Matrices

Table B1.1: Permafrost Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Construction Noise & Activity	Noise N/A; activity related to specific structures dealt with below	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dykes												
East Dike	Permafrost aggradation and formation of new active layer in portion of dike above 2PL level, including abutments - POSITIVE	gain	local	infrequent	Permanent	all year	enhancement	none	N/A	N/A	certain	Commence ground temperature monitoring in dikes and dike foundation as soon as possible. Commence slope monitoring as soon as structures are completed.
Tailings Dike	Permafrost aggradation and formation of new active layer - POSITIVE	gain	local	infrequent	Permanent	all year	enhancement	none	N/A	N/A	certain	Commence ground temperature monitoring in dikes and dike foundation as soon as possible. Commence slope monitoring as soon as structures are completed. Commence sub permafrost pore pressure monitoring as soon as the structure is completed.
Bay Zone Dike	Permafrost aggradation and formation of new active layer in portion of dike above 3PL level, including abutments - POSITIVE	gain	local	infrequent	Permanent	all year	enhancement	none	N/A	N/A	certain	Commence ground temperature monitoring in dikes and dike foundation as soon as possible. Commence slope monitoring as soon as structures are completed.
Goose Island & South Camp Island Dikes	Constructed during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering												
Second Portage Lake	A - Permafrost aggradation in talik under former 2PL NW arm and formation of a new active layer - POSITIVE; B - lowering of water table in nearby bogs and in bogs along tributary streams will cause temporary deepening of the active layer, minor warming of permafrost, melting of ground ice, thaw subsidence and sediment loss	A – gain B - loss	A – local B - footprint	infrequent	A – permanent B - short-term	A - all year B - summer	A - enhanc. B - high	B only: Silt fences to restrict movement of sediment into diked off portion of 2PL; adjust pumping rate to deal with possible high TSS; use NW corner as clarification pond, as required; in last phase of drawdown use locally isolated clarification pond(s) inside diked off area, as required	none	B only: High, although the condition is of limited concern because the polygons affected will ultimately be covered by tailings	High, assuming excess ground ice is present	B only: Only required during dewatering in so far as the condition influences TSS build-up in pumped discharge from pond
Portage Pit (Third Portage Lake)	A - Permafrost aggradation in talik under former 3PL north central shoreline area and formation of a new active layer - POSITIVE; B - lowering of water table in nearby possibly ice rich areas may cause temporary deepening of the active layer, minor warming of permafrost, melting of ground ice, thaw subsidence and sediment loss	A – gain B - loss	A – local B - footprint	infrequent	A – permanent B - short-term	A - all year B - summer	A - enhanc. B - high	B only: Silt fences to restrict movement of sediment into diked off portion of 3PL; adjust pumping rate to deal with possible high TSS; in last phase of drawdown use locally isolated clarification pond(s) inside diked off area, as required	none	B only: High, and relatively more important than the 2PL dewatering (above) because polygon that may be affected will become shoreline of 3PL at closure	Moderate because likelihood of widespread excess ground ice is very limited	B only: Only required during dewatering in so far as the condition influences TSS build-up in pumped discharge from pond
Goose Island (Third Portage Lake)	Dewatered during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage Pit	A - Loss of permafrost, cooling of remaining permafrost, and development of a new active layer in terrestrial areas; B - aggradation of permafrost and development of a new active layer in talik under former 2PL NW arm	A – loss B - gain	local	infrequent	A - short-term B - medium-term	all year	A – low B - enhance.	none	N/A	low	certain	none recommended
Goose Island Pit	Constructed during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	none recommended
Portage Rock Storage Facility	A - Fall, winter and spring construction activity will bury the natural ground surface and permafrost will aggrade into the waste rock where a new active layer will form - POSITIVE; B - Placement of lifts on natural ground in the summer may cause temporary deepening of the active layer, warming of near-surface permafrost, and possible subsidence, particularly in low lying bog areas	A – gain B - loss	A – local B - footprint	infrequent	A – permanent B - short-term	A – winter B - summer	A - enhanc. B - high	B only: Schedule placement of waste rock on thaw-sensitive polygons during winter months, possibly in conjunction with proactive measures to enhance ground chilling prior to placement (e.g. snow removal and/or compaction); use flatter side slopes	none	B only: Low	moderate	Internal and foundation temperatures to be monitored
Borrow Pit(s) (All borrow material is currently planned to be taken from the ultimate pit boundaries.)	Loss of permafrost, cooling of remaining permafrost, and development of a new active laver	loss	local	infrequent	Short-term	all year	low	none	N/A	low	certain	none recommended

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Storage Facilities	Permafrost aggradation and development of a new active layer in talik under former 2PL NW Arm - POSITIVE	gain	local	infrequent	Short-term	all year	enhancement	none	N/A	N/A	certain	N/A
Main Site Roads & Traffic	A - Loss of permafrost, cooling of remaining permafrost, and development of a new active layer in cut sections; B - permafrost aggradation, warming of underlying natural permafrost, and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	all year	low	none	N/A	low	certain	none recommended
Airstrip & Air Traffic	A - Loss of permafrost, cooling of remaining permafrost, and development of a new active layer in cut sections; B - permafrost aggradation, warming of underlying natural permafrost, and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	all year	low	none	N/A	low	certain	none recommended

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Ditches (Roads, Airstrip & Contact Water)	A - Loss of permafrost, warming of remaining permafrost, and development of a new active layer in cut sections; B - where ditches are excavated through bogs, there is potential for deepening of the active layer, warming of permafrost, ground ice degradation and related thaw subsidence, slumping and sediment losses	loss	A – local B - footprint	infrequent	A – permanent B - permanent	A - all year B - summer	A - low B - high	B only: Where thaw sensitive polygons are crossed, avoid using cut sections for ditches, ensure positive drainage away from fill sections, avoid concentrating runoff waters, or use rock aprons to slow the rate of thaw penetration and stabilize the underlying soils	none	B only: Low	high	B only - Further assessment of susceptible locations along proposed ditch centrelines is required
Mine Plant & Associated Facilities	A - Loss of permafrost, cooling of remaining permafrost, and development of a new active layer in cut sections; B - permafrost aggradation, warming of underlying natural permafrost, and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	all year	low	none	N/A/	low	certain	none recommended

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Freshwater Intake & Pipeline	A - Loss of permafrost at wet well excavation, warming of remaining permafrost around the excavated wet well, and local re-establishment of active layer ; B - potential warming of permafrost and deepening of active layer associated with pipeline	loss	local	infrequent	A – permanent B - short-term	all year	low	none	N/A	low	certain	none recommended
Discharge Facilities & Pipeline	A - Subaqueous discharge facility construction has no affect on permafrost; B - potential warming of permafrost and deepening of active layer associated with pipeline	negligible	local	infrequent	A - N/A B - short-term	A - N/A B - all year	low	none	N/A	low	certain	none recommended

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Non-Contact Diversion Facilities	A - Loss of permafrost, warming of remaining permafrost, and deepening of the active layer along ditches; B - where ditches are excavated through bogs, there is potential for deepening of the active layer, warming of permafrost, ground ice degradation and related thaw subsidence, slumping and sediment losses	loss	A – local B - footprint	infrequent	Short-term	A - all year B - summer	A – low B - high	B only: Where thaw sensitive polygons are crossed, avoid using cut sections for ditches, ensure positive drainage away from fill sections, avoid concentrating runoff waters, or use rock aprons to slow the rate of thaw penetration and stabilize the underlying soils	none	B only: High	certain	B only - Further assessment of susceptible locations along proposed ditch centrelines is required; selection of materials used as rock aprons, if required, must be done in keeping with the "non-contact" zonation
Laydown Storage (at Plant Site)	A - Loss of permafrost, cooling of remaining permafrost, and development of a new active layer in cut sections; B - permafrost aggradation, warming of underlying natural permafrost, and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	all year	low	none	N/A	low	certain	none recommended

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
AN/Explosives Storage & Emulsion Plant	A - Loss of permafrost, cooling of remaining permafrost, and development of a new active layer in cut sections; B - permafrost aggradation, warming of underlying natural permafrost, and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	all year	low	none	N/A	low	certain	none recommended
Site Accommodations	A - Loss of permafrost, cooling of remaining permafrost, and development of a new active layer in cut sections; B - permafrost aggradation, warming of underlying natural permafrost, and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	all year	low	none	N/A	low	certain	none recommended
Sewage & Waste Disposal	A - Loss of permafrost, cooling of remaining permafrost, and development of a new active layer in cut sections; B - permafrost aggradation, warming of underlying natural permafrost, and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	all year	low	none	N/A	low	certain	none recommended

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
VAULT FACILITIES												
Construction Noise & Activity	Noise N/A; activity related to specific structures dealt with below	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Dike	Constructed during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Lake Dewatering & Drainage Facilities	Dewatered during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Lake-Phaser Lake Berm	Constructed during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Phaser Lake Operation	Constructed during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Pit	Constructed during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Waste Dump	Constructed during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Access Road & Traffic												
Access Road Culverts (Tern Lake)	Constructed during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Shop/Office	Constructed during operations - see comments in operations matrix	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTHER FACILITIES												
Winter Road & All Terrain Vehicle Traffic	Chilling of permafrost and decrease in active layer thickness beneath winter roads - POSITIVE	gain	local	infrequent	Medium-term	winter	low	none	N/A	low	certain	none recommended

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road & Traffic	A - Loss of permafrost and development of a new active layer in cut sections; B - permafrost aggradation and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	A - all year B - winter	low	none	N/A	low	certain	none recommended
Barge Landing Facility	A - Loss of permafrost and development of a new active layer in cut sections; B - permafrost aggradation and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	A - all year B - winter	low	none	N/A	low	certain	none recommended
Barge Traffic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
In-town Staging Facility (approx. 1.5 km east of town)	A - Loss of permafrost and development of a new active layer in cut sections; B - permafrost aggradation and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	A - all year B - winter	low	none	N/A	low	certain	none recommended
Explosives Magazine	A - Loss of permafrost and development of a new active layer in cut sections; B - permafrost aggradation and formation of new active layer in fill sections - POSITIVE	negligible	local	infrequent	A – permanent B - medium-term	A - all year B - winter	low	none	N/A	low	certain	none recommended

Table B1.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm (40 million litres)	A - Loss of permafrost and development of a new active layer in cut sections; B - permafrost aggradation and formation of new active layer in fill sections - POSITIVE	gain	local	infrequent	A – permanent B - medium-term	A - all year B - winter	low	none	N/A	low	certain	none recommended

Table B1.2: Permafrost Impact Matrix – Operation

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Construction Noise & Activity	Noise N/A; activity related to specific structures dealt with below	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dikes												
East Dike	Continued permafrost aggradation and stabilization of new active layer in upstream portion of dike above 2PL level, across top, all of downstream side, and all sides of the abutments - POSITIVE	gain	local	infrequent	medium-term	all year	enhancement	none	N/A	N/A	certain	Monitoring of ground temperatures to ensure permafrost aggradation into the dike. This will facilitate optimum closure planning. Monitoring of slopes.
Tailings Dike	Continued permafrost aggradation and stabilization of new active layer - POSITIVE	gain	local	infrequent	medium-term	all year	enhancement	none	N/A	N/A	certain	Monitor ground temperatures and sub permafrost pore pressures to ensure permafrost aquitard can be relied upon as an effective barrier against contaminant movement from the tailings facility eastward toward the Portage Pit.

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Bay Zone Dike	Continued permafrost aggradation and stabilization of new active layer in upstream portion of dike above 3PL level, across top, all of downstream side, and all of abutments - POSITIVE; later, after construction of Goose Island & 3PL dikes and dewatering of pond, permafrost aggradation into upstream side and development of a new active layer - POSITIVE; finally, loss of this permafrost and development of a new active layer where portions of the dike are removed for completion of the Portage Pit	gain	local	infrequent	medium-term	all year	enhancement	none	N/A	N/A	certain	Monitoring of ground temperatures to ensure permafrost aggradation into the dike. This will facilitate optimum closure planning. Monitoring of slopes.
Goose Isl. & South Camp Isl. Dikes	Permafrost aggradation and formation of new active layer in portion of dike above 3PL level on upstream side, across top, all of downstream side, and all of abutments - POSITIVE	gain	local	infrequent	medium-term	all year	enhancement	none	N/A	N/A	certain	Commence ground temperature monitoring in dike and dike foundation as soon as possible. Continue monitoring to ensure permafrost aggradation into the dike. This will facilitate optimum closure planning. Commence slope monitoring as soon as the structure is completed.

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering												
Second Portage Lake	Continued permafrost aggradation in talik under former 2PL NW arm and stabilization of new active layer as long as subaerial exposure persists - POSITIVE; loss of this permafrost when levels of reclaim and attenuation ponds rise and flood former lake bottom; re-establishment of permafrost and development of a new active layer in conjunction with subaerial tailings deposition	gain	local	infrequent	permanent	all year	low	none	N/A	low	certain	Representative monitoring of ground temperatures to ensure permafrost aggradation into the talik beneath 2PL. Assessment of anticipated ice entrapment (i.e. ground ice development) in conjunction with permafrost aggradation. Assessment of suspected ground ice development in conjunction with permafrost aggradation (ie. outside of tailings area). These initiatives will facilitate optimum closure planning of the tailings facility.
Portage Pit (Third Portage Lake)	Continued permafrost aggradation in talik under former 3PL north central shoreline area and stabilization of new active layer as long as subaerial exposure persists; loss of a portion of this permafrost and formation of a new active layer as the Portage pit walls are pushed back	gain	local	infrequent	medium-term	all year	low	none	N/A	low	certain	Assessment of suspected ground ice development in conjunction with permafrost aggradation. Assessment of ground ice content of select shoreline polygons.

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island (Third Portage Lake)	A - Permafrost aggradation in talik under former 3PL NE arm and formation of a new active layer; B - lowering of water table in nearby possibly ice rich areas may cause temporary deepening of the active layer, minor warming of permafrost, melting of ground ice, thaw subsidence and sediment loss	A – gain B - loss	A – local B - footprint	infrequent	medium-term	A – winter B - summer	A - enhanc. B - high	B only: Silt fences to restrict movement of sediment into diked off portion of 3PL; adjust pumping rate to deal with high TSS; in last phase of drawdown use locally isolated clarification pond(s) inside diked off area	none	B only: High and relatively more important than the 2PL dewatering because polygon affected will become shoreline of 3PL at closure	Moderate because likelihood of widespread excess ground ice is very limited	B only: Only required during dewatering in so far as the condition influences TSS build-up in pumped discharge from pond. Assessment of suspected ground ice development in conjunction with permafrost aggradation. Assessment of ground ice content of select shoreline polygons. These initiatives will facilitate optimum closure planning.
Pits												
Portage Pit	A - Loss of permafrost and development of a new active layer in terrestrial areas as pit slopes are pushed back; B - aggradation of permafrost and development of a new active layer in talik under former 2PL NW arm after mining of benches is completed	A - loss B - gain	local	infrequent	medium-term	all year	A - low B - enhance.	none	N/A	low	certain	Assessment of suspected ground ice development in conjunction with permafrost aggradation.

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island Pit	A - Loss of permafrost and development of a new active layer in terrestrial areas as pit slopes are pushed back; B - aggradation of permafrost and development of a new active layer in talik under former 2PL NW arm and 3PL NE arm after mining of benches is completed	A - loss B - gain	local	infrequent	medium-term	all year	A - low B - enhance.	none	N/A	low	certain	none recommended

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage Rock Storage Facility	A - Fall, winter and spring placement will continue to bury the natural ground surface and permafrost will aggrade into the waste rock where a new and temporary active layer will form - POSITIVE; B - placement of lifts on natural ground in the summer may continue to cause temporary and localized deepening of the active layer, warming of near-surface permafrost and possible subsidence, particularly in low-lying areas; C - where new lifts are added to older lifts, permafrost will continue to aggrade into both new and older waste rock and new active layers will form, although summer placement conditions will include temporary and localized loss of new permafrost, the net effect will be permafrost aggradation and general ground cooling - NET POSITIVE	A – gain B – loss C - gain	A – local B – footprint C - local	infrequent	A – permanent B - medium-term C - permanent	A – winter B – summer C - all year	A - enhanc. B – high C - enhanc.	B only: Schedule placement of waste rock on thaw-sensitive polygons during winter months, possibly in conjunction with proactive measures to enhance ground chilling prior to placement (e.g. snow removal and/or compaction); use flatter side slopes	none	B only: Low	moderate	Internal and foundation temperatures to be monitored. These initiatives will facilitate optimum cap rock design and closure planning of the Portage waste rock pile.

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Borrow Pit(s) (All borrow material is currently planned to be taken from the ultimate pit boundaries)	Loss of permafrost, cooling of remaining permafrost, and development of a new active layer where pits continue to be operated; stabilization of permafrost temperatures and active layer thickness soon after operations cease	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Storage Facilities	Permafrost aggradation into subaerial tailings and ice entrapment. Entrapped ice originates from in situ freezing of transport water as interstitial ground ice and burial of reclaim/attenuation pond ice during winter operations. The large quantity of ice that forms in the long and cold winter months together with the high latent heat barrier it represents to melting in the short summer season accounts for the net accumulation of entrapped ice. The preliminary tailings facility design report provides volume elevation curves for 0%, 10%, 20% and 30% net volume entrapment scenarios	gain	local	infrequent	permanent	all year	Aggradation of permafrost is an enhancement, however, ice entrapment in the permafrost is assessed as a high unmitigated effect.	Ice entrapment can be managed in one of three ways: First, by subaqueous discharge during the winter months; second, by minimizing the thickness of winter placement to what will thaw the following summer season, which is usually 1 to 1.5 metres; and third, by thicker subaerial deposition where the entrapped ice content of the new permafrost is monitored so as to keep the net volume of entrapped ice within the design tolerance, which is less than or equal to 30% of the total unfrozen tailings volume. Choosing the first option requires relatively more reclaim / attenuation pond volume. Choosing the second or third options requires careful monitoring and regular relocation of the spigot points.	none	high	high	Ice entrapment is poorly constrained at this time, although there is momentum in the Northern Mining Industry toward valuable research and development (e.g. Diavik Diamond Mines water license).
Main Site Roads & Traffic	Stabilization of permafrost temperatures and active layer thickness	negligible	local	infrequent	medium-term	all year	low	none	N/A	low	certain	none recommended

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip & Air Traffic	Stabilization of permafrost temperatures and active layer thickness	negligible	local	infrequent	medium-term	all year	low	none	N/A	low	certain	none recommended
Ditches (Roads, Airstrip & Contact Water)	Stabilization of permafrost temperatures and active layer thickness; stabilization of thaw subsidence and sediment loss in bog areas	negligible	local	infrequent	permanent	all year	medium	Silt fences as required to manage sediment loss; rock aprons as required to slow the rate of thaw penetration and stabilize the underlying soils	none	low	moderate	none recommended
Mine Plant & Associated Facilities	A - Stabilization of permafrost temperatures and active layer thickness in outside areas; B - loss of permafrost under heated structures and potential settlement where ground ice is present and degrades under imposed ground temperatures	A – negligible B - loss	local	infrequent	medium-term	all year	A – low B - high	B only: Locate heated structures (at the design phase) where ground ice is not present in the subgrade materials. Alternatively, insulate foundations to retard thaw; artificially chill foundations to prevent thaw; and/or elevate structures on piles or insulated gravel pads to prevent thaw.	none	low	moderate	B only: Ground temperature measurements will be taken during operations where there is a need to monitor foundation temperatures
Freshwater Intake & Pipeline	Stabilization of permafrost temperatures and active layer thickness in the vicinity of the wet well and beneath the pipeline	negligible	local	infrequent	medium-term	all year	low	Use insulated pipe with heat tracing; elevate pipeline across thaw sensitive terrain	none	low	moderate	Monitor pipeline alignment for potential permafrost degradation. Monitoring may include one or both of ground surveys or ground temperature measurements.

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Discharge Facilities & Pipeline	Stabilization of permafrost temperatures and active layer thickness beneath the pipeline	negligible	local	infrequent	medium-term	all year	low	Use insulated pipe with heat tracing; elevate pipeline across thaw sensitive terrain	none	low	moderate	Monitor pipeline alignment for potential permafrost degradation. Monitoring may include one or both of ground surveys or ground temperature measurements.
Non-Contact Diversion Facilities	Stabilization of permafrost temperatures and active layer thickness; stabilization of thaw subsidence and sediment loss in bog areas	negligible	local	infrequent	permanent	all year	medium	Silt fences as required to manage sediment loss; gravel aprons as required to slow the rate of thaw penetration and stabilize the underlying soils	none	low	moderate	none recommended
Laydown Storage (at Plant Site)	Stabilization of permafrost temperatures and active layer thickness	negligible	local	infrequent	medium-term	all year	low	none	N/A	low	certain	none recommended
AN/Explosives Storage & Emulsion Plant (assumes buildings are not heated)	Stabilization of permafrost temperatures and active layer thickness	negligible	local	infrequent	medium-term	all year	low	none	N/A	low	certain	none recommended
Site Accommodations	A - Stabilization of permafrost temperatures and active layer thickness in outside areas; B - loss of permafrost under heated structures and potential settlement where ground ice is present and degrades under imposed ground temperatures	A - negligible B - loss	local	infrequent	medium-term	all year	A – low B - high	B only: Locate heated structures (at the design phase) where ground ice is not present in the subgrade materials. Alternatively, insulate foundations to retard thaw; artificially chill foundations to prevent thaw; and/or elevate structures on piles or insulated gravel pads to prevent thaw.	none	low	moderate	B only: Ground temperature measurements will be taken during operations where there is a need to monitor foundation temperatures

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Sewage & Waste Disposal	A - Stabilization of permafrost temperatures and active layer thickness in outside areas; B - loss of permafrost under heated structures and potential settlement where ground ice is present and degrades under imposed ground temperatures	A – negligible B - loss	local	infrequent	medium-term	all year	A - low B - high	B only: Locate heated structures (at the design phase) where ground ice is not present in the subgrade materials. Alternatively, insulate foundations to retard thaw; artificially chill foundations to prevent thaw; and/or elevate structures on piles or insulated gravel pads to prevent thaw.	none	low	moderate	B only: Ground temperature measurements will be taken during operations where there is a need to monitor foundation temperatures
VAULT FACILITIES												
Construction Noise & Activity	Noise N/A; activity related to specific structures dealt with below	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Dike	Permafrost aggradation and formation of new active layer in portion of dike above Vault Lake level on upstream side, across top, all of downstream side, and all of abutments - POSITIVE	gain	local	infrequent	medium-term	all year	enhancement	none	N/A	N/A	certain	N/A

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Lake Dewatering & Drainage Facilities	A - Permafrost aggradation in talik under former Vault Lake and formation of a new active layer; B - lowering of water table in nearby possibly ice rich areas may cause temporary deepening of the active layer, minor warming of permafrost, melting of ground ice, thaw subsidence and sediment loss	A – gain B - loss	A – local B - footprint	infrequent	medium-term	A - all year B - summer	A - enhanc. B - high	B only: Silt fences to restrict movement of sediment into diked off portion of Vault Lake; adjust pumping rate to deal with high TSS	none	B only: Medium because affected shoreline polygons are expected to quickly stabilize and Vault attenuation pond has high clarification capacity	A – certain B - moderate because likelihood of widespread excess ground ice is very limited	B only: Only required during initial drawdown in so far as the effect influences TSS build-up in pumped discharge from Vault Lake. Assessment of suspected ground ice development in conjunction with permafrost aggradation into former lake bottom.
Vault Lake-Phaser Lake Berm	A - Permafrost aggradation and formation of new active layer in berm; B - lowering of water table in Vault and Phaser lakes may cause temporary deepening of the active layer, warming of permafrost, melting of ground ice, thaw subsidence and sediment loss in local areas near structures, particularly in low lying bog areas	A – gain B - loss	A – local B - footprint	Infrequent	medium-term	A - all year B - summer	A - enhanc. B - high	B only: Schedule placement of fill on thaw-sensitive polygons during winter months, possibly in conjunction with proactive measures to enhance ground chilling prior to placement (e.g. snow removal and/or compaction); flatter sideslopes in affected areas; and/or subexcavate thaw sensitive soils.	none	B only: High	moderate	Further site investigations, geothermal modelling and slope stability analyses are needed during the next phase of study. These initiatives will facilitate optimum berm design and closure planning; and, are expected to reduce the residual impacts to a "low".

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Phaser Lake Operation	A - Permafrost will begin to aggrade into the subaerial portion of lake bottom during the first winter following dewatering; permafrost will be maintained in any portion of the former lake bottom that is not re-flooded with non-contact runoff and a new active layer will stabilize; B - lowering of water table in nearby bogs and in bogs along tributary streams may cause temporary deepening of the active layer, warming of permafrost, melting of ground ice, thaw subsidence and sediment loss	A – gain B - loss	A – local B - footprint	infrequent	medium-term	A - all year B - summer	A - enhanc. B - high	B only: Silt fences to restrict movement of sediment into Phaser Lake; adjust pumping rate to deal with high TSS	none	B only: High	moderate	Further work needed to assess ground ice content of shoreline polygons at next phase of study. Assessment of suspected ground ice development in conjunction with permafrost aggradation into former lake bottom during operation.
Vault Pit	A - Loss of permafrost and development of a new active layer in terrestrial areas as pit slopes are pushed back; B - aggradation of permafrost and development of a new active layer in talik under former Vault Lake after mining of benches is completed	A – loss B - gain	local	infrequent	medium-term	all year	A – low B - enhance.	none	N/A	low	certain	none recommended

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Waste Dump	A - Fall, winter and spring placement will bury the natural ground surface and permafrost will aggrade into the waste rock where a new and temporary active layer will form - POSITIVE; B - placement of lifts on natural ground in the summer will cause temporary and localized deepening of the active layer, warming of near-surface permafrost, and possible subsidence, particularly in low lying bog areas; C - where new lifts are added to older lifts, permafrost will aggrade into both new and older waste rock and new active layers will form, although summer placement conditions will include temporary and localized loss of new permafrost, the net effect will be permafrost aggradation and general ground cooling - NET POSITIVE	A – gain B – loss C - gain	A – local B – footprint C - local	infrequent	A – permanent B - medium-term C - permanent	A - all year B – summer C - all year	A - enhanc. B – high C - enhanc.	B only: Schedule placement of waste rock on thaw-sensitive polygons during winter months, possibly in conjunction with proactive measures to enhance ground chilling prior to placement (e.g. snow removal and/or compaction); use flatter side slopes	none	B only: Low	moderate	Internal and foundation temperatures to be monitored. These initiatives will facilitate optimum cap rock design and closure planning of the Vault waste rock pile.

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Access Road & Traffic												
Access Road Culverts (Turn Lake)	Loss of permafrost, warming of remaining permafrost, and deepening of the active layer where runoff is concentrated through culverts; possible subsidence, particularly in low lying bog areas	loss	local	infrequent	medium-term	summer	low	Maintenance, as required, to restore smooth grade where thaw settlement is a problem; avoid culverts in areas susceptible to thaw settlement	none	low	moderate	Maintenance, as required, to restore smooth grade where thaw settlement is a problem
Shop/Office	A - Loss of permafrost, cooling of remaining permafrost, and development of a new active layer in cut sections followed by stabilization of new ground temperature regime; B - permafrost aggradation, warming of underlying natural permafrost, and formation of a new active layer in fill sections followed by stabilization of new ground thermal regime; C - loss of permafrost under heated structures and potential settlement where ground ice is present and degrades under imposed ground temperatures	A – negligible B – negligible C - loss	local	infrequent	medium-term	all year	A – low B – low C - high	C only: Locate heated structures (at the design phase) where ground ice is not present in the subgrade materials. Alternatively, insulate foundations to retard thaw; artificially chill foundations to prevent thaw; and/or elevate structures on piles or insulated gravel pads to prevent thaw.	none	low	moderate	C only: Ground temperature measurements will be taken during operations where there is a need to monitor foundation temperatures

Table B1.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
OTHER FACILITIES												
Winter Road & All Terrain Vehicle Traffic	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	medium-term	all year	enhancement	none	N/A	N/A	certain	N/A
Baker Lake Access Road & Traffic	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	medium term	all year	low	none	N/A	low	certain	none recommended
Barge Landing Facility	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	medium term	all year	low	none	N/A	low	certain	none recommended
Barge Traffic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Facility (approx. 1.5 km east of town)	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	medium-term	all year	low	none	N/A	low	certain	none recommended
Explosives Magazine	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	medium term	all year	low	none	N/A	low	certain	none recommended
Tank Farm (40 million litres)	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	medium term	all year	low	none	N/A	low	certain	none recommended

Table B1.3: Permafrost Impact Matrix – Closure & Post-Closure

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Construction Noise & Activity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dikes												
East Dike	Degradation of recently developed permafrost and loss of active layer in submerged downstream (west) side of dike; slight warming of recently developed permafrost and deepening of the active layer in the portion of the dike above the level of 2PL and 3PL	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	Representative monitoring of ground temperatures to ensure permafrost characteristics are understood at closure and for the short-term after re-flooding of the remaining NW arm of 2PL.
Tailings Dike	Degradation of recently developed permafrost and loss of active layer in submerged downstream (east) side of dike; slight warming of recently developed permafrost and deepening of the active layer in the portion of the dike above the level of 3PL	loss	local	infrequent	permanent	all year	medium	none	N/A	medium	high	Monitor ground temperatures and sub permafrost pore pressures to confirm permafrost aquitard remains an effective barrier against contaminant movement from the tailings facility into 3PL

Table B1.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Bay Zone Dike	Degradation of recently developed permafrost and loss of active layer in breached portions of the dike as well as the submerged downstream (north) side of remaining dike; slight warming of recently developed permafrost and deepening of the active layer in the remaining portion of the dike above the level of 3PL	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	Representative monitoring of ground temperatures to ensure permafrost characteristics are understood at closure and for the short-term after re-flooding of the remaining NW arm of 2PL.
Goose Island & South Camp Island Dikes	Degradation of recently developed permafrost and loss of active layer in breached portions of the dike as well as the submerged downstream side of the remaining dike; slight warming of recently developed permafrost and deepening of the active layer in the remaining portion of the dike above the level of 3PL	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	Representative monitoring of ground temperatures to ensure permafrost characteristics are understood at closure and for the short-term after re-flooding of the remaining NW arm of 2PL.

Table B1.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering												
Second Portage Lake	Stabilization of permafrost temperatures and depth of active layer in tailings cover and tailings infilling of the reclaim and attenuation ponds, and downward movement of permafrost into the remaining talik beneath 2PL NW arm where these structures are located; loss of permafrost and active layer as remaining portion of original 2PL basin is flooded by waters from 3PL; increased elevation of 3PL level in relation to 2PL will result in small net loss of permafrost around remaining portion of original 2PL shoreline; degradation of ground ice, where present on the lake bottom and around the remaining shoreline, accompanied by thaw subsidence and possible sediment release	loss	footprint	infrequent	permanent	all year	high	Silt fences to restrict movement of sediment into re-flooded section from affected shoreline; however, sediment release from melting ground ice on the re-flooded lake bottom cannot be contained.	none	High	Moderate because likelihood of widespread excess ground ice is expected to be limited	Only a concern during re-flooding. The potential significance of ground ice along the shoreline and across the former lake basin will be assessed during the next phase of study, and ongoing assessment will be carried out through operation in order to prepare for closure.

Table B1.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage Pit (Third Portage Lake)	Loss of permafrost and active layer beneath original 3PL basin after it is flooded by 3PL; degradation of ground ice, where present on the lake bottom and around the new shoreline, accompanied by thaw subsidence and possible sediment release	loss	footprint	infrequent	permanent	all year	medium	Silt fences to restrict movement of sediment into re-flooded section from affected shoreline; however, sediment release from melting ground ice on the re-flooded lake bottom cannot be contained.	none	medium	Moderate because likelihood of widespread excess ground ice is expected to be limited	Only a concern during re-flooding. The potential significance of ground ice along the shoreline and across the former lake basin will be assessed during the next phase of study, and ongoing assessment will be carried out through operation in order to prepare for closure.
Goose Island (Third Portage Lake)	Loss of permafrost and active layer beneath original 3PL basin after it is flooded by 3PL; degradation of ground ice, where present on the lake bottom and around the new shoreline, accompanied by thaw subsidence and possible sediment release	loss	footprint	infrequent	permanent	all year	medium	Silt fences to restrict movement of sediment into re-flooded section from affected shoreline; however, sediment release from melting ground ice on the re-flooded lake bottom cannot be contained.	none	medium	Moderate because likelihood of widespread excess ground ice is expected to be limited	Only a concern during re-flooding. The potential significance of ground ice along the shoreline and across the former lake basin will be assessed during the next phase of study, and ongoing assessment will be carried out through operation in order to prepare for closure.
Pits												
Portage Pit	Loss of permafrost and active layer as pit is flooded by 3PL	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Goose Island Pit	Loss of permafrost and active layer as pit is flooded by 3PL	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Portage Rock Storage Facility	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	gain	local	infrequent	permanent	all year	medium	none	N/A	medium	certain	Cover and internal temperature regimes will be monitored for several years after closure to ensure predicted performance is achieved.

Table B1.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Borrow Pit(s) (All borrow material is currently planned to be taken from the ultimate pit boundaries.)	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Tailings Storage Facilities	Stabilization of permafrost temperatures and active layer thickness, and downward movement of permafrost into the remaining talik beneath 2PL NW arm - POSITIVE	gain	local	infrequent	permanent	all year	medium	none	N/A	medium	certain	Cover, internal and former talik temperature regimes will be monitored for several years after closure to ensure predicted performance is achieved.
Main Site Roads & Traffic	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Airstrip & Air Traffic	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Ditches (Roads, Airstrip & Contact Water)	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Mine Plant & Associated Facilities	Recovery of any degraded permafrost from beneath heated structures; stabilization of permafrost temperatures and active layer thickness - POSITIVE	gain	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended

Table B1.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Freshwater Intake & Pipeline	Recovery of any degraded permafrost from beneath disturbed areas; stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Discharge Facilities & Pipeline	Recovery of any degraded permafrost from beneath disturbed areas; stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Non-Contact Diversion Facilities	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Laydown Storage (at Plant Site)	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
AN/Explosives Storage & Emulsion Plant	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Site Accommodations	Recovery of any degraded permafrost from beneath heated structures; stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended

Table B1.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Sewage & Waste Disposal	Recovery of any degraded permafrost from beneath heated structures; stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
VAULT FACILITIES												
Construction Noise & Activity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Dike	Degradation of recently developed permafrost and loss of active layer in breached portion of the Vault dike as well as the submerged downstream (south) side of dike; warming of recently developed permafrost and deepening of the active layer in the portion of the dike above the level of Vault-Wally lakes.	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	Representative monitoring of ground temperatures to ensure permafrost characteristics are understood at closure and for the short-term after re-flooding of Vault Lake.
Vault Lake Dewatering & Drainage Facilities	Loss of permafrost and active layer beneath subaerial portion of original Vault Lake basin after it is flooded; degradation of ground ice, where present on the lake bottom and around the new shoreline, accompanied by thaw subsidence and possible sediment release	loss	Footprint	infrequent	permanent	all year	medium	Silt fences to restrict movement of sediment into re-flooded section from affected shoreline; however, sediment release from melting ground ice on the re-flooded lake bottom cannot be contained.	none	medium	Moderate because likelihood of widespread excess ice is expected to be limited.	Only a concern during re-flooding. The potential significance of ground ice along the shoreline and across the former lake basin will be assessed during the next phase of study, and ongoing assessment will be carried out through operation in order to prepare for closure.

Table B1.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Lake-Phaser Lake Berm	Stabilization of permafrost temperatures and active layer thickness - POSITIVE; except loss of permafrost and establishment of a new active layer where berm is removed to facilitate re-establishment of drainage between Phaser and Vault lakes.	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Phaser Lake Operation	Loss of permafrost and active layer beneath subaerial portion of original Phaser Lake basin after it is flooded; degradation of ground ice, where present, accompanied by thaw subsidence and possible sediment release	loss	Footprint	infrequent	permanent	all year	medium	Silt fences to restrict movement of sediment into re-flooded section from affected shoreline; however, sediment release from melting ground ice on the re-flooded lake bottom cannot be contained.	none	medium	Moderate because likelihood of widespread excess ice is expected to be very limited.	Only a concern during re-flooding. The potential significance of ground ice along the shoreline and across the former lake basin will be assessed during the next phase of study, and ongoing assessment will be carried out through operation in order to prepare for closure.
Vault Pit	Loss of permafrost and active layer as pit is flooded by Vault Lake	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Vault Waste Dump	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	gain	local	infrequent	permanent	all year	medium	none	N/A	medium	certain	Cover and internal temperature regimes will be monitored for several years after closure to ensure predicted performance is achieved.
Vault Access Road & Traffic												
Access Road Culverts (Turn Lake)	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	loss	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended

Table B1.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Shop/Office	Recovery of any degraded permafrost from beneath heated structures; stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
OTHER FACILITIES												
Winter Road & All Terrain Vehicle Traffic	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Baker Lake Access Road & Traffic	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Barge Landing Facility	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Barge Traffic	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Staging Facility (approx. 1.5 km east of town)	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended
Explosives Magazine	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended

Table B1.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	Stabilization of permafrost temperatures and active layer thickness - POSITIVE	negligible	local	infrequent	permanent	all year	low	none	N/A	low	certain	none recommended

Table B2.1: Air Quality Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Air Quality and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dykes												
East Dyke	Generation of dust during placement of dyke materials	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower particulate concentration	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan.
West Dyke	Generation of dust during placement of dyke materials	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower particulate concentration	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan.
Portage South Dyke	Generation of dust during placement of dyke materials	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower particulate concentration	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan.
Goose Island and 3 rd Portage Arm Dykes	Generation of dust during placement of dyke materials	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower particulate concentration	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan.

Table B2.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects	Residual Effects/ Influence of Mitigation		Significance of Residual Impacts	Probability		
		Magnitude	Spatial Extent	Frequency	Duration						Timing	
Dewatering												
2 nd Portage Lake	Generation of dust from fine lake bottom sediments exposed during dewatering	High	Local	Contin	Long	Summer	Yes	Apply water spray during summer; cover dry areas; see Air Quality and Noise Management Plan	Lower particulate concentration	No	High	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan.
Portage Pit (3 rd Portage Lake)	Generation of dust from fine lake bottom sediments exposed during dewatering	High	Local	Contin	Long	Summer	Yes	Apply water spray during summer;cover dry areas; see Air Quality and Noise Management Plan	Lower particulate concentration	No	High	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan.
Goose Island (3 rd Portage Lake)	Generation of dust from fine lake bottom sediments exposed during dewatering	High	Local	Contin	Long	Summer	Yes	Apply water spray during summer; cover dry areas; see Air Quality and Noise Management Plan	Lower particulate concentration	No	High	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan.
Pits												
Portage Pit	Generation of dust and gases from blasting, overburden stripping, excavation and other construction related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Minimize pit footprint; apply water spray during summer or use other dust suppressants; use fuel efficient machinery with emissions controls; use specialized blasting techniques; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan , Aquatic Environmental Management Plan, and Wildlife Management Plan.

Table B2.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island Pit	Generation of dust and gases from blasting, overburden stripping, excavation and other construction related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Minimize pit footprint; apply water spray during summer or use other dust suppressants; use fuel efficient machinery with emissions controls; use specialized blasting techniques; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan , Aquatic Environmental Management Plan, and Wildlife Management Plan.
Waste Dump (Portage/Goose)	Generation of dust from materials deposited on waste dump	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; cover stockpiles with material with low potential for dust generation; see Air Quality and Noise Management Plan	Lower particulate concentration	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan.
Borrow Pit/ Quarry (MAY NOT APPLY)	Generation of dust and gases from blasting, overburden stripping, excavation and other construction related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	Medium	Local	Contin	Long	All Year	No	Minimize quarry footprint; apply water spray during summer or use other dust suppressants; use fuel efficient machinery with emissions controls; avoid prolonged idling of service equipment vehicle engines; use specialized blasting techniques; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan , Aquatic Environmental Management Plan, and Wildlife Management Plan.
Tailings Facilities (2 nd Portage Lake)	Not until operations	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA

Table B2.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Generation of dust and emissions from overburden stripping, excavation and other construction related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Minimize road length and width; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate and gaseous pollutants; better visibility	No	Certain	Maintain vehicles in good operating condition; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
	Generation of dust and emissions from frequent activity by service and mine vehicles, and ongoing maintenance	High	Local	Contin	Long	All Year	Yes	Enforce speed limits; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate and gaseous pollutants; better visibility	No	Certain	Monitor scheduling to ensure number of trips are minimized; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan and Access and Air Traffic Management Plan

Table B2.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	Generation of dust and gases from overburden stripping, excavation and other construction related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Minimize airstrip length and width; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; see Air Quality and Noise Management Plan
	Generation of dust and emissions from frequent activity by aircraft	High	Local	Contin	Long	All Year	Yes	Minimize number of take-offs and landings; avoid excessive engine operation on high rotation; see Air Quality and Noise Management, and Access and Air Traffic Management Plan	Lower concentration of particulate and gaseous pollutants	No	Certain	Monitor scheduling to ensure number of trips are minimized; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
Mine Plant and Associated Facilities	Generation of dust and gases from overburden stripping, excavation and other construction related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Minimize plant footprint; apply water spray during summer or use other dust suppressants; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; see Air Quality and Noise Management Plan
Freshwater Intake and Pipeline	Low levels of dust and emissions related to construction of pipeline and intake	Low	Local	Infreqnt	Medium	Summer	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	High	Maintain equipment in good repair
Discharge Facilities and Pipeline(s)	Low levels of dust and emissions related to construction of facility	Low	Local	Infreqnt	Medium	Summer	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	High	Maintain equipment in good repair

Table B2.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Fuel Storage (at Plant site)	Low levels of dust and emissions related to construction of facility	Low	Local	Infreqnt	Medium	Summer	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	High	Maintain equipment in good repair
Emulsion/AN Storage/ Explosives Magazines	Low levels of dust and emissions related to construction of facilities	Low	Local	Infreqnt	Medium	Summer	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	High	Maintain equipment in good repair
Camps (North and South)	Small release of carbon monoxide, carbon dioxide and other contaminants from oil-fired tent heaters and diesel generators	Low	Local	Contin	Medium	Summer	No	Maximize combustion efficiency of diesel generators; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	Certain	Maintain equipment in good repair
Sewage and Solid Waste Disposal	Low levels of dust and emissions related to construction of facility	Low	Local	Infreqnt	Medium	Summer	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	High	Maintain equipment in good repair
	Release of pollutants such as carbon monoxide and nitrogen oxides from incineration	Low	Local	Contin	Long	All Year	No	Use fuel efficient incinerator with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	Certain	Maintain construction equipment and air scrubbers in good repair; see Air Quality and Noise Management Plan
	Food and other wastes not disposed of by incineration my result in unpleasant odours and attraction of scavengers such as Grizzly Bear and Wolverine	Medium	Local	Contin	Long	All Year	No	Incinerate all rubbish, such as food wastes when needed; see Air Quality and Noise Management Plan	Lower concentration of particulate and gaseous pollutants	No	High	Monitor adherence to daily burning policy; see Air Quality and Noise Management Plan

Table B2.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
VAULT FACILITIES												
Air Quality and Activity Dyke(s)	Generation of dust during placement of dyke materials	Low	Local	Infreqnt	Short	Summer	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower concentration of particulate matter	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan
Dewatering	Not until operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	Not until operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Generation of dust from materials deposited on waste dump	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; cover stockpiles with material with low potential for dust generation; see Air Quality and Noise Management Plan	Lower concentration of particulate matter	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Roads and Traffic	Generation of dust and emissions from frequent activity by service and mine vehicles, and ongoing maintenance	High	Local	Contin	Long	All Year	Yes	Minimize vehicle traffic and speeds; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Monitor scheduling to ensure number of trips are minimized; enforce speed limits; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
Non-contact Diversion Facilities												
Mine Shop/ Office	Low levels of dust and emissions related to construction of facility	Low	Local	Infreqnt	Medium	Summer	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	High	Maintain equipment in good repair

Table B2.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
OTHER FACILITIES												
Winter Road and Traffic	Low levels of emissionsrelated to maintenance	Low	Regional	Contin	Long	Winter	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Maintain equipment in good repair
	Low levels of emissions related to road use	Medium	Local	Contin	Long	Winter	No	Use fuel efficient machinery with emissions controls; minimize vehicle traffic and speeds; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Enforcement of traffic speeds; maintain equipment in good repair in order to reduce emissions; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
Baker Lake Access Road and Traffic	Generation of dust and emissions from overburden stripping, excavation and other construction related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	Medium	Local	Contin	Perman	All Year	No	Minimize road length and width; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
	Generation of dust and emissions from frequent activity by service and vehicles accessing staging facility, and ongoing maintenance	Medium	Local	Contin	Perman	All Year	No	Minimize vehicle traffic and speeds; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Monitor scheduling to ensure number of trips are minimized; enforce speed limits; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan

Table B2.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Landing Facility	No measurable effects on air quality anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Barge Traffic	Minor levels of emissions associated with barge engines	Low	Regional	Contin	Long	Summer	No	Minimize number of barges required per year; minimize amount of engine idling	Lower frequency of pollutant occurrences	No	Certain	None recommended
In-town Staging Facility	Generation of dust and gases from overburden stripping, excavation and other construction related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Minimize staging facility footprint; apply water spray during summer or use other dust suppressants; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; see Air Quality and Noise Management Plan
Explosives Magazine	Low levels of dust and emissions related to construction of facilities	Low	Local	Infreqnt	Medium	Summer	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	High	Maintain equipment in good repair
Tank Farm	Low levels of dust and emissions related to construction of facilities	Low	Local	Infreqnt	Medium	Summer	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	High	Maintain equipment in good repair
	Potential explosion or fire may release contaminants into the air	Low	Local	Infreqnt	Short	All Year	No	Follow Hazardous Materials Management Plan; follow Spill Contingency Guidelines	Unpredictable	No	Improbable	Regular maintenance checks; monitor fuel handling procedures in Hazardous Materials Management Plan

Table B2.2: Air Quality Impact Matrix – Operation

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significanc e of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Air Quality and Activity	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Dykes	Generation of dust during placement of Goose Island dyke materials	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower concentration of particulate matter; increased visibility	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
East Dyke	Generation of dust during placement of Goose Island dyke materials	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower concentration of particulate matter; increased visibility	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
West Dyke	Generation of dust during placement of Goose Island dyke materials	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower concentration of particulate matter; increased visibility	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Portage South Dyke	Generation of dust during placement of Goose Island dyke materials	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower concentration of particulate matter; increased visibility	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan

Table B2.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island and 3 rd Portage Arm Dykes	Generation of dust during placement of Goose Island dyke materials	Medium	Local	Contin	Long	All Year	No	Apply water spray during summer or use other dust suppressants; see Air Quality and Noise Management Plan	Lower concentration of particulate matter; increased visibility	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Dewatering												
2 nd Portage Lake	Ongoing generation of dust from fine lake bottom sediments exposed during dewatering	Medium	Local	Contin	Long	Summer	No	Apply water spray during summer; cup dry areas; see Air Quality and Noise Management Plan	Lower concentration of particulate matter; increased visibility	No	High	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Portage Pit (3 rd Portage Lake)	Ongoing generation of dust from fine lake bottom sediments exposed during dewatering	Medium	Local	Contin	Long	Summer	No	Apply water spray during summer; cover dry areas with non-PAG waste rock; see Air Quality and Noise Management Plan	Lower concentration of particulate matter; increased visibility	No	High	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Goose Island (3 rd Portage Lake)	Ongoing generation of dust from fine lake bottom sediments exposed during dewatering	Medium	Local	Contin	Long	Summer	No	Apply water spray during summer; cover dry areas with non-PAG waste rock; see Air Quality and Noise Management Plan	Lower concentration of particulate matter; increased visibility	No	High	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan

Table B2.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage Pit	Generation of dust and gases from blasting, excavation and other mine-development related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Minimize pit footprint; apply water spray during summer or use other dust suppressants; use fuel efficient machinery with emissions controls; use specialized blasting techniques; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants; increased visibility	No	Certain	Maintain vehicles in good operating condition; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Goose Island Pit	Generation of dust and gases from blasting, excavation and other mine-development related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Minimize pit footprint; apply water spray during summer or use other dust suppressants; use fuel efficient machinery with emissions controls; use specialized blasting techniques; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants; increased visibility	No	Certain	Maintain vehicles in good operating condition; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Waste Dump (Portage/Goose)	Generation of dust from materials deposited on waste dump	High	Local	Contin	Long	All Year	Yes	Apply water spray during summer or use other dust suppressants; cover stockpiles with material with low potential for dust generation; see Air Quality and Noise Management Plan	Lower concentration of particulate matter; increased visibility	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan

Table B2.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Facilities (2 nd Portage Lake)	Generation of dust from tailings	High	Local	Contin	Perman	All Year	Yes	Apply water spray during summer; cover dry areas with non-PAG waste rock; see Air Quality and Noise Management Plan	Reduce dispersion of airborne dust	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Roads and Traffic	Generation of dust and emissions from further road development and maintenance activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	Medium	Local	Contin	Long	All Year	No	Minimize road length and width; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate matter and gaseous pollutants; increased visibility	No	Certain	Maintain vehicles in good operating condition; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
	Generation of dust and emissions from frequent activity by service and mine vehicles, and ongoing maintenance	Medium	Local	Contin	Long	All Year	No	Enforce speed limits; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate matter and gaseous pollutants; increased visibility	No	Certain	Monitor scheduling to ensure number of trips are minimized; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan

Table B2.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significanc e of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	Generation of dust and gases from airstrip expansion and maintenance activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	Medium	Local	Contin	Long	All Year	No	Minimize airstrip length and width; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; see Air Quality and Noise Management Plan
	Generation of dust and emissions from frequent activity by aircraft	Medium	Local	Contin	Long	All Year	No	Minimize number of take-offs and landings; avoid excessive engine operation on high rotation; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Monitor scheduling to ensure number of trips are minimized; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan and Access and Air Traffic Management Plan
Mine Plant and Associated Facilities	Power plant emissions result in ground level concentration of pollutants; crushing and grinding releases dust containing heavy metals with potential impacts on aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Use low sulphur oil; purchase low NOx emission burners; provide adequate stack height; operate efficient dust filters for operation dust emissions; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Installation of continuous emissions monitoring system (CEMS) on the power plant stack for nitrogen oxides and particulate matter; confirmation of CEMS accuracy by relative accuracy test audit (RATA); see Air Quality and Noise Management Plan
Freshwater Intake and Pipeline	No further impacts to air quality once pipeline is constructed	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	No further impacts to air quality once pipeline is constructed	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities												

Table B2.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Fuel Storage (at Plant site)	Potential explosion or fire may release contaminants into the air	Low	Local	Infreqnt	Short	All Year	No	Follow Hazardous Materials Management Plan; follow Spill Contingency Guidelines	NA	No	Moderat	Regular maintenance checks; monitor fuel handling procedures in Hazardous Materials Management Plan
Emulsion/AN Storage/ Explosives Magazines	Potential explosion or fire may release contaminants into the air	Low	Local	Infreqnt	Short	All Year	No	Follow Hazardous Materials Management Plan; follow Spill Contingency Guidelines	NA	No	Moderat	Regular maintenance checks; monitor fuel handling procedures in Hazardous Materials Management Plan
Camps (North and South)	No further impacts to air quality since camp will be decommissioned	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	Release of pollutants such as carbon monoxide, particulate and nitrogen oxides from incineration	Low	Local	Contin	Long	All Year	No	Follow code of waste disposal practices	Lower concentration of particulate matter and odorous substances	No	Certain	Maintain air scrubbers in good condition; see Air Quality and Noise Management Plan
	Food and other wastes not disposed of by incineration my result in unpleasant odours and attraction of scavengers such as Grizzly Bear and Wolverine	Medium	Local	Contin	Long	All Year	No	Incinerate all rubbish, such as food wastes when necessary ; see Air Quality and Noise Management Plan	No attraction	No	High	Monitor adherence to daily burning policy; see Air Quality and Noise Management Plan
VAULT FACILITIES												
Dyke(s)	No further measurable impacts to air quality	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B2.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering	Generation of dust from fine lake bottom sediments exposed during dewatering	Medium	Local	Contin	Long	Summer	No	Apply water spray during summer; cover dry areas;cupping of exposed dry areas; see Air Quality and Noise Management Plan	Lower concentration of dust	No	High	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Pit	Generation of dust and gases from blasting, excavation and other construction and mine-development related activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	High	Local	Contin	Long	All Year	Yes	Minimize pit footprint; apply water spray during summer or use other dust suppressants; use fuel efficient machinery with emissions controls; use specialized blasting techniques; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants; decrease area affected by pollutants	No	Certain	Maintain vehicles in good operating condition; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan
Waste Dump	Generation of dust from materials deposited on waste dump	High	Local	Contin	Long	All Year	Yes	Apply water spray during summer or use other dust suppressants; cover stockpiles with material with low potential for dust generation; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, Aquatic Environmental Management Plan, and Wildlife Management Plan

Table B2.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significanc e of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Generation of dust and emissions from further road development and maintenance activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	Medium	Local	Contin	Long	All Year	No	Minimize road length and width; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
	Generation of dust and emissions from frequent activity by service and mine vehicles, and ongoing maintenance	Medium	Local	Contin	Long	All Year	No	Enforce speed limits; apply water spray during summer or use other dust suppressants when necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan		No	Certain	Monitor scheduling to ensure number of trips are minimized; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
Mine Shop/ Office	No further measurable impacts to air quality	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B2.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
OTHER FACILITIES												
Winter Road and Traffic	Low levels of emissions related to ongoing maintenance	Low	Regional	Contin	Long	Winter	No	Use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants		Certain	Maintain equipment in good repair
	Low levels of emissions related to road use	Medium	Local	Contin	Long	Winter	No	Use fuel efficient machinery with emissions controls; minimize vehicle traffic and speeds; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan		no	Certain	Enforcement of traffic speeds; maintain equipment in good repair in order to reduce emissions; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
Baker Lake Access Road and Traffic	Generation of dust and emissions from maintenance activities resulting in poor air quality and contamination of aquatic and terrestrial habitats	Low	Local	Contin	Long	All Year	No	Use dust suppressants as necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Maintain vehicles in good operating condition; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan
	Generation of dust and emissions from frequent activity by service and vehicles accessing staging facility	Medium	Local	Contin	Long	All Year	No	Minimize vehicle traffic and speeds; use dust suppressants as necessary; use fuel efficient machinery with emissions controls; see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan		no	Certain	Monitor scheduling to ensure number of trips are minimized; enforce speed limits; monitor dust fallout by static collectors (method ASTM D1739); see Air Quality and Noise Management Plan, and Access and Air Traffic Management Plan

Table B2.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Monitoring/ Management
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Landing Facility	No measurable effects on air quality anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	Minor levels of emissions associated with barge engines	Low	Regional	Contin	Long	Summer	No	Minimize number of barges required per year; minimize amount of engine idling	Lower frequency of air pollution events	No	Certain	None recommended
In-town Staging Facility	Power plant emissions result in ground level concentration of pollutants	Medium	Local	Contin	Perman	All Year	No	Use low sulphur oil; purchase low NOx emission burners; provide adequate stack height; see Air Quality and Noise Management Plan	Lower concentration of particulate matter and gaseous pollutants	No	Certain	Installation of continuous emissions monitoring system (CEMS) on the power plant stack for nitrogen oxides and particulate matter; confirmation of CEMS accuracy by relative accuracy test audit (RATA); see Air Quality and Noise Management Plan
Explosives Magazine	Potential explosion or fire may release contaminants into the air	Low	Local	Infreqnt	Short	All Year	No	Follow Hazardous Materials Management Plan; follow Spill Contingency Guidelines	NA	NA	Improbable	Regular maintenance checks; monitor fuel handling procedures in Hazardous Materials Management Plan
Tank Farm	Potential explosion or fire may release contaminants into the air	Low	Local	Infreqnt	Short	All Year	No	Follow Hazardous Materials Management Plan; follow Spill Contingency Guidelines	NA	NA	Improbable	Regular maintenance checks; monitor fuel handling procedures in Hazardous Materials Management Plan

Table B2.3: Air Quality Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Dykes	No effect – flooding operation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
East Dyke	No effect – will remain intact	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
West Dyke	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage South Dyke	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Flooring	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
2 nd Portage Lake	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage Pit (3 rd Portage Lake)	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island (3 rd Portage Lake)		NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits	No effect – flooding operation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage Pit	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island Pit	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Generation of dust and gases linked with surface re-grading by heavy vehicles	Low	Local	Discontinue after abandonment	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
Borrow Pit/ Quarry	No effect											
Tailings Facilities (2 nd Portage Lake)	Generation of dust and emissions from equipment during cover with non-PAG waste rock	Low	Local	Discontinue after abandonment	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
Roads and Airstrip	Generation of dust during re-grading and recontour embarkment	Low	Local	Discontinue after abandonment	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
Mine Plant and Associated Facilities	Medium – dust generation during demilishion of structures	Medium	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B2.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Non-contact Diversion Facilities	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage/ Explosives Magazines	Dust generated during structure demolishon	Low	Local	Discontin after closing	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Camps (North and South)	Low - dust generated during structure demolishon	Low	Local	Discontinue after abandonme nt	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
Sewage and Solid Waste Disposal	Low - dust generted during cover with waste rock	Low	Local	Discontinue after abandonme nt	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
VAULT FACILITIES												
Dyke(s)	Controlled flooding – no effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	No effect	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Dust generted during cover with waste rock	Low	Local	Discontinue after abandonme nt	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
Roads	Generation of dust during re-grading and recontour embarkment	Low	Local	Discontinue after abandonme nt	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
Non-contact Diversion Facilities	No effects	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	Dust generated during demolition of buildings	Low	Local	Discontinue after abandonme nt	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
OTHER FACILITIES												
Winter Road	Low - generation of dust during re-grading and recontour embarkment	Low	Local	Discontinue after abandonme nt	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
Baker Lake Access Road	Generation of dust during re-grading and recontour embarkment	Low	Local	Discontinue after abandonme nt	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation

Table B2.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Landing Facility	No Effects	Low	Regional	Contin	Long	Summer	No	Apply dust suppressants; control vehicles movement	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Barge Traffic	No effects	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	No effects	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	Low – dust generated during structure demolishon	Low	Local	Discontinue after abandonme nt	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation
Tank Farm	Low – dust generated during tanks dismantling	Low	Local	Discontinue after abandonme nt	Short	Summer	No	Apply dust suppressants; control vehicles movement	Lower dust concentration; improved visibility	No	Moderate	Supervise the operation

Table B3.1: Noise Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Dykes												
East Dyke	Moderate noise levels from construction	Medium	Local	Infreqnt	Medium	Summer	No	Use pumps and generators equipped with mufflers; place equipment inside dyke below the ground level; minimize number of trips required to transport equipment	Lower noise levels	No	Certain	Maintain equipment in good repair
West Dyke	Moderate noise levels from construction	Medium	Local	Infreqnt	Medium	Summer	No	Use pumps and generators equipped with mufflers; place equipment inside dyke below the ground level; minimize number of trips required to transport equipment	Lower noise levels	No	Certain	Maintain equipment in good repair
Portage South Dyke	Moderate noise levels from construction	Medium	Local	Infreqnt	Medium	Summer	No	Use pumps and generators equipped with mufflers; place equipment inside dyke below the ground level; minimize number of trips required to transport equipment	Lower noise levels	No	Certain	Maintain equipment in good repair
Goose Island and 3 rd Portage Arm Dykes	Moderate noise levels from construction	Medium	Local	Infreqnt	Medium	Summer	No	Use pumps and generators equipped with mufflers; place equipment inside dyke below the ground level; minimize number of trips required to transport equipment	Lower noise levels	No	Certain	Maintain equipment in good repair

Table B3.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering												
2 nd Portage Lake	Low noise levels associated with assembling pumping facilities and pump operation; some noise associated with helicopter transport of materials	Medium	Local	Infreqnt	Medium	Summer	No	Use pumps and generators equipped with mufflers; place equipment inside dyke below the ground level; minimize number of trips required to transport equipment	Lower noise levels	No	Certain	Maintain equipment in good repair
Portage Pit (3 rd Portage Lake)	Low noise levels associated with assembling pumping facilities and pump operation; some noise associated with helicopter transport of materials	Medium	Local	Infreqnt	Medium	Summer	No	Use pumps and generators equipped with mufflers; place equipment inside dyke below the ground level; minimize number of trips required to transport equipment	Lower noise levels	No	Certain	Maintain equipment in good repair
Goose Island (3 rd Portage Lake)	Low noise levels associated with assembling pumping facilities and pump operation; some noise associated with helicopter transport of materials	Medium	Local	Infreqnt	Medium	Summer	No	Use pumps and generators equipped with mufflers; place equipment inside dyke below the ground level; minimize number of trips required to transport equipment	Lower noise levels	No	Certain	Maintain equipment in good repair
Pits												
Portage Pit	High noise levels from blasting, drilling and material handling will disturb wildlife and result in reduced habitat effectiveness	High	Local	Contin	Long	All Year	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available; limit noisy operation to day time use; use specialized blasting techniques	Lower noise levels	Yes	Certain	Maintain vehicle mufflers and noisy components; monitor noise levels and behavioral responses of wildlife

Table B3.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island Pit	High noise levels from blasting, drilling and material handling will disturb wildlife and result in reduced habitat effectiveness	High	Local	Contin	Long	All Year	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available; limit noisy operation to day time use; use specialized blasting techniques	Lower noise levels	Yes	Certain	Maintain vehicle mufflers and noisy components; monitor noise levels and behavioral responses of wildlife
Waste Dump (Portage/Goose)	Moderate noise levels from berm construction and material handling	Medium	Local	Contin	Long	All Year	No	Limit noisy operation to day time use; use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair
Borrow Pit/ Quarry (UNKNOWN)	High noise levels from blasting, excavation, and material handling will disturb wildlife and result in reduced habitat effectiveness	High	Local	Contin	Long	All Year	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available; limit noisy operation to day time use; use specialized blasting techniques	Lower noise levels	Yes	Certain	Maintain vehicle mufflers and noisy components; monitor noise levels and behavioral responses of wildlife
Tailings Facilities (2 nd Portage Lake)	Not until operation	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Roads and Traffic	Moderate noise levels associated with construction	Medium	Local	Frequent	Medium	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; Use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair

Table B3.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Moderate noise associated with traffic and road maintenance activities	Medium	Local	Contin	Long	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; minimize vehicular traffic and speeds; convoy shipments whenever possible; limit random traffic; schedule transportation for daytime hours whenever possible	Lower noise levels	No	Certain	Enforcement of traffic speeds; maintain equipment in good repair; maintain road in order to reduce tire noise
Airstrip and Air Traffic	Intermittent noise from air traffic reduces habitat effectiveness adjacent to airstrip and results in behavioural changes in wildlife	Medium	Regional	Contin	Long	All Year	Yes	Minimize number of take-offs and landings; avoid excessive engine operation on high rotation follow clearly defined flight corridors; maintain minimum altitude; maintain a no wildlife harassment policy	Lower noise levels	No	Certain	Control flight paths and altitudes of flights
Mine Plant and Associated Facilities	High noise levels from blasting, material handling and construction will disturb wildlife and result in reduced habitat effectiveness	High	Local	Infreq	Medium	All Year	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available; limit noisy operation to day time use; minimize amount of blasting necessary	Lower noise levels	Yes	Certain	Maintain vehicle mufflers and noisy components; monitor noise levels (decibels) and behavioral responses of wildlife
Freshwater Intake and Pipeline	Low noise levels associated with construction and assemblage	Low	Local	Infreqnt	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair

Table B3.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Discharge Facilities and Pipeline(s)	Low noise levels associated with construction and assemblage	Low	Local	Infreqnt	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair
Non-contact Diversion Facilities												
Fuel Storage (at Plant site)	Low noise levels associated with construction and assemblage	Low	Local	Infreqnt	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair
Emulsion/AN Storage/ Explosives Magazines	Low noise levels associated with construction and assemblage	Low	Local	Infreqnt	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair
Camps (North and South)	Low noise levels associated with human activity and generators around camps	Low	Local	Contin	Long	Summer	No	None necessary	Lower noise levels	No	High	NA
Sewage and Solid Waste Disposal	Low noise levels associated with construction and assemblage	Low	Local	Infreqnt	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair
VAULT FACILITIES												
Dyke(s)	Low noise levels associated with construction and assemblage	Low	Local	Infreqnt	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; Use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair

Table B3.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering	Low noise levels associated with assembling pumping facilities and pump operation; some noise associated with helicopter transport of materials	Low	Local	Infreqnt	Medium	Summer	No	Use pumps and generators equipped with mufflers; place equipment inside dyke below the ground level; minimize number of trips required to transport equipment	Lower noise levels	No	Certain	Maintain equipment in good repair
Waste Dump	Moderate noise levels from berm construction and material handling	Medium	Local	Contin	Long	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; Use quietest machinery available; minimize amount of blasting required	Lower noise levels	No	Certain	Maintain equipment in good repair
Roads and Traffic	Moderate noise levels associated with construction	Medium	Local	Frequent	Medium	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; Use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair
	Moderate noise associated with traffic and road maintenance activities	Medium	Local	Contin	Long	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; minimize vehicular traffic and speeds; convoy shipments whenever possible; limit random traffic; schedule transportation for daytime hours whenever possible	Lower noise levels	No	Certain	Enforcement of traffic speeds; maintain equipment in good repair; maintain road in order to reduce tire noise
Mine Shop/ Office	Low noise levels associated with construction and assemblage	Medium	Local	Infreqnt	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; Use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair

Table B3.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
OTHER FACILITIES												
Winter Road and Traffic	Noise associated with grading and snowplowing	Medium	Regional	Contin	Long	Winter	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; Use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair
	Moderate noise associated with traffic and road maintenance activities	Medium	Regional	Contin	Long	Winter	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; minimize vehicular traffic and speeds; convoy shipments whenever possible; limit random traffic; schedule transportation for daytime hours whenever possible	Lower noise levels	No	Certain	Enforcement of traffic speeds; maintain equipment in good repair; maintain road in order to reduce tire noise
Baker Lake Access Road and Traffic	Moderate noise levels associated with construction	Medium	Local	Frequent	Medium	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; Use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair
	Moderate noise associated with traffic and road maintenance activities	Medium	Local	Contin	Long	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; minimize vehicular traffic and speeds; convoy shipments whenever possible; limit random traffic; schedule transportation for daytime hours whenever possible	Lower noise levels	No	Certain	Enforcement of traffic speeds; maintain equipment in good repair in order to reduce tire noise
Barge Landing Facility	No measurable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B3.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Traffic	Minor noise levels associated with barge engines and beach landings	Low	Regional	Contin	Long	Summer	No	Minimize number of barges required per year	Lower frequency of noise appearances	No		None recommended
In-town Staging Facility	Moderate noise levels from blasting, material handling and construction will disturb wildlife and result in reduced habitat effectiveness	High	Local	Infreqnt	Long	All Year	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available; limit noisy operation to day time use; minimize amount of blasting necessary	Lower noise levels	No	Certain	Maintain vehicle mufflers and noisy components; monitor noise levels and behavioral responses of wildlife
Explosives Magazine	Low noise levels associated with construction and assemblage	Low	Local	Infreqnt	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair
Tank Farm	Low noise levels associated with construction and assemblage	Low	Local	Infreqnt	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower noise levels	No	Certain	Maintain equipment in good repair

Table B3.2: Noise Impact Matrix – Operation

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Dykes												
East Dyke	Moderate noise levels from construction of Goose Island Dyke	Medium	Local	Infreq	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower level noise	No	Certain	Maintain equipment in good repair
West Dyke	Moderate noise levels from construction of Goose Island Dyke	Medium	Local	Infreq	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower level noise	No	Certain	Maintain equipment in good repair
Portage South Dyke	Moderate noise levels from construction of Goose Island Dyke	Medium	Local	Infreq	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower level noise	No	Certain	Maintain equipment in good repair
Goose Island and 3 rd Portage Arm Dykes	Moderate noise levels from construction of Goose Island Dyke	Medium	Local	Infreq	Medium	Summer	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower level noise	No	Certain	Maintain equipment in good repair
Dewatering												
2 nd Portage Lake	No further dewatering activities anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage Pit (3 rd Portage Lake)	No further dewatering activities anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island (3 rd Portage Lake)	No further dewatering activities anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												

Table B3.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage Pit	High noise levels from blasting, drilling and material handling will disturb wildlife and result in reduced habitat effectiveness	High	Local	Contin	Long	All Year	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available; use specialized blasting techniques	Lower level noise	Yes	Certain	Maintain vehicle mufflers and other noisy components; monitor noise levels and behavioral responses of wildlife
Goose Island Pit	High noise levels from blasting, drilling and material handling will disturb wildlife and result in reduced habitat effectiveness	High	Local	Contin	Long	All Year	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available; use specialized blasting techniques	Lower level noise	Yes	Certain	Maintain vehicle mufflers and other noisy components; monitor noise levels and behavioral responses of wildlife
Waste Dump (Portage/Goose)	Moderate noise levels from ongoing berm construction, and material handling and deposition	Medium	Local	Contin	Long	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower level noise	No	Certain	Maintain equipment in good repair
Borrow Pit (MAY NOT APPLY)	High noise levels from blasting, excavation, and material handling will disturb wildlife and result in reduced habitat effectiveness	High	Local	Contin	Long	All Year	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available; limit noisy operation to day time use; use specialized blasting techniques	Lower level noise	Yes	Certain	Maintain vehicle mufflers and other noisy components; monitor noise levels and behavioral responses of wildlife
Tailings Facilities (2 nd Portage Lake)	Moderate noise levels from ongoing berm construction, and material handling and deposition	Medium	Local	Contin	Long	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; Use quietest machinery available	Lower level noise	No	Certain	Maintain vehicle mufflers and other noisy components; monitor noise levels and behavioral responses of wildlife

Table B3.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Negligible noise levels associated with maintenance of road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Moderate noise associated with traffic and road maintenance activities	Medium	Local	Contin	Long	All Year	No	Use newer vehicles equipped in efficient mufflers; minimize vehicular traffic and speeds; convoy shipments whenever possible; limit random traffic; schedule transportation for daytime hours whenever possible	Lower level noise	No	Certain	Enforcement of traffic speeds; maintain equipment in good repair; maintain roads in order to reduce tire noise
Airstrip and Air Traffic	Negligible noise levels associated with maintenance of airstrip	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Intermittent noise from air traffic reduces habitat effectiveness adjacent to airstrip and results in behavioural changes in wildlife	Medium	Regional	Contin	Long	All Year	Yes	Minimize number of take-offs and landings; avoid excessive engine operation on high rotation follow clearly defined flight corridors; maintain minimum altitude; maintain a no wildlife harassment policy	Lower level noise	No	Certain	Control flight paths and altitudes of flights
Mine Plant and Associated Facilities	Negligible noise levels associated with maintenance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Moderate noise levels may result in displacement of wildlife and reduced habitat effectiveness	Medium	Local	Contin	Long	All Year	No	Locate noisy equipment indoor. Provide noise barrier around crushers. Provide mufflers for power generators.	Lower level noise	No	Certain	Monitor sound levels of various activities
Freshwater Intake and Pipeline	Negligible noise levels associated with maintenance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B3.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Discharge Facilities and Pipeline(s)	Negligible noise levels associated with maintenance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities												
Fuel Storage (at Plant site)	Negligible noise levels associated with maintenance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage/ Explosives Magazines	Negligible noise levels associated with maintenance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camps (North and South)	Low noise levels associated with dismantling of camps and habitat reclamation activities; once camps dismantled, no further noise impacts anticipated	Low	Local	Infreq	Medium	Summer	No	None necessary	Noise at daytime only	No	High	NA
Sewage and Solid Waste Disposal	Occasional noise of waste hauling trucks	Medium	Local	Infreq	Short	All year	No	Limit operation at disposal site to daytime hours	NA	No	Certain	Maintain equipment in good repair
VAULT FACILITIES												
Dyke(s)	Negligible noise levels associated with maintenance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	No further dewatering activities anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	High noise levels from blasting, drilling and material handling will disturb wildlife and result in reduced habitat effectiveness	High	Local	Contin	Long	All Year	Yes	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available; use specialized blasting techniques	Lower level noise	Yes	Certain	Maintain vehicle mufflers and moving parts; monitor noise levels; observe behavioral responses of wildlife

Table B3.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Waste Dump	Moderate noise levels from ongoing berm construction, and material handling and deposition	Medium	Local	Contin	Long	All Year	No	Use newer trucks, loaders and dozers equipped in efficient mufflers; use quietest machinery available	Lower level noise	No	Certain	Maintain equipment in good repair
Roads and Traffic	Negligible noise levels associated with maintenance of road	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Moderate noise associated with traffic and road maintenance activities	Medium	Local	Contin	Long	All Year	No	Use newer vehicles equipped in efficient mufflers; minimize vehicular traffic and speeds; convoy shipments whenever possible; limit random traffic; schedule transportation for daytime hours whenever possible	Lower level noise	No	Certain	Enforcement of traffic speeds; maintain equipment in good repair; maintain roads in order to reduce tire noise
Non-contact Diversion Facilities												
Mine Shop/ Office	Negligible noise levels associated with maintenance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												
Winter Road and Traffic	Noise associated with grading and snowplowing; traffic noise	Medium	Regional	Contin	Long	Winter	Yes	Use newer vehicles equipped in efficient mufflers; Use quietest machinery available	Lower level noise	No	Certain	Maintain equipment in good repair

Table B3.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road and Traffic	Negligible noise levels associated with maintenance of road	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Moderate noise associated with traffic and road maintenance activities	Medium	Local	Contin	Long	All Year	No	Use newer vehicles equipped in efficient mufflers; minimize vehicular traffic and speeds; convoy shipments whenever possible; limit random traffic; schedule transportation for daytime hours whenever possible	Lower level noise	No	Certain	Enforcement of traffic speeds; maintain equipment in good repair; maintain roads in order to reduce tire noise
Barge Landing Facility	No measurable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	Minor noise levels associated with barge engines and beach landings	Medium	Regional	Contin	Long	Summer	No	Minimize number of barges required per year	Lower level noise	No	Certain	None recommended
In-town Staging Facility	Moderate noise levels from on-site activity	Medium	Local	Contin	Long	All Year	No	Use newer vehicles equipped in efficient mufflers; use quietest machinery available; limit noisy operation to day time use	Lower level noise	No	Certain	Maintain vehicle mufflers and noise generating components
Explosives Magazine	Negligible noise levels associated with maintenance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tank Farm	Negligible noise levels associated with maintenance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B3.3: Noise Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Dykes												
East Dyke	Moderate noise level from site preparation for closure	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment which meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
West Dyke	Moderate noise level from site preparation for closure	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Portage South Dyke	Moderate noise level from site preparation for closure	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Goose Island and 3 rd Portage Arm Dykes	Moderate noise level from site preparation for closure	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Dewatering								Use equipment that meets noise emission specification standards.				
2 nd Portage Lake	Low noise levels from equipment removal	Low	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Portage Pit (3 rd Portage Lake)	Low noise levels from equipment removal	Low	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.

Table B3.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island (3 rd Portage Lake)	Low noise levels from equipment removal	Low	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Pits												
Portage Pit	Moderate noise from pit closure activities	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment which meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Goose Island Pit	Moderate noise from pit closure activities	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Waste Dump (Portage/Goose)	Moderate noise from dump cupping equipment	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Tailings Facilities (2 nd Portage Lake)	Moderate noise from tailings cupping equipment	Medium	Local	Contin at closure	Short	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Roads and Traffic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Airstrip and Air Traffic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Plant and Associated Facilities	Moderate noise level from plant disassemble	Medium	Local	Contin at closure	Long	All year	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Freshwater Intake and Pipeline	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B3.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Discharge Facilities and Pipeline(s)	Low level noise from facilities abandon activities	Low	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Non-contact Diversion Facilities												
Fuel Storage (at Plant site)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage/ Explosives Magazines	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camps (North and South)	Low level noise from facilities abandon activities	Low	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Sewage and Solid Waste Disposal	Moderate noise levels associated with disposal site capping	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
VAULT FACILITIES												
Dyke(s)	Moderate noise from cupping equipment	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Dewatering	Low noise levels from equipment removal	Low	Local	Contin at closure	Short	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Pit	Moderate noise from pit closure activities	Medium	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.

Table B3.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Waste Dump	Moderate noise from cupping equipment	Medium	Local	Contin at closure	Short	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Roads and Traffic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities												
Mine Shop/ Office	Low level noise from facilities abandon activities	Low	Local	Contin at closure	Long	All Year	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
OTHER FACILITIES												
Winter Road and Traffic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baker Lake Access Road and Traffic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Landing Facility	Low level noise from facility closing	Low	Local	Contin at closure	Medium	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
Barge Traffic	Minor noise level associated with barge engines and beach landing during closure	Low	Regional	Contin	Long	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.
In-town Staging Facility											Certain	
Explosives Magazine	Low level noise from facilities abandon activities	Low	Local	Contin at closure	Short	Summer	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.

Table B3.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	Moderate noise level from tanks disassemble	Medium	Local	Contin at closure	Long	All Year	No	Use equipment that meets noise emission specification standards.	Lower noise level	No	Certain	Conduct work according to code of practice for minimizing noise. Schedule work to avoid simultaneous noisy operations.

Table B4.1: Surface Water Quantity Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Construction Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	
Dykes												
East Dyke	Isolation of northwest arm of Second Portage Lake (~135 ha); impoundment of 35% surface area and 58% volume of Second Portage Lake (see dewatering section); dyke itself displaces very little water volume	Low	Local	Continuous	Permanent	All Year	No	None	Construction of East Dyke will have very small impact on water volume within the project lake because of the very small footprint and volume of dykes relative to the lake	No	Certain	No mitigation required because of small area displaced by dykes
	Change in lake circulation patterns in residual areas of Second Portage Lake; residence time of water in Second Portage Lake is expected to decrease	Low	Local	Continuous	Permanent	All Year	No	None recommended.	NA	No	NA	Ongoing hydrological monitoring will be conducted at the Second Portage Lake outlet channel
West Dyke	No impact since West dyke on Second Portage Lake is constructed within the dewatered Second Portage Lake arm after the construction of East dyke	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B4.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Bay Zone Dyke	Isolation of a small portion of Third Portage Lake (~20 ha); impoundment of 0.5% surface area and ~0.2% volume of Third Portage Lake (see dewatering section); dyke itself displaces very little water volume	Low	Local	Continuous	Permanent	All Year	No	None	Small footprint and volume of dykes relative to the lake	No	Certain	No mitigation required because of small area displaced by dykes
	Construction of Bay Zone Dyke will eliminate the westernmost connecting channel (the main outlet of three channels, holding ~50% of the flow) between Third Portage and Second Portage lakes; increased flow to other outlet channel(s) with potential for channel overtopping and erosion; rise in Third Portage Lake water levels leading to shoreline erosion	High	Regional	Continuous	Permanent	All Year	Yes	One of the existing channels between Third Portage and Second Portage lakes will be modified to accept larger flows. Bottom elevation of the new channel will be engineered to ensure that discharge will not be constrained and that the existing 1 m elevation difference between Third Portage and Second Portage lakes is maintained	The new channel will ensure that discharge capacity is not diminished below current conditions; concerns related to Third Portage Lake water levels and erosion of existing channels due to high flows will not be reduced	No	High	Ongoing hydrological monitoring will be conducted at the Third Portage Lake outlet channel
	Change in lake circulation patterns; increased mixing between basins within Third Portage Lake is expected with the removal of the Bay Zone area	Low	Local	Continuous	Medium-term	All Year	No	None recommended.	NA	No	High	Ongoing hydrological monitoring will be conducted at the Third Portage outlet channel.
Goose Island and Third Portage Arm Dykes	Constructed during the operation phase.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B4.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering												
Second Portage Arm & Pumping Facilities	Approximately 12 million cubic meters of water will be pumped from Second Portage Arm (i.e., area impounded by East Dyke) to Third Portage Lake resulting in increased volume (5%) and water levels (20-30 cm) in Third Portage Lake; because of constraints at outlet channels, in the absence of mitigation, the increased water volume will be released back to residual areas of Second Portage Lake over several years; although water level increases fall within natural lake level fluctuations, some shoreline erosion due to ice and wave scour is possible; increased discharge volumes may also cause erosion of outlet channels, particularly since the main channel is eliminated by the Bay Zone Dyke	High	Regional	Continuous	Short-term	Summer	Yes	One of the existing channels between Third Portage and Second Portage lakes will be modified to accept greater flows.	The new channel will ensure that discharge capacity is not diminished below current conditions.	No	High	Ongoing hydrological monitoring will be conducted at the Third Portage Lake outlet channel
	Anticipated increase in discharge from Second Portage Lake to Tehek Lake fall within natural fluctuation and is not expected to impact outlet channel integrity between Second Portage and Tehek lakes or lake levels in Tehek Lake	Low	Regional	Continuous	Short-term	Summer	No	No mitigation is required since flows fall well within seasonal norms.	NA	No	Certain	Ongoing hydrological monitoring will be conducted on the outlet channel from Second Portage Lake to Tehek Lake
	Decrease in Second Portage Lake volume	High	Local	Continuous	Permanent	All Year	Yes	No mitigation is possible since dewatered area will be used as permanent disposal area for mine tailings	NA	Yes	Certain	NA

Table B4.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Bay Zone	Dewatering will not occur until the operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage Pits	Portage Pit will be excavated within area impounded by East and West dykes, so no additional impacts on water quantity anticipated; some potential for seepage from Second and Third Portage lakes into the pit and then pump-back from the sumps to the attenuation pond	Low	Local	Continuous	Medium	All Year	No	Seepage water pumped into attenuation pond.	NA	No	High	Pit limits defined by reserves and geotechnical parameters; set back of 80m between pit and dyke might be reduced through further study or after initial experience gained.
Goose Island Pit	Constructed when the mine is in operation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage & Goose)	Gradual loss of natural surface drainage equal to the area of the waste dump; loss of storage capacity in small ponds and wetlands	Low	Local	Continuous	Permanent	All Year	No	Collect seepage and runoff from waste dumps in the attenuation pond and discharge to Third Portage Lake.	Overall small changes in inputs to Third Portage Lake	No	Certain	Minimize footprint and separate clean from contaminated runoff as far as possible through appropriate layout; discharge clean run-off to Third Portage Lake
Borrow Pit(s)	No borrow pits required. All construction materials to be produced from on-site crushing & screening of pre-stripping material.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailings Disposal (Facilities & Ponds)	Reduction of lake area and water volume in Second Portage Lake. Impacts resulted from construction of East Dyke and dewatering of Second Portage Lake arm (see above)	High	Local	Continuous	Permanent	All Year	Yes	No mitigation is possible since dewatered area will be used as permanent disposal area for mine tailings	NA	Yes	Certain	NA
Main Site Roads & Traffic	Disruption of surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain roads & culverts in good condition and maintain adequate drainage patterns.	NA	No	Certain	Use sedimentation traps, selection of more durable materials for road surfacing.

Table B4.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip & Air Traffic	Disruption of surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain adequate drainage patterns	NA	No	Certain	Strip straddles a ridge and drainage disruption minor. Ensure drainage patterns are not disrupted.
	Reclamation of portion of Third Portage Lake for northwest end of runway; small amount of volume displaced	Low	Local	Continuous	Permanent	All Year	No	Minimize length of runway	NA	No	Certain	None recommended.
	Alteration of circulation patterns in Third Portage Lake is expected to be negligible	Low	Local	Continuous	Permanent	All Year	No	Minimize length of runway	NA	No	Certain	None recommended.
Plant Site (Footprint & Ground Activity)	Interference with surface drainage patterns; runoff directed to the attenuation pond	Low	Local	Infrequent	Medium	Summer	No	Grade site to control and collect runoff.	NA	No	Certain	Clean runoff will be directed to attenuation pond and eventually discharged to Third Portage Lake; monitor integrity of surface drainage structures
Process Plant Activity	Processing commences after the construction is completed and the mine is in operation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake & Pipeline	Intake structure and pipeline constructed in construction phase. Fresh water demand for the process commences in operations; negligible reduction in Third Portage Lake volume for water consumption during construction. Minor interference with surface drainage patterns.	Low	Local	Infrequent	Medium	Summer	No	Minimize freshwater requirements	NA	No	High	Monitor freshwater intake volumes.
Discharge Facilities & Pipeline	Extra volume (~2.1 million cubic metres/ year; 0.9% of total lake volume) discharged to Third Portage Lake during operations phase; discharge during construction phase is expected to be minimal; Interference with surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Discharging water to the receiving environment lake that would normally receive this runoff; discharging only during the open water season	NA	No	Certain	Monitor discharge volumes.

Table B4.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Non-Contact Diversion Facilities	Drainage patterns changed. Runoff diverted from Second Portage Lake catchment to Third Portage Lake catchment resulting in increased runoff volumes to Third Portage Lake.	Low	Local	Infrequent	Permanent	Summer	No	Diverted to Third Portage Lake.	NA	No	Certain	Monitor discharge volumes of non-contact water.
Fuel Storage (at Plant Site)	Minor loss of runoff volume to Third Portage Lake due to fuel containment berm. Site runoff directed to attenuation pond	Low	Local	Infrequent	Medium	Summer	No	None	NA	No	Certain	None recommended.
AN / Explosives Storage & Emulsion Plant	Minor loss of runoff volume to Third Portage Lake due to containment berm. Interference with drainage patterns	Low	Local	Infrequent	Medium	Summer	No	None	NA	No	Certain	None recommended.
Site Accommodations	Interference with local drainage patterns (see Plant Site above)	Low	Local	Infrequent	Medium	Summer	No	Grade site to control runoff.	NA	No	Certain	None recommended.
Sewage & Waste Disposal	No effects on surface water quantity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Construction Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vault Dyke	Complete isolation of Vault Lake from Wally and Drilltrail lakes with natural discharge eliminated; small volume of water displaced by dyke	Low	Local	Continuous	Permanent	All Year	No	None	Small footprint and volume of dykes relative to the lake	No	Certain	No mitigation required because of small are displaced by dykes

Table B4.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering												
Vault Lake Dewatering & Drainage Facilities	Approximately 1.5 million cubic meters of water will be pumped from Vault Lake to Wally/Drilltrail lakes resulting in a small increase in volume of receiving lakes (~3.4%); discharge volumes are expected to be well within inter-annual variation and the existng discharge channel can easily pass this additional flow	Low	Regional	Continuous	Medium	Summer	No	None required	NA	No	High	Ongoing hydrological monitoring will be conducted on the outlet channel between Second Portage Lake (ie., receiving water for Wally and Driltrail lakes) and Tehek Lake
	Decrease in Vault Lake volume	High	Local	Continuous	Medium	All Year	Yes	No mitigation is possible since dewatered area will be used as temporary attenuataion pond	NA	Yes	Certain	NA
Vault Pit	Pit developed within dewatered area, so no further impacts to water quantity anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Volumes & Facilities	Extra volume (~0.4 million cubic metres/ year; 0.9% of total lake volume) discharged to Wally and Drilltrail lakes; Interference with surface drainage patterns	Low	Local	Continuous	Medium	Summer	No	Discharging water to the receiving environment lake that would normally receive this runoff; discharging only during the open water season	NA	No	High	Monitor discharge volumes.
Vault Waste Dump	Gradual loss of natural surface drainage equal to the area of the waste dump; loss of storage capacity in small ponds and wetlands	Low	Local	Continuous	Permanent	All Year	No	Collect seepage and runoff from waste dumps in the attenuation pond and discharge to Wally/ Drilltrail lakes	Overall small changes in inputs to Wally/ Drilltrail lakes	No	Certain	Minimize footprint and separate clean from contaminated runoff as far as possible through appropriate layout
Vault Access Road & Traffic	Disruption of surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain roads & culverts in good condition and maintain adequate drainage patterns.	NA	No	Certain	Use sedimentation traps, selection of more durable materials for road surfacing.

Table B4.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Access Road Culverts (Turn Lake)	Culverts will reduce ability of Turn Lake to discharge spring freshet and Phaser Lake diversions resulting in increases in water levels	Medium	Local	Continuous	Medium-term	Summer	Yes	Culverts will be sized (ie., 2.5 m diameter) to handle 1:100 year flood events and increased discharge due to annual Phaser Lake dewatering; culverts will be installed in winter when the outlet from Turn Lake to Drilltrail Lake is frozen to the bottom, ensuring no disruption of flow	With no constraints on water discharge, the potential magnitude of the impact would be low	No	High	Ongoing hydrological monitoring will be conducted at the Turn Lake outlet to Drilltrail Lake
Mine Shop / Office	Interference with surface drainage patterns; runoff directed to the attenuation pond	Low	Local	Infrequent	Medium	Summer	No	Grade site to control and collect runoff.	NA	No	Certain	Clean runoff will be directed to attenuation pond and eventually discharged to Third Portage Lake; monitor integrity of surface drainage structures
OTHER FACILITIES												
Winter Road & Traffic	No impact on surface water anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Existing route used traditionally
Baker Lake Access Road & Traffic	Interference with local surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain roads in good condition and maintain adequate drainage pattern.	NA	No	Certain	Use sedimentation traps, selection of more durable materials for road surfacing.
Barge Landing Facility	Small changes or interference with local drainage patterns and lake circulation	Low	Local	Infrequent	Medium	Summer	No	Minimize footprint.	NA	No	Certain	None recommended
Barge Traffic	No measurable impacts on surface water anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Staging Facility (approx. 1.5 km east of town)	Interference with local drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Minimize footprint; construct in area with minimal impacts to drainage patterns, install culverts as required	NA	No	Certain	Runoff directed to Baker Lake.
Explosives Magazine	Interference with local drainage patterns	Low	Local	Infrequent	Medium	Summer	No	None recommended	NA	No	Certain	None recommended

Table B4.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	Small loss of surface drainage area and interference with drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain adequate drainage patterns.	NA	No	Certain	Monitor integrity of drainage facilities.

Table B4.2: Surface Water Quantity Impact Matrix – Operation

Project Components	Potential Effects	Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects	Proposed Mitigation	Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	Mine Waste and Water Management Plan
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Construction Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dykes												
East Dyke	Impact occurred during construction phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
West Dyke	No impact - dyke is constructed after East dyke within already dewatered arm of Second Portage Lake	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bay Zone Dyke	Impact occurred during construction phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and Third Portage Arm Dykes	Isolation of a small portion of Third Portage Lake (~73 ha), small reduction in Third Portage Lake surface area and volume	Low	Local	Continuous	Medium	All Year	No	None	NA	No	Certain	None recommended.
	Change in lake circulation patterns. Water entering the East basin of Third Portage Lake from the North and South basins will be forced further east, possibly resulting in increased mixing. This change in potential circulation pattern is considered to be relatively small.	Low	Local	Continuous	Medium	All Year	No	Dewatering will be timed such that there is no cumulative impact on water balance in Third Portage Lake as a result of dewatering of Second Portage Lake	NA	No	Certain	Ongoing hydrological monitoring will be conducted at the Third Portage Lake outlet.
Dewatering												
Second Portage Lake	No further dewatering anticipated during operations	NA	NA	NA	NA	NA	NA	None	None	NA	Certain	

Table B4.2 Continued

Project Components	Potential Effects	Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects	Proposed Mitigation	Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	Mine Waste and Water Management Plan
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Bay Zone	Approximately 0.4 million cubic meters of water will be pumped to residual areas of Third Portage Lake resulting in a negligible increase in volume (0.2%) and water levels. Given that dewatering takes place at least two years after dewatering of Second Portage Lake, negligible cumulative effects in water volume and levels in Third Portage Lake are anticipated.	Low	Local	Continuous	Medium	All Year	No	Enhancement of one of Third Portage Lake outlet channels will ensure that increased discharge is easily handled	NA	No	Certain	Ongoing hydrological monitoring will be conducted at the Third Portage Lake outlet.
Goose Island (Third Portage Lake)	Approximately 2.2 million cubic meters of water will be pumped to residual areas of Third Portage Lake in Year 4 or 5 resulting in an increase in volume (<1%) and water levels (maximum of 4 -5 cm), well within annual variations. Given that dewatering takes place at least four years after dewatering of Second Portage Lake, negligible cumulative effects in water volume and levels in Third Portage Lake are anticipated.	Low	Local	Continuous	Medium	Summer	No	Controlled rate of dewatering to minimize flow fluctuations	NA	No	Certain	Ongoing hydrological monitoring at Third Portage Lake outlet to Second Portage Lake

Table B4.2 Continued

Project Components	Potential Effects	Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects	Proposed Mitigation	Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	Mine Waste and Water Management Plan
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage Pit	Some potential for high seepage rates from Second Portage and Third Portage lakes into pit, but minor effect lake water levels	Low	Local	Continuous	Medium	All Year	No	Dykes designed with suitable cutoffs to minimize seepage rates. Treatment plant and Attenuation Pond designed to handle projected seepage rates.	NA	No	Moderate	Monitoring of pit seepage rates.
Goose Island Pit	Some potential for high seepage rates from Third Portage lakes into pit, but minor effect lake water levels	Low	Local	Continuous	Medium	All Year	No	Dykes designed with suitable cutoffs to minimize seepage rates. Treatment plant and Attenuation Pond designed to handle projected seepage rates.	NA	No	Moderate	Monitoring of pit seepage rates.
Waste Dump (Portage & Goose)	Loss of natural surface drainage equal to the area of the waste dump. Loss of natural storage capacity in small ponds and wetlands. Changed local drainage patterns.	Low	Local	Infrequent	Medium	Summer	No	Collect and treat any runoff and/or seepage from waste dump. Divert non-contact water away from waste dump.	NA	No	Certain	Minimize footprint and separate clean from contaminated runoff as far as possible through appropriate layout; discharge clean run-off to Third Portage Lake
Borrow Pit(s)	No borrow pits required. All construction materials to be produced from on-site crushing & screening of pre-stripping material.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B4.2 Continued

Project Components	Potential Effects	Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects	Proposed Mitigation	Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	Mine Waste and Water Management Plan
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Disposal Facilities	Impacts previously resulted from construction of East Dyke (see dewatering during Construction phase)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Pumping of tailings water to treatment plant for discharge to Third Portage Lake after year 6. Minor increase in flows to Third Portage Lake, no measurable water level changes expected	Low	Local	Continuous	Medium	All Year	No	Pace treatment plant releases to receiving water flows; discharge water only during open water season.	NA	No	Certain	Monitor discharge volumes and timing.
Main Site Roads & Traffic	Disruption of surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain roads & culverts in good condition and maintain adequate drainage patterns.	NA	No	Certain	Use sedimentation traps, selection of more durable materials for road surfacing.
Airstrip & Air Traffic	Disruption of surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain adequate drainage patterns	NA	No	Certain	Strip straddles a ridge and drainage disruption minor. Ensure drainage patterns are not disrupted.
Plant Site Footprint & Ground Activity	Interference with surface drainage patterns; runoff directed to the attenuation pond	Low	Local	Infrequent	Medium	Summer	No	Grade site to control and collect runoff.	NA	No	Certain	Clean runoff will be directed to attenuation pond and eventually discharged to Third Portage Lake; monitor integrity of surface drainage structures
Process Plant Activity including Freshwater Intake and Pipeline	Lower seasonal water levels in Third Portage Lake from freshwater consumption; annual consumption is estimated at 4.1 million cubic metres or 1.8% of the total volume of Third Portage Lake on an annual basis	Low	Local	Continuous	Medium	All Year	No	Minimize intake of fresh water; treat tailings and reclaim water and discharge back to Third Portage Lake; ensure reclaim system operates all year.	Decrease net process-related flows to/from Third Portage Lake	No	Certain	Monitor fresh water pumped, monitor reclaim system.

Table B4.2 Continued

Project Components	Potential Effects	Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects	Proposed Mitigation	Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	Mine Waste and Water Management Plan
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Discharge Facilities & Pipeline	Possible minor increase in water levels in Third Portage Lake during discharge periods.	Low	Local	Continuous	Medium	Summer	No	Pace treatment plant releases to receiving water flows.	Minimize or eliminate possible effects	No	Certain	Monitor treated water flow at discharge point.
Non-Contact Diversion Facilities	Drainage patterns changed. Runoff diverted from Second Portage Lake catchment to Third Portage Lake catchment resulting in increased runoff volumes to Third Portage Lake.	Low	Local	Infrequent	Permanent	Summer	No	Diverted to Third Portage Lake.	NA	No	Certain	Monitor discharge volumes of non-contact water.
Fuel Storage (at Plant Site)	Minor loss of runoff volume to Third Portage Lake due to fuel containment berm. Site runoff directed to attenuation pond	Low	Local	Infrequent	Medium	Summer	No	None	NA	No	Certain	None recommended,
AN / Explosives Storage & Emulsion Plant	Minor loss of runoff volume to Third Portage Lake due to containment berm. Interference with drainage patterns	Low	Local	Infrequent	Medium	Summer	No	None	NA	No	Certain	None recommended.
Site Accommodations	Interference with local drainage patterns (see Plant Site above)	Low	Local	Infrequent	Medium	Summer	No	Grade site to control runoff.	NA	No	Certain	None recommended.
Sewage & Waste Disposal	Very small effects on surface water quantity. Treated water is discharged to tailings pond, treated again before being discharged to Third Portage Lake	Low	Local	Infrequent	Medium	All Year	No	Discharge treated water back to Third Portage Lake.	NA	No	Certain	None recommended.
VAULT FACILITIES												
Construction Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B4.2 Continued

Project Components	Potential Effects	Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects	Proposed Mitigation	Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	Mine Waste and Water Management Plan
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Dyke	Impact on water circulation patterns in Wally Lake	Low	Local	Continuous	Medium	All Year	No	None	NA	No	Certain	None recommended.
Dewatering												
Vault Lake Dewatering & Drainage Facilities	Dewatering occurred during Construction phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Ongoing discharge into Wally Lake from attenuation pond, not expected to be greatly different from pre-development	Low	Local	Infrequent	Medium	Summer	No	Control discharge rates to minimize/eliminate impacts on Wally Lake levels	NA	No	Certain	Monitor attenuation pond discharge rates.
Phaser Lake dewatering	Decrease in water volumes and levels in Phaser Lake	Low	Local	Infrequent	Medium-term	Summer	No	Control pumping rates to minimize the rate of summer drawdown in Phaser Lake	NA	No	Certain	Minimize fluctuations in water levels.
	Increased runoff volume into Turn Lake due to Phaser Lake diversion (ie., approximately 1m); additional volume during summer from lowering of Phaser Lake	Low	Local	Infrequent	Medium-term	Summer	No	Control pumping rates to minimize or eliminate impacts on Turn Lake levels	NA	No	Certain	Ongoing hydrological monitoring will be conducted at the Turn Lake outlet
Vault Pit	Pit water collected and pumped to attenuation Pond.	Low	Local	Infrequent	Medium	Summer	No	Attenuation Pond designed with adequate storage, controlled release or treat/release to Wally Lake	NA	No	Certain	Monitor attenuation pond levels.
Vault Waste Dump	Loss of natural surface drainage equal to the area of the waste dump. Loss of natural storage capacity in small ponds and wetlands. Changed local drainage patterns.	Low	Local	Infrequent	Medium	Summer	No	Collect and treat any runoff and/or seepage from waste dump. Divert non-contact water away from waste dump.	NA	No	Certain	Minimize footprint and separate clean from contaminated runoff as far as possible through appropriate layout; discharge clean run-off to Wally Lake
Vault Access Road	Disruption of surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain roads & culverts in good condition and maintain adequate drainage patterns.	NA	No	Certain	Use sedimentation traps, selection of more durable materials for road surfacing.

Table B4.2 Continued

Project Components	Potential Effects	Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects	Proposed Mitigation	Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	Mine Waste and Water Management Plan
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Access Road Culverts (Turn Lake)	Culverts will reduce ability of Turn Lake to discharge spring freshet and Phaser Lake diversions resulting in increases in water levels	Medium	Local	Continuous	Medium-term	Summer	Yes	Culverts will be sized (ie., 2.5 m diameter) to handle 1:100 year flood events and increased discharge due to annual Phaser Lake dewatering; culverts will be installed in winter when the outlet from Turn Lake to Drilltrail Lake is frozen to the bottom, ensuring no disruption of flow	With no constraints on water discharge, the potential magnitude of the impact would be low	No	High	Ongoing hydrological monitoring will be conducted at the Turn Lake outlet to Drilltrail Lake; check culverts on regular basis for blockages and ensure free-flowing
Mine Shop / Office	Interference with surface drainage patterns; runoff directed to the attenuation pond	Low	Local	Infrequent	Medium	Summer	No	Grade site to control and collect runoff.	NA	No	Certain	Clean runoff will be directed to attenuation pond and eventually discharged to Third Portage Lake; monitor integrity of surface drainage structures
OTHER FACILITIES												
Winter Road	No impact on surface water anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	Existing route used traditionally
Baker Lake Access Road	Interference with local surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain roads in good condition and maintain adequate drainage pattern.	NA	No	Certain	Use sedimentation traps, selection of more durable materials for road surfacing.
Barge Landing Facility	Small changes or interference with local drainage patterns and lake circulation	Low	Local	Infrequent	Medium	Summer	No	Minimize footprint.	NA	No	Certain	None recommended
Barge Traffic	No measurable impacts on surface water anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Staging Facility (approx. 1.5 km east of Baker Lake)	Interference with local drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Minimize footprint; construct in area with minimal impacts to drainage patterns, install culverts as required	NA	No	Certain	Runoff directed to Baker Lake.
Explosives Magazine	Interference with local drainage patterns	Low	Local	Infrequent	Medium	Summer	No	None recommended	NA	No	Certain	None recommended

Table B4.2 Continued

Project Components	Potential Effects	Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects	Proposed Mitigation	Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	Mine Waste and Water Management Plan
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	Small loss of surface drainage area and interference with drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain adequate drainage patterns.	NA	No	Certain	Monitor integrity of drainage facilities.

Table B4.3: Surface Water Quantity Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries			Temporal Boundaries				Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN SITE												
Construction Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dykes											High	
East Dyke	Impact occurred during construction phase; remains permanently; will provide shoreline for arm of Third Portage Lake after reflooding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
West Dyke	Impact occurred during construction phase; remains permanently; will provide shoreline for arm of Third Portage Lake after reflooding	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Bay Zone Dyke	Breached on closure to allow controlled flooding of Portage pit; area of Third Portage Lake increased; some continued alteration of lake circulation patterns	Low	Local	Continuous	Permanent	All Year	No	Construct permanent breach openings to minimize water level differentials	NA	No	Certain	None recommended.
Goose Island and Third Portage Arm Dykes	Breached on closure to allow controlled flooding of Goose Island pit, portion of Third Portage Lake "recovered"; some continued alteration of lake circulation patterns	Low	Local	Continuous	Permanent	All Year	No	Construct permanent breach openings to minimize water level differentials	NA	No	Certain	None recommended.

Table B4.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries			Temporal Boundaries				Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Rewatering												
Portage and Goose Island Pit	Instantaneous rewatering of the Portage and Goose Island Pit (100 million cubic metres) has the potential for significant drawdowns of Third Portage Lake	High	Regional	Infrequent	Short	All Year	Yes	Rather than instantaneous rewatering, pit flooding will be achieved by a combination of seepage, precipitation and some re-direction of annual freshet flows from Third Portage Lake	Impact of rewatering will be of low magnitude	No	High	Rewatering volumes will be carefully monitored.
	Third Portage Lake surface area and volume will increase after rewatering - POSITIVE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Lake circulation patterns will be altered with increased mixing expected due to the presence of a new arm of Third Portage Lake (formerly Portage Pit); because of the depth of pits, they will become a depositional area for sediment	Low	Local	Continuous	Permanent	All Year	No	None recommended	NA	No	High	None recommended
Dewatering	Construction phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B4.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries			Temporal Boundaries				Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage Pit	Instantaneous rewatering of the Portage and Goose Island Pit (100 million cubic metres) has the potential for significant drawdowns of Third Portage Lake	High	Regional	Infrequent	Short	All Year	Yes	Rather than instantaneous rewatering, pit flooding will be achieved by a combination of seepage, precipitation and some re-direction of annual freshet flows from Third Portage Lake; complete breaching of dykes will not occur until water levels have stabilized	Impact of rewatering will be of low magnitude	No	High	Rewatering volumes will be carefully monitored.
Goose Island Pit	Instantaneous rewatering of the Portage and Goose Island Pit (100 million cubic metres) has the potential for significant drawdowns of Third Portage Lake	High	Regional	Infrequent	Short	All Year	Yes	Rather than instantaneous rewatering, pit flooding will be achieved by a combination of seepage, precipitation and some re-direction of annual freshet flows from Third Portage Lake; complete breaching of dykes will not occur until water levels have stabilized	Impact of rewatering will be of low magnitude	No	High	Rewatering volumes will be carefully monitored.
Waste Dump (Portage & Goose)	Recontoured surface drainage equal to the area of the waste dump gained on closure; loss of storage capacity in small local ponds and wetlands	Low	Local	Continuous	Permanent	All Year	No	Design stable drainage channels	NA	No	Certain	Monitor drainage volumes.

Table B4.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries			Temporal Boundaries				Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Borrow Pit(s)	No borrow pits identified in the project. All construction material locally generated.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailings Disposal (Facilities & Ponds)	Permanent reduction of lake area and water volume in 2nd Portage Lake	High	Local	Continuous	Permanent	All Year	Yes	None recommended.	NA	Yes	Certain	None recommended.
	Larger catchment area diverted to Third Portage Lake	Low	Local	Continuous	Permanent	All Year	No	Design stable channels and outlets toThird Portage Lake	NA	No	High	Monitor diversion channel discharge volumes.
Main Site Roads & Traffic	Site roads to be decommissioned and reclaimed to restore drainage patterns - POSITIVE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Airstrip & Air Traffic	Upon completing closure activities the airstrip to be decommissioned and surface recontoured to restore drainage patterns; some ongoing disruption of circulation patterns in Third Portage Lake anticipated	Low	Local	Continuous	Permanent	All Year	No	Recontour and restore natural drainage patterns.	NA	No	High	Maintain drainage structures.
Plant Site Footprint	Upon completing closure activities the plant site to be decommissioned and surface recontoured to restore drainage patterns	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Process Plant Activity	No impacts during closure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B4.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries			Temporal Boundaries				Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Freshwater Intake & Pipeline	Intake structure and pipeline removed; temporary very minor disturbance in lake during removal activities.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities & Pipeline	Discharge facilities and pipeline removed; temporary very minor disturbance in lake during removal activities.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-Contact Diversion Facilities	On closure all surfaces to be reclaimed and recontoured to provide adequate drainage to the natural environment	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant Site)	Upon completing closure activities the fuel storage site will be decommissioned and surface recontoured to restore drainage patterns	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AN / Explosives Storage & Emulsion Plant	Upon completing closure activities the fuel storage will be decommissioned and surface recontoured to restore drainage patterns	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Accommodations Complex	See Plantsite Footprint	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage & Waste Disposal	No impacts during closure; facilities removed.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Construction Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA

Table B4.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries			Temporal Boundaries				Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Dyke and Pit	Instantaneous rewatering of the Vault Pit has the potential for significant drawdowns of Third Portage Lake	High	Regional	Infrequent	Short	All Year	Yes	Rather than instantaneous rewatering, pit flooding will be achieved by a combination of seepage, precipitation and some re-direction of annual freshet flows from Wally Lake; complete breaching of dykes will not occur until water levels have stabilized	Impact of rewatering will be of low magnitude	No	High	Rewatering volumes will be carefully monitored.
Vault Waste Dump	Recontoured surface drainage equal to the area of the waste dump gained on closure; loss of storage capacity in small local ponds and wetlands	Low	Local	Continuous	Permanent	All Year	No	Design stable drainage channels	NA	No	Certain	Monitor drainage volumes.
Vault Access Road & Traffic	Site roads to be decommissioned and reclaimed to restore drainage patterns - POSITIVE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Access Road Culverts (Turn Lake)	Culverts removed to restore natural drainage patterns - POSITIVE	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop / Office	Upon completing closure activities the mine shop and office to be decommissioned and surface recontoured to restore drainage patterns	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												
Winter Road & Traffic	No impact.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B4.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Mine Waste and Water Management Plan
		Spatial Boundaries			Temporal Boundaries				Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road & Traffic	Interference with local surface drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain roads in good condition and maintain adequate drainage pattern.	NA	No	Certain	Use sedimentation traps, selection of more durable materials for road surfacing.
Barge Landing Facility	Activities cease on closure.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	Activities cease on closure.	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Staging Facility (approx. 1.5 km east of town)	Interference with local drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain drainage patterns.	NA	No	Certain	Runoff directed to Baker Lake.
Explosives Magazine	Interference with local drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain drainage patterns.	NA	No	Certain	Runoff directed to Baker Lake.
Tank Farm	Interference with local drainage patterns	Low	Local	Infrequent	Medium	Summer	No	Maintain drainage patterns.	NA	No	Certain	Runoff directed to Baker Lake.

Table B5.1: Water Quality Impact Matrix – Construction

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Construction Noise & Activity (General)	Sedimentation may degrade nearby water quality.	medium	footprint to local	Continuous	Short-term	Summer	low	Best management practices for sediment control (silt fences, settling ponds, silt curtains, sediment traps). See Mine Waste and Water Management Plan	high	low	medium	Maintain and monitor conditions. See Mine Waste and Water Management Plan and Aquatic Environmental Management Plan.
	Dust and emission from construction activities may degrade nearby water quality	low	footprint to local	Continuous	Short-term	Summer	low	Use of dust suppressants, watering, road preparation and/or other dust control procedures. See Air Quality and Noise Management Plan.	high	low	high	See Air Quality and Noise Management Plan and Aquatic Environment Management Plan
	Potential for blasting residues (nitrogen species) to be released to lakes in runoff or melting of lake ice	medium	footprint to local	Frequent	Short-term	Summer	low	Appropriate selection of explosive type, and charge load. Best Management Practices to minimize spills and excess explosives loss. See Aquatic Environment Management Plan and Mine Waste and Water Management Plan)	medium	low	medium	See Aquatic Environment Management Plan
	Spills of fuel and/or loads on ice and in close proximity to water bodies may result in water quality degradation.	medium	footprint to local	Rare	Short-term	All Year	low to medium	Implement Spill Contingency Plan and other emergency responses, when required.	medium	low	medium	Spill Contingency Plan, Emergency Response Plan, and Accidents and Malfunctions Plan

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dykes												
All Dikes	Dust and emission from construction activities may degrade water quality in 2PL and 3PL	low	local	Continuous	Short-term	Summer	low	Use of dust suppressants, watering, road preparation and/or other dust control procedures. See Air Quality and Noise Management Plan.	high	low	high	See Air Quality and Noise Management Plan and Aquatic Environment Management Plan
East Dike	Disturbance of lake sediment during rock placement releasing TSS to 2PL	very high to high	footprint to local	Continuous	Short-term	Summer	high	Utilize silt curtains, and other sediment control practices and monitoring (BMP). See Aquatic Environment Management Plan.	High: Spatical extent reduced to vicinity of dikes inside silt curtains	medium to low	medium	See Aquatic Environment Management Plan and other relevant monitoring documents
	Release of soluble rock and/or till constituents to dike porewaters and 2PL as material is placed into water (blasting residues, metals, TSS).	high to medium	footprint	Continuous	Short-term	Summer	medium	Appropriate selection of explosive type (use emulsion explosives rather than dry ANFO), and charge load. Selection of appropriate rock type for use to minimize metals loading (rocks with low leaching potential) and potential acid generation. See Aquatic Environment Management Plan.	Medium: Magnitude reduced	medium to low	medium to low	Monitor water quality. See Aquatic Environment Management Plan
	Seepage through dike to pit area during and after drawdown	high	footprint	Continuous	Short-term	Summer	low	Collect seepage water and direct to the settling pond.	high	low	high	Mine Waste and Water Management Plan

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
West (Tailings) Dike	Runoff from construction materials will enter the de-watered area of the northwest arm of Second Portage Lake, and will likely be contained within shallow remnant ponds.	very high to high	footprint	Continuous	Short-term	Summer	low	Best management practices for sediment control (silt fences, settling ponds, sediment traps). Construct diversion facilities to capture and direct water to settling ponds.	medium	low	medium	Maintain and monitor conditions. See Mine Waste and Water Management Plan and Aquatic Environmental Management Plan.
Portage South (Bay Zone) Dike	Disturbance of lake sediment during rock placement, releasing TSS to 3PL	very high to high	footprint to local	Continuous	Short-term	Summer	high	Utilize silt curtains, and other sediment control practices and monitoring (BMP). See Aquatic Environment Management Plan.	High: Spatical extent reduced to vicinity of dikes inside silt curtains	medium to low	medium	See Aquatic Environment Management Plan and other relevant monitoring documents
	Release of soluble rock and/or till constituents to 3PL as material is placed into water (blasting residues, metals, TSS)	high to medium	footprint	Continuous	Short-term	Summer	medium	Appropriate selection of explosive type (use emulsion explosives rather than dry ANFO), and charge load. Selection of appropriate rock type for use to minimize metals loading (rocks with low leaching potential) and potential acid generation. See Aquatic Environment Management Plan.	Medium: Magnitude reduced	medium to low	medium to low	Monitor water quality. See Aquatic Environment Management Plan
	Seepage through dike during and after drawdown	high	footprint	Continuous	Short-term	Summer	low	Collect seepage water and direct to the settling pond.	high	low	high	Mined Waste and Water Management Plan
Goose Island & 3rd Portage Arm (South Camp Island) Dikes	Constructed during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering												
2nd Portage Lake	Release of TSS to 3PL in dewatering discharge	very high to high	footprint to local	Frequent	Short-term	Summer	high	Only relatively clean water to be discharged directly to 3PL; non-compliant water to be directed to tailings storage facility or attenuation storage pond. Monitor location of suction pipe to minimize sediment disturbance. Monitor outlet pipe location and use silt curtains.	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan and Aquatic Environmental Management Plan.
Portage Pit (3rd Portage Lake)	Release of TSS to 3PL in dewatering discharge	very high to high	footprint to local	Frequent	Short-term	Summer	high	Only relatively clean water to be discharged directly to 3PL; non-compliant water to be directed to tailings storage facility or attenuation storage pond. Monitor location of suction pipe to minimize sediment disturbance. Monitor outlet pipe location and use silt curtains.	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan and Aquatic Environmental Management Plan.
Goose Island (3rd Portage Lake)	Dewatered during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage Pit	Release of sediments, metals and contaminants to local sumps, and possibly local lakes and groundwater, from surface water runoff during overburden and lake sediment prestripping and initial mining.	very high to high	footprint to local	Continuous	Short to medium term	Summer	low to high	Direct sump water to tailings storage facility, use sediment control structures and BMP. Contain water and treat, if required before discharge. Impacts to groundwater are likely limited to surface active layer within mine footprint, as groundwater flows into, not out of, dewatered pit. See Mine Waste and Water Management Plan.	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan and Aquatic Environmental Management Plan.
	Generation of dust from blasting, overburden stripping, excavation and other construction activities depositing in 2PL and 3PL.	medium	footprint	Frequent	Short-term	All Year	low	Use of dust suppressants, watering, road preparation and/or other dust control procedures (see Air Quality and Noise Management Plan). Select appropriate explosives and charge weight. Maintain and operate equipment in an efficient manner.	medium	low	medium	See Air Quality and Noise Management Plan and Aquatic Environment Management Plan
Goose Island Pit	Constructed during operations (see comments in Operation Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage Rock Storage Facility	TSS, metals and acidity from waste rock seepage and runoff released to tundra, surface water and ground water	very high to high	footprint	Continuous	Short to medium term	Summer	medium	Material to be placed in containment facility. Seepage and runoff to be collected by collection facilities and sumps, and directed to Attenuation Storage Pond for discharge and treatment if required. Release to groundwater will be limited by collection facilities. Rock will eventually freeze (below the active zone) reducing potential generation of metals and acidic drainage. See Mine Waste and Water Management Plan.	high	low	high	Monitor conditions. See Mine Waste and Water Management Plan, and Aquatic Environmental Management Plan.
	Dust and emissions generated from stripping of organic soils and deposition of waste rock, reaching 2PL through direct deposition or in runoff.	medium	footprint	Frequent	Short-term	All Year	low	Use of dust suppressants, watering, road preparation and/or other dust control procedures (see Air Quality and Noise Management Plan). Select appropriate explosives and charge weight. Maintain and operate equipment in an efficient manner.	medium	low	medium	See Air Quality and Noise Management Plan and Aquatic Environment Management Plan
Borrow Pit(s)	N/A (All borrow from within pit footprint)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Disposal Facilities	N/A (See comments on Tailings Dike construction)											
Main Site Roads & Traffic	Sedimentation, dusting, fuel and load spills from traffic affects quality in water bodies along transit route.	medium	footprint and local	Continuous/ Rare	Short-term	Summer/ All Year	medium to low	Use of dust suppressants, watering, road preparation and/or other dust control procedures (see Air Quality and noise Management Plan). Use BMP for sediment control in ditches and control of runoff. Implement Spill Contingency Plan and other emergency responses, when required.	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan, Aquatic Environmental Management Plan, Air Quality and Noise Management Plan.
Airstrip & Air Traffic	Sedimentation and dusting from construction affects water quality in 3PL.	medium	local	Continuous	Short-term	Summer	medium	Use of dust suppressants, watering, road preparation and/or other dust control procedures (see Air Quality and Noise Management Plan). Use BMP for sediment control in ditches and control of runoff. Implement Spill Contingency Plan and other emergency responses, when required. Minimize disturbed area.	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan, Aquatic Environmental Management Plan, Air Quality and Noise Management Plan.

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities	Sedimentation and dusting from construction, fuel and load spills from traffic effects localized water quality that drains to tailings impoundment.	medium	footprint	Continuous/ Rare	Short-term	Summer/ All Year	low	Use of dust suppressants, watering, road preparation and/or other dust control procedures (see Air Quality and Noise Management Plan). Use BMP for sediment control in ditches and control of runoff. Implement Spill Contingency Plan and other emergency responses, when required. Minimize disturbed area.	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan, Aquatic Environmental Management Plan, Air Quality and Noise Management Plan.
Freshwater Intake & Pipeline	Disruption of 3PL foreshore from construction of wet well or barge causes release of sediment to 3PI. Blasting for wet well releases blast residues and emissions to 3PL. Construction of pipeline will release sediment to 3PL along route	low	footprint	Rare	Short-term	Summer	low	Use BMP for construction and control of sediment and dust. Minimize disturbed area. Pipeline constructed above ground surface on raised footings.	high	low	high	Monitor conditions.
Discharge Facilities & Pipeline	Disruption of 3PL foreshore from construction of diffuser station and pipeline causes release of sediment to 3PI.	low	footprint	Rare	Short-term	Summer	low	Use BMP for construction and control of sediment and dust. Minimize disturbed area. Pipeline constructed above ground surface on raised footings.	high	low	high	Monitor conditions.

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Effluent Discharge	Effluent from construction disturbance released to 3PL	medium	local	Continuous	Short-term	Summer	medium	Surface waters in mine footprint collected in natural depressions in dewatered Northwest Arm of 2PL. Best Management Practices applied to reduce total suspended solids. No effluent discharge planned during construction period. See Mine Waste and Water Management Plan	high	low	high	Monitor contained water quality and filling of depressions (Mine Waste and Water Management Plan)
Non-Contact Diversion Facilities	Sedimentation from construction of ditches and sumps released to 2PL and/or 3PL; sediment losses due to degradation of permafrost associated with ditches and sumps, particularly through bogs.	medium	footprint	Frequent	Short-term	Summer	low	Use BMP for construction and control of sediment and dust.	medium	low	medium	Monitor conditions. See Mine Waste and Water Management Plan, Aquatic Environmental Management Plan.

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Storage (at Plant Site)	Construction of laydown areas releases sediment and blast residues which drain to tailings impoundment or 3PL.	medium	footprint	Continuous	Short-term	Summer	low	Runoff directed to tailings impoundment, or directed to sedimentation ponds and pumped to tailings impoundment.	high	low	high	Monitor conditions.
	Fuel storage area construction of area and potential leaks.	medium	footprint	Continuous/ Rare	Short-term	Summer/ All Year	medium to low	Contain runoff and trap sediments from construction area using BMP and direct water to sedimentation ponds. In the event of a spill containment should be achieved by protective liner and bermed area.	high	low	high	Mine Waste and Water Management Plan
AN/Explosives Storage & Emulsion Plant	Sedimentation and blast residues during facility construction released to local water bodies	medium	footprint	Continuous	Short-term	Summer	low	Runoff directed to tailings impoundment, or directed to sedimentation ponds and pumped to tailings impoundment.	high	low	high	Monitor conditions.
	Spills of explosives during manufacture and transport	medium	footprint	Rare	Short-term	All Year	low/medium	Implement Spill Contingency Plan and other emergency responses, when required.	medium	low	medium	Spill Contingency Plan, Emergency Response Plan, and Accidents and Malfunctions Plan

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Site Accommodations	Construction of site accommodations releases sediment to local water bodies and sediment ponds.	medium	footprint	Continuous	Short-term	Summer	low	Use BMP for construction and control of sediment and dust. Minimize disturbed area.	high	low	high	Monitor conditions. See Mine Waste and Water Management Plan, Aquatic Environmental Management Plan.
	Incinerated waste emissions settle in water bodies, degrading water quality	low	local	Continuous	Short-term	All Year	low	Use BMP for operation of facility and insure appropriate environmental controls for stack emissions are in place.	medium	low	high	Air Quality and Noise Management Plan
	Leachate from incineration ashes enter water bodies, degrading water quality	medium	footprint	Continuous	Short-term	Summer	medium to low	Incinerator residue will be disposed of in the tailings facility. Monitor and maintain tailings facility and ensure dust control so incinerator ash does not become airborne.	high	low	medium	Mine Waste and Water Management Plan
Sewage & Waste Disposal	Waste water and sewage discharge increases BOD and nutrient load to water bodies	medium	footprint	Continuous	Short-term	All Year	low	Sewage treatment plant to reduce effluent concentrations to legislated levels. Sewage sludge will be incinerated. Effluent from sewage treatment plant will be disposed of in the tailings facility.	high	low	medium	Mine Waste and Water Management Plan
VAULT FACILITIES												
Construction Noise & Activity	Constructed during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Dike	Constructed during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Lake Dewatering & Drainage Facilities	Constructed during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Pit	Constructed during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Rock Storage Facility	Constructed during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Area Effluent Discharge	N/A during construction	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Vault Access Road & Traffic	Constructed during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Access Road Culverts (Tern Lake)	Constructed during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mine Shop/Office	Constructed during operations (see comments in Operations Matrix)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTHER FACILITIES												
Winter Road & Traffic	Spills of fuel and/or loads on ice and in close proximity to water bodies may result in water quality degradation.	medium	footprint	Rare	Short-term	All Year	low to medium	Implement Spill Contingency Plan and other emergency responses, when required.	medium	low	medium	Spill Contingency Plan, Emergency Response Plan, and Accidents and Malfunctions Plan
Baker Lake Access Road & Traffic	Sedimentation, dusting, fuel and load spills from traffic affects quality in water bodies along transit route.	low to medium	footprint	Continuous/ Rare	Short-term	All Year	low to medium	Implement Spill Contingency Plan and other emergency responses, when required. Follow BMP for storm water management and sediment control, and use dust control measures, as necessary.	medium	low	medium	Spill Contingency Plan, Emergency Response Plan, and Accidents and Malfunctions Plan

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Landing Facility	Localized degradation of water quality along Baker Lake foreshore due to sediment loading during construction of facility. Loss of diesel during transfer.	low to medium	footprint	Continuous/ Rare	Short-term	Summer	low to medium	Implement Spill Contingency Plan and other emergency responses, when required. Follow BMP for storm water management and sediment control, and use dust control measures, as necessary.	medium	low	medium	Spill Contingency Plan, Emergency Response Plan, and Accidents and Malfunctions Plan
Barge Traffic	Dust and emissions from off-loading equipment traffic settles in Baker Lake affecting water quality	low	footprint	Continuous	Short-term	Summer	low	Use dust control, as required. Ensure proper equipment maintenance.	medium	low	medium	Air Quality and Noise Management Plan
	Fuel and load spills from traffic affects runoff quality and possibly water bodies along transit route.	low to medium	footprint	Continuous/ Rare	Short-term	All Year	low to medium	Implement Spill Contingency Plan and other emergency responses, when required. Follow BMP for storm water management and sediment control, and use dust control measures, as necessary.	medium	low	medium	Spill Contingency Plan, Emergency Response Plan, and Accidents and Malfunctions Plan
In-town Staging Facility												
Explosives Magazine	Disturbance of area with sediment entering surface water runoff during construction. Once in use if an accident, then leaks, fires or explosions from this facility could negatively impact water quality.	low to high	footprint	Continuous/ Rare	Short-term	Summer/ All Year	low to high	Construct plant on concrete foundation surrounded by a berm and drainage control structures. See Hazardous Materials Management Plan	high	low	medium	See Construction Documents and Hazardous Materials Storage Plan

Table B5.1 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	Diesel spills to Baker Lake	low to medium	footprint	Rare	Short-term	All Year	low to medium	Lined, bermed facility	high	low	high	Spill Contingency Plan, Emergency Response Plan, and Accidents and Malfunctions Plan

Table B5.2: Water Quality Impact Matrix – Operation

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Construction Noise & Activity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dykes												
East Dike	Leaching of metals and acidity from dike rock to 2PL Leached metals and acidity initially reach pit as seepage through dike. Metals and acidity in runoff from downstream (pit side) rock embankment report to pit (see Pit discussions)	Low	footprint to local	Continuous	Long-term	Year Round	low	Use of UM rock for capping. Use of IF for submerged rock in upstream shell.	medium	low	medium to high	Monitor water quality adjacent to dikes. See Aquatic Environment Management Plan.
West (Tailings) Dike	Metals and acidity in seepage and runoff from downstream (pit side) of rock embankment report to pit	High	Footprint	Frequent	Medium-term	Summer	Low	Use of IV and UM as construction rock. Directing all seepage and runoff to pit, and pump to attenuation pond for potential treatment. Permafrost aggradaion into dike will reduce seepage.	Medium: magnitude reduced	Low	medium	Monitor internal dike temperature using thermistors (potential seepage control).
	Metals and acidity in runoff from downstream portion of tailings dam report to tailings impoundment (See Tailings Storage Facility Discussion)	High	Footprint	Frequent	Medium-term	Summer	Low	Use of IV and UM as construction rock. Directing all seepage and runoff to tailings storage facility and eventually attenuation pond for treatment.	Medium: magnitude reduced	Low	medium	
Portage South (Bay Zone) Dike	Leaching of metals and acidity from dike rock to 3PL during open season Leached metals and acidity initially reach pit as seepage through dike. Metals and acidity in runoff from downstream (pit side) rock embankment report to pit (see Pit discussions)	Low	footprint to local	Continuous	Long-term	Year Round	low	Use of UM rock for capping. Use of IF for submerged rock in upstream shell.	medium	low	medium to high	Monitor water quality adjacent to dikes. See Aquatic Environment Management Plan.

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island & 3rd Portage Arm (South Camp Island) Dikes	Disturbance of lake sediment during rock placement, releasing TSS to 3PL	very high to high	footprint to local	Continuous	Short-term	Summer	high	Utilize silt curtains, and other sediment control practices and monitoring (BMP). See Aquatic Environment Management Plan.	high	medium to low	medium	See Aquatic Environment Management Plan.
	Release of soluble rock and/or till constituents to 2PL as material is placed into water (blasting residues, metals, TSS)	high to medium	footprint	Continuous	Short-term	Summer	medium to low	Appropriate selection of explosive type (use emulsion explosives rather than dry ANFO), and charge load. Selection of appropriate rock type for use to minimize metals loading (rocks with low leaching potential) and potential acid generation. See Aquatic Environment Management Plan.	medium	medium to low	medium to low	Monitor water quality. See Aquatic Environment Management Plan
	Seepage through dike to pit during and after drawdown (See Pit Discussion)											
	Leaching of metals and acidity from dike rock to 3PL during open season Leached metals and acidity initially reach pit as seepage through dyke. Metals and acidity in runoff from downstream shell of dam report to pit (see Pit discussions)	Low	footprint to local	Continuous	Long-term	Year Round	low	Use of UM rock for capping. Use of IF for submerged rock in upstream shell.	medium	low	medium to high	Monitor water quality adjacent to dikes. See Aquatic Environment Management Plan.
Dewatering												
2nd Portage Lake	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Portage Pit (3rd Portage Lake)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island (3rd Portage Lake)	Release of TSS to 3PL in dewatering discharge	very high to high	footprint to local	Frequent	Short-term	Summer	high	Only relatively clean water to be discharged directly to 3PL; non-compliant water to be directed to tailings storage facility or attenuation storage pond. Monitor location of suction pipe to minimize sediment disturbance. Monitor outlet pipe location an use silt curtains.	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan and Aquatic Environmental Management Plan.
	Dust and emission from construction activities may degrade water quality in 2PL and 3PL	low	footprint	Continuous	Short-term	Summer	low	Use of dust suppressants, watering, road preparation and/or other dust control procedures. See Air Quality and Noise Management Plan.	high	low	high	See Air Quality and Noise Management Plan and Aquatic Environment Management Plan
Pits												
Portage Pit	Metals, acidity and explosives residues are released in runoff from pit walls and in seepage and runoff from dikes.	Very High	Footprint	Continuous	Medium-term	Year Round	Low	Use of appropriate rock in dike construction. Remove water rapidly from pit. Encourage permafrost aggradation into dike to reduce seepage. Collect pit water and pump to attenuation pond for potential treatment.	Medium	Low	medium	Monitor conditions. See Mine Waste and Water Management Plan.

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island Pit	Metals, acidity and explosives residues are released in runoff from pit wall and seepage and runoff from dikes	Very High	Footprint	Continuous	Medium-term	Year Round	Low	Use of appropriate rock in dike construction, removal of water rapidly from pit, pit water collected and directed to attenuation pond.	Medium	Low	medium	Monitor conditions. See Mine Waste and Water Management Plan.
	Dust and emissions from haul truck traffic	Low	Footprint	Continuous	Medium-term	Year Round	Low	Use of water trucks for dust suppression	Medium	Low	High	
	Potential for blasting residues (nitrogen species) to be released to lakes in runoff or melting of lake ice	medium	footprint to local	Frequent	Short-term	Summer	low	Appropriate selection of explosive type, and charge load. Best Management Practices to minimize spills and excess explosives loss. See AEMP	medium	Low	medium	See Aquatic Environment Management Plan
Portage Rock Storage Facility	Metals, acidity and nitrogen species are released in seepage and runoff to tundra, active layer groundwater and project lakes	High	Local	Frequent	Medium-Term	Summer	High	Seepage and runoff contained by collection facilities, and directed to sumps and the attenuation pond. Release to active layer groundwater limited by collection facilities.	High: Spatial extent reduced	Low	High	
Borrow Pit(s)	Within waste rock storage facility and/or ultimate pit footprints.											

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Disposal Facilities	Decant from tailings process water and runoff from exposed tailings beaches confined to tailings storage facility from Year 1 to 5. Tailings Pond and Portage Attenuation Pond are combined after Year 5 (See comments on Portage Attenuation Pond)	Very high	Footprint	Continuous	Medium-term	All Year	Low	Cyanide destruction treatment in mill. Progressive capping with UM rock to promote freezing and improve runoff quality. Recycle to mill to reduce volumes. Contained within tailings pond with in Years 1 to 5. No contribution to effluent discharge to 3PL.	High: Spatial extent confined to footprint; No contribution to effluent.	Low	High	Monitor cyanide destruction plant and reclaim to validate predictions. Monitor of internal temperatures in tailings with thermistors.
	Release of concentrated pore water when forced to surface during tailings freeze back	Very High	Footprint	Infrequent	Medium to Long term	Winter	Low	Containment in tailings disposal facility and/or attenuation pond, with treatment before discharge to environment. Progressive capping with UM rock to encourage freezing of tailings	High	Low	Medium	Monitor tailings beach and recycle
	Dust from desiccated exposed tailings transports metals and nitrogen species to local water bodies.	Medium	Footprint to Local	Infrequent	Medium-term	Year Round	Medium	Progressive placement of UM cover material to reduce erosion and wind blow dust (Abandonment & Restoration Plan)	Medium: magnitude reduced; Spatial extent reduced.	Low	Medium	Air Quality and Noise Monitoring Plan
	Tailings process water moves into the groundwater system via the talik under the former Northwest Arm of Second Poratage Lake	Very high	footprint to local	Continuous	Medium-term	Year Round	High	Promote permafrost aggradation in the tailings facility to encourage permafrost to act as a cutoff to groundwater flow.	High: Reduce magnitude, reduce spatial extent	Low	Medium	Monitor permafrost development in the underlying talik

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Main Site Roads & Traffic	Diesel spills to local water bodies	Medium	Footprint to Local	Rare	Medium to Long term	Year Round	Medium to Low	Best Management Practices and Spill Contingency Plans	Medium	Low	High	
	Dust from traffic releases metals and nitrogen species to local water bodies	Low	Footprint/Local	Frequent	Medium-term	Year round	Low	Dust control water will be drawn from the Portage Attenuation Pond (Abandonment & Restoration Plan) within Portage catchment. Dust control water for haul roads outside the Portage catchment areas will be drawn from Phase Lake in an effort to keep contact water within the mining areas. (Abandonment & Restoration Plan)	Medium	Low	High	Air Quality and Noise Monitoring Plan
	Metals, acidity and nitrogen species in runoff and seepage from road bed are released to local water bodies	Low	Footprint to Local	Frequent	Medium to Long term	Summer	Low	Majority of roadways servicing the Portage mining and milling areas are located such that their drainage will be directed at proposed contact water management infrastructure (Abandonment & Restoration Plan)	Medium	Low	medium	Mine site monitoring, and settling pond cleanout

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip & Air Traffic	Fuel spills to local water bodies	Medium	Footprint to Local	Rare	Medium to Long term	Year Round	Medium to Low	Best Management Practices and Spill Contingency Plans	Medium	Low	High	
	Dust from air traffic/ loading and unloading transports metals and nitrogen species to local water bodies	Low	Footprint/Local	Frequent	Medium-term	Year round	Low	Dust control water will be drawn from the Portage Attenuation Pond (Abandonment & Restoration Plan) within Portage catchment. Dust control water for haul roads outside the Portage catchment areas will be drawn from Phase Lake in an effort to keep contact water within the mining areas. (Abandonment & Restoration Plan)	Medium	Low	High	Air Quality and Noise Monitoring Plan
	Metals, acidity and nitrogen species in runoff and seepage from road bed are released to local water bodies	Low	Footprint to Local	Frequent	Medium to Long term	Summer	Low	Runoff collected in ditches and directed to attenuation pond	Medium	Low	Medium	Mine site monitoring, and settling pond cleanout
Mine Plant and Associated Facilities	Runoff from mine plant site contains TSS, metals, acidity and potential reagent spills.	Medium	Footprint	Infrequent	Medium-term	Summer	Medium	Plant site runoff directed to a local sump, and pumped to attenuation pond.	High	Low	High	Mine site monitoring, and settling pond cleanout
	Dust from traffic and ore handling releases metals and nitrogen species to local water bodies.	Low	Footprint/Local	Frequent	Medium-term	Year round	Low	Dust control water will be drawn from the Portage Attenuation Pond (Abandonment & Restoration Plan)	Medium	Low	High	Air Quality and Noise Monitoring Plan
	Inadvertent spill of tailings.	High	Footprint	Rare	Medium-term	Year round	Low	Tailings contained within ditch, containment sumps located in depressions, Pipeline pressure monitored	High	Low	High	Regular inspections of tailings pipeline; Monitoring of tailings line pressure.
Freshwater Intake & Pipeline	N/A											

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage Attenuation Pond (Discharge Facilities & Pipeline)	From Year 1 to 5, effluent from attenuation pond releases TSS, metals, acidity, explosives residues to 3PL. Effluent sources are runoff and seepage from Portage Area Pits, Portage Rock Storage Facility and Plant Site Runoff.	Medium	Local	Continuous	Medium-term	Summer	Medium	All effluents directed to Portage Attenuation Pond for settling and monitoring prior to discharge; See comments on effluent sources for additional mitigation. Effluent discharged through diffusers, only during summer months	medium	Low	Low	
	After Year 5, effluent includes tailings supernatant, releasing TSS, metals, acidity, explosives residue and cyanide species to 3PL.	High	Local	Continuous	Medium-term	Summer	High	All effluents directed to Portage Attenuation Pond for settling and treatment prior to discharge. See comments on effluent sources for additional mitigation. Effluent discharged through diffusers, only during summer months. Potable water intake located away from effluent discharge location.	medium	Medium	Low	
Non-Contact Diversion Facilities	Sediment loss to receiving waters due to degradation of permafrost associated with ditch and sump construction, particularly through bogs..	medium	Local	Infrequent	Medium to Long term	Summer	Low	Construction of diversion facility to address local permafrost conditions, and placement of erosion protection.	Medium	Low	Medium	See Aquatic Environmental Management Plan
Storage (at Plant Site)	Runoff from storage facility contains contaminants from pad, stored materials or spilled diesel and reagents.	High	Footprint	Infrequent	Medium - term	Summer	Low	Plant site runoff directed to a local sump, and pumped to attenuation pond. Spill Contingency Plan	High	Low	Medium	

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
AN/Explosives Storage & Emulsion Plant	Spills of explosives during manufacture and transport	Medium	Footprint	Rare	Medium to Long term	Summer	Low	Best Management Practices; Runoff collected and directed to settling pond.	Medium	Low	Medium	
	Site runoff releases nitrogen species to local water bodies	Medium	Footprint	Infrequent	Medium to Long term	Summer	Low	Placed on a local topographic high; runoff collected and directed to settling pond	Medium	Low	Medium	See Aquatic Environmental Management Plan
Site Accommodations	Incinerated waste emissions settle in water bodies, degrading water quality	Low	Local	Frequent	Medium-term	Year Round	Low	Best Management Practices in operation of incinerator.	High	Low	Medium	Air Quality and Noise Monitoring Plan
	Leachate from incineration ashes enter water bodies, degrading water quality							Ash from incinerated organic materials (including but not limited to paper, wood, food waste and sewage treatment sludge will be placed within the tailings impoundment (Abandonment & Restoration Plan)				
Sewage & Waste Disposal	Waste water and sewage discharge increases BOD and nutrient load to water bodies	Medium	Footprint	Continuous	Medium to Long term	Year Round	Medium	Effluent will be treated to a Level 3 standard for discharge into the pipeline tailings stream (Abandonment & Restoration Plan)	High	Low	High	
	Leachate from landfill released to water bodies	medium	Local	Frequent	Long-term	Year Round	High	All materials considered unsuitable for landfill depositions will be packaged for shipment and disposed off site (Abandonment & Restoration Plan)	High	Low	Medium	
VAULT FACILITIES												
Construction Noise & Activity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Dike	Construction in Year 1: Disturbance of lake sediment during rock placement, releasing TSS to Wally Lake and Attenuation Storage Pond	very high to high	footprint to local	Continuous	Short-term	Summer	high	Utilize silt curtains, and other sediment control practices and monitoring (BMP). See Aquatic Environment Management Plan.	high	medium to low	medium	See Aquatic Environment Management Plan and other relevant monitoring documents
	Release of soluble rock and/or till constituents as material is placed underwater (blasting residues, metals, TSS) to Wally Lake and Attenuation Storage Pond	high to medium	footprint	Continuous	Short-term	Summer	medium to low	Appropriate selection of explosive type (use emulsion explosives rather than dry ANFO), and charge load. Selection of appropriate rock type for use to minimize metals loading (rocks with low leaching potential) and potential acid generation. See Aquatic Environment Management Plan.	medium	medium to low	medium to low	Monitor water quality. See Aquatic Environment Management Plan
	Metals, acidity and nitrogen species released in seepage through dyke and runoff from downstream dike shell to Attenuation Pond during and after drawdown	high	footprint	Continuous	Short-term	Summer	low	Collect seepage water and direct to the settling pond.	high	low	high	Mine Waste and Water Management Plan
	Leaching of metals and acidity from dike rock to Wally Lake during open season	Low	footprint to local	Continuous	Long-term	Year Round	low	Use of UM rock for capping. Use of IF for submerged rock in upstream shell.	medium	low	medium to high	Monitor water quality adjacent to dikes. See Aquatic Environment Management Plan.

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Lake Dewatering & Drainage Facilities	Release of TSS and metals to Turn Lake in dewatering discharge of relatively clean water from Phaser Lake	very high to high	footprint to local	Frequent	Short-term	Summer	high	Only relatively clean water to be discharged directly to Turn Lake; non-compliant water to be directed to the attenuation storage pond. Monitor location of suction pipe to minimize sediment disturbance. Monitor outlet pipe location.	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan and Aquatic Environmental Management Plan.
	Release of TSS and metals to Wally Lake in dewatering discharge of relatively clean water from Vault Lake (V1)	very high to high	footprint to local	Frequent	Short-term	Summer	high	Turbid water left in attenuation storage pond; treated for TSS removal if required. Monitor location of suction pipe to minimize sediment disturbance. Monitor outlet pipe location and water quality.	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan and Aquatic Environmental Management Plan.
	Sediment loading in attenuation pond is increased as Vault Lake bottom sediments are disturbed during drawdown, and runoff from local area increases TSS.	very high to high	footprint to local	Continuous	Short-term	Summer	high	Turbid water left in attenuation storage pond; treated for TSS removal if required	high	low	medium	Monitor conditions. See Mine Waste and Water Management Plan and Aquatic Environmental Management Plan.
	Runoff from the local area releases TSS to the Attenuation Pond.	medium	local	Continuous	Short-term	Summer	medium	A small berm will be constructed between Phaser and Vault Lake to ensure no flow is directed to Vault Lake. Non-contact water is directed away from the Attenuation Pond				

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Pit	Metals, acidity and explosives residues are released in runoff from pit walls.	Medium	Footprint	Continuous	Medium-Term	Year Round	Low	Pump to Attenuation Pond	High	Low	medium	
	Dust and emissions from haul truck traffic	Low	Footprint	Continuous	Medium-term	Year Round	Low	Use of water trucks for dust suppression	Medium	Low	High	
	Potential for blasting residues (nitrogen species) to be released to lakes in runoff or melting of lake ice	medium	footprint to local	Frequent	Short-term	Summer	low	Appropriate selection of explosive type, and charge load. Best Management Practices to minimize spills and excess explosives loss. See Aquatic Environment Management Plan.	medium	low	medium	See Aquatic Environment Management Plan
Vault Rock Storage Facility	Metals, acidity and nitrogen species are released in seepage, runoff, and active layer groundwater.	High	Footprint	Frequent	Medium-term	Summer	High	Seepage and runoff contained by collection facilities, and directed to sumps, then to Vault attenuation pond. Release to active layer groundwater limited by collection facilities.	Medium	Low	High	
Vault Area Effluent Discharge	Collected water from pits, waste rock piles are directed to the Attenuation Pond and discharge to Wally Lake	High	Local	Continuous	Medium-term	Summer	High	All effluents to be directed to the Vault Attenuation Pond for settling and monitoring prior to discharge. Effluent to be discharged through diffuser, only during summer months. Treatment of effluent prior to discharge if required (Abandonment & Restoration Plan)	medium	medium	medium	

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Access Road & Traffic	Diesel spills to local water bodies	Medium	Footprint to Local	Rare	Medium to Long term	Year Round	Medium to Low	Best Management Practices and Spill Contingency Plans	Medium	Low	High	Spill Contingency Plan, Emergency Response Plan, and Accidents and Malfunctions Plan
	Dust from traffic releases metals and nitrogen species to local water bodies	Low	Footprint/Local	Frequent	Medium-term	Year round	Low	Dust control water for haul roads will be drawn from Phaser Lake (Abandonment & Restoration Plan)	Medium	Low	High	Air Quality and Noise Monitoring Plan
	Metals, acidity and nitrogen species in runoff and seepage from road bed are released to local water bodies	Low	Footprint to Local	Frequent	Medium to Long term	Summer	Low	Where possible, haul road drainage will be directed to areas serviced by contact water management infrastructure.	Medium	Low	medium	Mine site monitoring, and settling pond cleanout
Access Road Culverts (Turn Lake)	Metals, acidity and nitrogen species in runoff and seepage from road bed are released to Turn Lake	Medium	Footprint to Local	Rare	Medium to Long term	Year Round	Medium to Low	Select rock with low ARD and metal leaching potential will be used for construction. Best Management Practices for sediment and erosion control	Medium	Low	High	Mine site monitoring, and settling pond cleanout
Mine Shop/Office	Runoff from mine plant site contains TSS, metals, acidity and potential reagent spills.	Medium	Footprint	Continuous	Medium-term	Summer	Low	Runoff collected in ditches and directed to attenuation pond	medium	Low	High	Mine Site monitoring.
OTHER FACILITIES												
Winter Road & Traffic	Diesel spills released to local water bodies	Medium	Local	Rare	Medium to Long term	Winter	Medium	Best Practices; Spill Contingency Plan	Medium	Low	medium	See Aquatic Environment Management Plan.
Baker Lake Access Road & Traffic	Diesel spills released to local water bodies	Medium	Local	Rare	Medium to Long term	Year Round	Medium	Best Practices; Spill Contingency Plan	Medium	Low	medium	See Aquatic Environment Management Plan.
Barge Landing Facility	Spills from transferred materials	Medium	Local	Rare	Medium to Long term	Summer	Medium	Best Practices; Spill Contingency Plan	Medium	Low	medium	See Aquatic Environment Management Plan.
Barge Traffic	Diesel spills	Medium	Local	Rare	Medium to Long term	Summer	Medium	Best Practices (Abandonment & restoration Plan)	Medium	Low	medium	See Aquatic Environment Management Plan.
Staging Facility (approx. 1.5 km east of town)	Runoff contains reagent spills	Medium	Footprint	Infrequent	Medium to Long term	Year Round	Low	Best Practices; Spill Contingency Plan	Medium	Low	medium	See Aquatic Environment Management Plan.

Table B5.2 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Explosives Magazine	Runoff contains nitrogen species	Medium	Footprint	Rare	Medium to Long term	Year Round	Low	Best Practices; Spill Contingency Plan	Medium	Low	medium	See Aquatic Environment Management Plan.
Tank Farm	Diesel spills during transfer.	High	Footprint	Infrequent	Medium to Long term	Year Round	Low	Best Practices - The tank farm will be contained within a secondary containment facility approximately 15,200 m2 comprising a geomembrane liner overlying soil containment berms and access ramps, a storm water sump and grease trap. (Abandonment & Restoration Plan).	Medium	Low	medium	See Aquatic Environment Management Plan.

Table B5.3: Water Quality Impact Matrix – Closure & Post Closure

Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Construction Noise & Activity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Dykes												
East Dike	Flooding will release soluble components from downstream (pit side) rock fill embankment to Pit Lake (See Comments on Pit Lake)											
	Leaching of metals and acidity from dike rock to 2PL	Low	Footprint to local	Continuous	Long-term	Year Round	Low	Use of UM rock for exposed surface rock. Use of IF for submerged rock in upstream shell.	medium	low	medium	Monitor water quality adjacent to dikes. See Aquatic Environment Management Plan.
West (Tailings) Dike	Flooding will release soluble components from downstream (pit side) rock fill embankment to Pit Lake (See Comments on Pit Lake)											
Portage South (Bay Zone) Dike	Flooding will release soluble components from downstream (pit side) rock fill embankment to Pit Lake (See Comments on Pit Lake)											
	Leaching of metals and acidity from dike rock to 2PL	Low	Footprint to local	Continuous	Long-term	Year Round	Low	Use of UM rock for exposed surface rock. Use of IF for submerged rock in upstream shell.	medium	low	medium	Monitor water quality adjacent to dikes. See Aquatic Environment Management Plan.
Goose Island & 3rd Portage Arm (South Camp Island) Dikes	Flooding will release soluble components from downstream (pit side) rock fill embankment to Pit Lake (See Comments on Pit Lake)											
	Leaching of metals and acidity from dike rock to 2PL	Low	Footprint to local	Continuous	Long-term	Year Round	Low	Use of UM rock for exposed surface rock. Use of IF for submerged rock in upstream shell.	medium	low	medium	Monitor water quality adjacent to dikes. See Aquatic Environment Management Plan.
Dewatering												
2nd Portage Lake	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B5.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage Pit (3rd Portage Lake)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Goose Island (3rd Portage Lake)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Pits												
Portage Pit	Flooding releases soluble metals from pit walls and dikes to Pit Lake	Medium	Footprint	Continuous	Short to medium term	Summer	Low	Flood slowly over five summer seasons to minimize TSS release. Pit Lake water not to be released to project lakes until of acceptable quality	Low	Low	low	Water quality will be monitored and managed until pit water is acceptable to be mixed with surrounding lake water.
Goose Island Pit	Flooding creates a single Pit Lake from North Portage, Third Portage and Goose Pits (see Pit Lake comments)											

Table B5.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pit Lake	Pit Lake water released to 3PL	Medium	Local to regional	Continuous	Medium-term to Long term	All year	High	Effluent will be managed, such that water quality will not be released until it reached acceptable levels (Abandonment & Restoration Plan). Removal of portions of the Goose Island Dike will not occur until the pit lake elevation achieves static conditions and the water quality monitoring results are considered acceptable for discharge without treatment to the environment. (Abandonment & Restoration Plan)	Medium: Magnitude reduced	Low	Low	Water quality will be monitored and managed until pit water is acceptable to be mixed with surrounding lake water.
	Pit Lake water moves into underlying talik to impact underlying deep regional groundwater.	Medium	Footprint	Continuous	Long-term	All year	Low	Low differential head between Pit Lake and surrounding lakes limits driving head, such that downward contaminant transport limited to diffusion.	Low: reduction of spatial extent below pit floor.	Low	moderate	Water quality monitored in pit lake and minimal driving head confirmed.
	Pit Lake itself becomes permanent part of receiving environment	Medium	Local	Continuous	Long-term	All Year	High	Pit Lake will not become part of 3PL until water quality reaches acceptable levels.	Medium	Medium	Low	Water quality will be monitored and managed until pit water is acceptable to be mixed with surrounding lake water.

Table B5.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage Rock Storage Facility	Release of metals and acidity from active layer to tundra and local lakes	Very high	Footprint	Frequent	Long-term	Summer	High	Regrading to promote runoff and use of UM rock in active layer to minimize release of acidity and metals (Abandonment & Restoration Plan). Seepage to be directed to Portage Attenuation Pond until quality and volumes are shown suitable for uncontrolled discharge.	High	Medium	Low	Monitoring to validate predictions (see Aquatic Environment Management Plan)
Borrow Pit(s)	N/A											
Tailings Disposal Facilities	Combined with Portage Attenuation Pond (see comments below)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Main Site Roads & Traffic	Continued leaching of metals and acidity from active layer rock	Medium	Footprint	Frequent	Long-term	Summer	Medium	Selection of appropriate construction rock. (see Water and Waste Management Plan). Contingency (where monitoring indicates unanticipated metal leaching or acidic drainage) capping with nominal 2 m layer of UM rock.	High	Low	moderate	

Table B5.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip & Air Traffic	Continued leaching of metals and acidity from active layer rock	Medium	Footprint	Frequent	Long-term	Summer	Medium	Selection of appropriate construction rock. (see Water and Waste Management Plan). Contingency (where monitoring indicates unanticipated metal leaching or acidic drainage) capping with nominal 2 m layer of UM rock.	High	Low	moderate	
Mine Plant and Associated Facilities	Continued leaching of metals and acidity from active layer rock	Medium	Footprint	Frequent	Long-term	Summer	Medium	Selection of appropriate construction rock. (see Water and Waste Management Plan). Contingency (where monitoring indicates unanticipated metal leaching or acidic drainage) capping with nominal 2 m layer of UM rock.	High	Low	moderate	
Freshwater Intake & Pipeline	N/A (removed)											

Table B5.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage Attenuation Pond	Drainage/runoff from rock storage facility continues to discharge to attenuation pond.	High	Footprint	Frequent	Long-term	Summer	High	See comments on Portage Rock Storage Facilities for mitigation. Portage Attenuation Pond provides additional settling and aging of runoff.	High	Medium	Moderate	
	Release of concentrated pore water when forced to surface during tailings freeze back; Release of metals and acidity from active layer of frozen tailings to attenuation pond	Very high	Footprint	Infrequent	Long-term	Summer	High	Placement of UM cover material to allow pore water to move into rock voids and minimize release of acidity and metals from tailings by promoting freezing in the tailings (Abandonment & Restoration Plan). Tailings placement to be managed to promote a naturally graded, sloping beach surface prior to freezing to promote runoff. Tailings runoff permanently directed to Portage Attenuation Pond for settling and aging.	High	Medium	Moderate	
	Dust from desiccated exposed tailings releases metals and nitrogen species deposited in local water bodies.	Medium	Footprint to local	Frequent	Long-term	Year Round	High	Placement of UM cover material to reduce erosion and wind blow dust (Abandonment & Restoration Plan)	High: reduces magnitude and spatial extent	Low	High	See Air Quality and Noise Monitoring Plan

Table B5.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Discharge Facilities & Pipeline	Portage Attenuation Pond connected to 3PL	Medium	Local	Continuous	Long-term	Summer	High	Treatment plant continues in operation until all mine operations and closure activities are completed in the Portage mining and milling areas, the attenuation pond is drained and covered, and the monitoring results can demonstrate that the water quality from this watershed is acceptable for discharge without treatment to the environment (Abandonment & Restoration Plan)	Medium	Low	Low	See Aquatic Environment Management Plan
Non-Contact Diversion Facilities	Remain as per operations.											
Storage (at Plant Site)	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
AN/Explosives Storage & Emulsion Plant	N/A after removal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Site Accommodations	N/A after removal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sewage & Waste Disposal	N/A after removal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VAULT FACILITIES												
Construction Noise & Activity	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B5.3 Continued

Table B-10 Continued												
Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Dike	Flooding will release soluble components from dyke downstream shell materials to Attenuation Pond. (see comments on Vault Pit)							Selection of appropriate construction rock to minimize buildup of metals and acidity prior to flooding. Dike can be removed entirely if required.				
	Leaching of metals and acidity from dike rock to Wally Lake during open season	Low	Footprint to local	Continuous	Long-term	Year Round	Low	Use of UM rock for exposed surface rock. Use of IF for submerged rock in upstream shell. Dike can be removed entirely if required.	medium	low	medium	Monitor water quality adjacent to dikes. See Aquatic Environment Management Plan.
Vault Lake Dewatering & Drainage Facilities	Increased TSS as non-contact diversion above Phase Lake returned to natural path and flow to pit	Medium	Footprint	Frequent	Short to medium term	Summer	Low	Use of erosion protection and best management practices for sediment control until flows are reestablished	Medium	Low	High	On-site monitoring at closure

Table B5.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Pit Lake/Attenuation Pond	Flooding releases soluble metals from previously exposed pit walls and suspended sediments from former lake bed to Attenuation Pond	Medium	Footprint	Continuous	Short to medium term	Summer	Medium	Flooding conducted over five summer seasons to minimize impacts to lake elevations.	low	Medium	Low	Water quality will be monitored and managed until pit water is acceptable to be mixed with surrounding lake water.
	At steady state, both exposed and submerged pit walls and dike materials continue to leach to Vault Pit/Attenuation Pond. Dike removed to connect Vault Attenuation Pond with Wally Lake.	Low	Local	Continuous	Long-term	Year Round	Low	Effluent will be managed, such that water quality will not be released until it reached acceptable levels (Abandonment & Restoration Plan). Removal of Vault Dike will not occur until the pit lake water levels achieve static conditions and the water quality monitoring results from pit lake are considered acceptable for discharge without treatment to the environment. (Abandonment & Restoration Plan)	Medium	Low	Low	Water quality will be monitored and managed until pit water is acceptable to be mixed with surrounding lake water.
	Pit Lake water moves into talik that develops under Attenuation Pond and flooded pit, and may be released to underlying deep regional groundwater system.	Medium	Footprint	Continuous	Long-term	All year	Low	Analyse suggests that the talik will not develop a connection to the underlying regional groundwater system. In addition, low differential head between Pit Lake and surrounding lakes limits driving head, such that downward contaminant transport would primarily be limited to diffusion.	Low	Low	moderate	Water quality monitored in pit lake, and minimal driving head confirmed.

Table B5.3 Continued

Project Component	Potential Effect	Assessment of Unmitigated Effects					Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Management and Monitoring
		Spatial Boundaries		Temporal Boundaries					Influence of Mitigation on Effects Assessment	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Vault Rock Storage Facility	Continued release of metals and acidity from active layer to local water bodies and Attenuation Pond	Medium to High	Footprint	Frequent	Long-term	Summer	Medium	Regrading to promote runoff. Use of appropriate construction rock.	Medium	Medium	Low	
Vault Access Road & Traffic	Continued release of metals and acidity from active layer to local water bodies and Attenuation Pond	Low	Local to footprint	Frequent	Long-term	Summer	Low	Regrading to promote runoff. Contingency (where monitoring indicates unanticipated metal leaching or acidic drainage) capping with nominal 2 m layer of UM rock.	Medium	Low	High	
Access Road Culverts (Tern Lake)	N/A after removal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Mine Shop/Office	N/A after removal	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
OTHER FACILITIES												
Winter Road & Traffic	N/A after final closure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Baker Lake Access Road & Traffic	N/A after final closure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barge Landing Facility	N/A after final closure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Barge Traffic	N/A after final closure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
In-town Staging Facility	N/A after final closure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Explosives Magazine	N/A after final closure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Tank Farm	N/A after final closure	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Table B6.1: Vegetation Cover Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	NA to Vegetation Cover	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dykes												
East Dyke	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of shorelines encroached by dykes	Minor loss and alteration of vegetation communities	No	Certain	Revegetate disturbed areas if necessary
West Dyke	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of shorelines encroached by dykes	Minor loss and alteration of vegetation communities	No	Certain	Revegetate disturbed areas if necessary
Portage South Dyke	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of shorelines encroached by dykes	Minor loss and alteration of vegetation communities	No	Certain	Revegetate disturbed areas if necessary
Goose Island and 3 rd Portage Arm Dykes	NA – Activity occurs during the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake	Minor vegetation loss and/or disturbance in shoreline areas, and areas where pumps and pipelines are located	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduce disturbance of vegetation	Minor residual effects anticipated as potentially disturbed areas will return to pre-development conditions rapidly.	No	High	Revegetate on an as-needed basis
Portage Pit (3 rd Portage Lake)	Minor vegetation loss and/or disturbance in shoreline areas, and areas where pumps and pipelines are located	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduce disturbance of vegetation	Minor residual effects anticipated as potentially disturbed areas will return to pre-development conditions rapidly.	No	High	Revegetate on an as-needed basis
Goose Island (3 rd Portage Lake)	NA – Activity occurs during the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B6.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage Pit	Vegetation loss and disturbance from stripping activities	Low	Local	Contin	Long	All Year	No	Minimize width of pits to reduce overall vegetation loss	Permanent vegetation loss on local level	No	Certain	None recommended
Goose Island Pit	NA – Activity occurs during the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Vegetation loss and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent vegetation alteration and loss on a local level	No	Certain	Monitor success of reclamation activities
Tailings Facilities (2 nd Portage Lake)	NA – Tailings will not be deposited until the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Vegetation loss and disturbance	Low	Local	Contin	Perman	All Year	No	Minimize number of required roads and road dimensions	Permanent vegetation loss at local level	No	Certain	Revegetation activities along road edges
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Minimize vehicular traffic and speeds; implement dust control measures; restrict off-road access and use	Limited and local habitat degradation	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads; continue phenology studies
	Introduction of non-native plant species	Low	Local	Infrqnt	Long	All Year	No	Ensure vehicles are washed and clean before being used on site	Low likelihood of occurrence due to hostile environment for non-native species	No	Moderat	Monitor plant species composition
Airstrip and Air Traffic	Vegetation loss and disturbance	Low	Local	Contin	Perman	All Year	Moderate	Minimize width and length of runway, and number of flights	Limited and local habitat degradation	No	Certain	Revegetation activities along airstrip edges
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Minimize number of air flights; implement dust control measures	Limited and local habitat degradation	No	Moderat	Monitor contaminant levels in vegetation adjacent to airstrip roads; continue phenology studies
Mine Plant and Associated Facilities	Vegetation loss and disturbance	Low	Local	Contin	Perman	All Year	No	Minimize footprint of mine facilities; clearly delineate footprint to reduce habitat degradation in surrounding areas	Permanent vegetation loss on a local level	No	Certain	Revegetate areas disturbed during construction

Table B6.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Freshwater Intake and Pipeline	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Construct pipeline in manner to minimize impact to vegetation (e.g., elevate above ground)	Minor alteration in vegetation communities	No	Certain	Revegetate areas disturbed during construction
Discharge Facilities and Pipeline(s)	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Construct pipeline in manner to minimize impact to vegetation	Minor alteration in vegetation communities	No	Certain	Revegetate areas disturbed during construction
Non-contact Diversion Facilities	Minor vegetation loss and disturbance associated with diversion ditches and associated structures	Low	Local	Contin	Perman	Summer	No	Construct diversion ditches in such a way as to minimize potential for erosion	Minor vegetation loss and alteration	No	Certain	Revegetate areas disturbed during construction; natural revegetation will likely occur
Fuel Storage (at Plant site)	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of fuel storage area and associated containment berm	Minor vegetation loss	No	Certain	Revegetate areas disturbed during construction
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of facilities and associated containment berm	Minor vegetation loss	No	Certain	Revegetate areas disturbed during construction
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B6.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Camps (North and South)	Minor vegetation loss and disturbance	Low	Local	Contin	Medium	All Year	No	Designate tent sites and walking trails; use pallets or raised walkways in areas with heath, sedge or other vegetation sensitive to trampling	Minor vegetation loss or alteration	No	Certain	Regular maintenance of designated trail system; monitor development of 'bandit' trails; revegetate camp areas that are no longer in use
	POSITIVE – Reclamation of camp areas as more permanent facilities are built	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal Facility	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize footprint of facilities	Minor vegetation loss or alteration	No	Certain	Revegetate areas disturbed during construction
VAULT FACILITIES												
Noise and Activity	NA to Vegetation Cover	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dyke	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize shoreline areas impacted by dyke construction	Alteration of vegetation communities	No	Certain	Revegetation of disturbed areas if necessary; monitor success of reclamation efforts
Dewatering	NA - since no terrestrial component	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vault Pit	NA – Activity occurs during Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Vegetation loss and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent vegetation alteration and loss on a local level	No	Certain	Monitor success of reclamation activities

Table B6.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Vegetation loss and disturbance	Low	Local	Contin	Perman	All Year	No	Minimize number of required roads and road dimensions	Permanent vegetation loss at local level	No	Certain	Revegetation activities along road edges
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Minimize vehicular traffic and speeds; implement dust control measures; restrict off-road access and use	Limited and local habitat degradation	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads; continue phenology studies
	Introduction of non-native plant species	Low	Local	Infrqnt	Long	All Year	No	Ensure vehicles are washed and clean before being used on site	Low likelihood of occurrence due to hostile environment for non-native species	No	Moderat	Monitor plant species composition
Access Road Culvert (Turn Lake)	NA since no terrestrial component	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	Minor vegetation loss and disturbance associated with diversion ditches and associated structures	Low	Local	Contin	Perman	Summer	No	Construct diversion ditches in such a way as to minimize potential for erosion	Minor vegetation loss and alteration	No	Certain	Revegetate areas disturbed during construction; natural revegetation will likely occur
Mine Shop/ Office	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of facilities	Minor vegetation loss	No	Certain	Revegetate areas disturbed during construction
OTHER FACILITIES												
Winter Road and Traffic	Some compaction of vegetation cover possible, particularly in wind swept areas	Low	Local	Contin	Long	Winter	No	Build up windswept areas with snow and ice to avoid disturbance of underlying vegetation communities	Impact of winter road on underlying vegetation communities is minimized	No	High	Regular monitoring of winter/ice road conditions

Table B6.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road and Traffic	Vegetation loss and disturbance	Low	Local	Contin	Perman	All Year	No	Minimize number of required roads and road dimensions	Permanent vegetation loss at local level	No	Certain	Revegetation activities along road edges
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Minimize vehicular traffic and speeds; implement dust control measures; restrict off-road access and use	Limited and local habitat degradation	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads; continue phenology studies
	Introduction of non-native plant species	Low	Local	Infrqnt	Long	All Year	No	Ensure vehicles are washed and clean before being used on site	Low likelihood of occurrence due to hostile environment for non-native species	No	Moderat	Monitor plant species composition
Barge Landing Facility	Minor loss and disturbance of beach vegetation	Low	Local	Contin	Long	Summer	No	Provide facilities to restrict beach landing activities to one area to minimize vegetation disturbance over a larger area	Minor disturbance and alteration of vegetation communities	No	Certain	Revegetate areas disturbed during construction
Barge Traffic	NA since no terrestrial effects	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	Vegetation loss and disturbance	Low	Local	Contin	Perman	All Year	No	Minimize footprint of facilities; clearly delineate footprint to reduce habitat degradation in surrounding areas	Permanent vegetation loss on a local level	No	Certain	Revegetate areas disturbed during construction
Explosives Magazine	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of facilities and associated containment berm	Minor vegetation loss	No	Certain	Revegetate areas disturbed during construction
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B6.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of tank farm area and associated containment berm	Minor vegetation loss	No	Certain	Revegetate areas disturbed during construction
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B6.2: Vegetation Cover Impact Matrix – Operation

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dykes												
East, West and Portage South Dyke	Low likelihood of continued vegetation loss and disturbance during operations since dykes already built	Low	Local	Contin	Long	All Year	No	Minimize expansion of toe of dykes	Minor vegetation loss	No	Certain	Revegetate disturbed areas if necessary
	POSITIVE - Vegetation will become established on sediments exposed by 2 nd Portage drawdown	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	Minor vegetation loss and disturbance associated with construction of dyke	Low	Local	Contin	Long	All Year	No	Minimize area of shorelines encroached by dyke	Alteration of vegetation communities	No	Certain	Revegetation of disturbed areas if necessary
Dewatering												
2 nd Portage Lake	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage Pit (3 rd Portage Lake)	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island (3 rd Portage Lake)	Minor vegetation loss and/or disturbance in shoreline areas, and areas where pumps and pipelines are located	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduce disturbance of vegetation	Minor residual effects anticipated as potentially disturbed areas will return to pre-development conditions rapidly.	No	High	Revegetate on an as-needed basis
Pits												
Portage Pit	No further vegetation loss and disturbance anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Goose Island Pit	Vegetation loss and disturbance from stripping activities	Low	Local	Contin	Long	All Year	No	Minimize width of pits to reduce overall vegetation loss	Permanent vegetation loss on local level	No	Certain	None recommended
Waste Dump (Portage/Goose)	Continued vegetation loss and disturbance as waste rock dump expands during operation	Medium	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent vegetation loss and alteration at local level	No	Certain	Reclamation undertaken on completed areas of waste rock dump; monitor success of reclamation activities

Table B6.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Facilities (2 nd Portage Lake)	Possible wind erosion resulting in dispersion of potentially contaminated dust	Low	Regional	Cont	Perman	All Year	Yes	Cap facility with appropriate clean material; undertake a comprehensive revegetation plan; utilize dust suppression methods	Potential dust dispersion impacts reduced to local level; some minor contamination of vegetation downwind of tailings facility is possible	No	Certain	Monitor dust dispersion (modelling); monitor contaminant levels in vegetation
	POSITIVE - Vegetation will become established on sediments exposed by 2 nd Portage drawdown, but eventually covered with tailings. Vegetation growth will occur on capped tailings	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Minimize vehicular traffic and speeds; implement dust control measures; restrict off-road access and use	Limited and local habitat degradation	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads; continue phenology studies
	Introduction of non-native plant species	Low	Local	Infrqnt	Long	All Year	No	Ensure vehicles are washed and clean before being used on site	Low likelihood of occurrence due to hostile environment for non-native species	No	Moderat	Monitor plant species composition
Airstrip and Air Traffic	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Minimize number of air flights; implement dust control measures	Limited and local habitat degradation	No	Moderat	Monitor contaminant levels in vegetation adjacent to airstrip roads; continue phenology studies
Mine Plant and Associated Facilities	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B6.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	Minor vegetation loss and disturbance associated with short reclaim pipeline	Low	Local	Contin	Long	All Year	No	Construct pipeline in a manner to minimize impacts to vegetation	Minor alteration of vegetation communities	No	Certain	Revegetate disturbed areas
Non-contact Diversion Facilities	Vegetation loss due to erosion and permafrost degradation	Low	Local	Contin	Perman	Summer	No	Construct diversion facilities in such a way as to minimize potential for erosion	Minor vegetation loss and alteration	No	Moderat	Maintain integrity of diversion facilities on a regular basis' undertake reclamation activities on an as-needed basis
Fuel Storage (at Plant site)	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of fuel storage area and associated containment berm	Minor vegetation loss	No	Certain	Revegetate areas disturbed during construction
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	Minor vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of facilities and associated containment berm	Minor vegetation loss	No	Certain	Revegetate areas disturbed during construction
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	POSITIVE - Increased vegetation growth and reduced disturbance as camps are removed and reclamation work is undertaken	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B6.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
VAULT FACILITIES												
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dyke(s)	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	POSITIVE - Vegetation will become established on sediments exposed by Vault Lake drawdown	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	Vegetation loss and disturbance from stripping activities	Low	Local	Contin	Long	All Year	No	Minimize width of pits to reduce overall vegetation loss	Permanent vegetation loss on local level	No	Certain	None recommended
Waste Dump	Continued vegetation loss and disturbance as waste rock dump expands during operation	Medium	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent vegetation loss and alteration at local level	No	Certain	Reclamation undertaken on completed areas of waste rock dump; monitor success of reclamation activities
Roads and Traffic	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Minimize vehicular traffic and speeds; implement dust control measures; restrict off-road access and use	Limited and local habitat degradation	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads; continue phenology studies
	Introduction of non-native plant species	Low	Local	Infrqnt	Long	All Year	No	Ensure vehicles are washed and clean before being used on site	Low likelihood of occurrence due to hostile environment for non-native species	No	Moderat	Monitor plant species composition
Access Road Culverts (Turn Lake)	NA since no terrestrial component)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities												
Mine Shop/ Office	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												

Table B6.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Winter Road and Traffic	Some compaction of vegetation cover possible, particularly in wind swept areas	Low	Local	Contin	Long	Winter	No	Build up windswept areas with snow and ice to avoid disturbance of underlying vegetation communities	Impact of winter road on underlying vegetation communities is minimized	No	High	Regular monitoring of winter/ice road conditions
Baker Lake Access Road and Traffic	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Minimize vehicular traffic and speeds; implement dust control measures; restrict off-road access and use	Limited and local habitat degradation	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads; continue phenology studies
	Introduction of non-native plant species	Low	Local	Infrqnt	Long	All Year	No	Ensure vehicles are washed and clean before being used on site	Low likelihood of occurrence due to hostile environment for non-native species	No	Moderat	Monitor plant species composition
Barge Landing Facility	Minor loss and disturbance of beach vegetation	Low	Local	Contin	Long	Summer	No	Provide facilities to restrict beach landing activities to one area to minimize vegetation disturbance over a larger area	Minor disturbance and alteration of vegetation communities	No	Certain	Revegetate areas disturbed during construction
Barge Traffic	NA - No terrestrial effects	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA

Table B6.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B6.3: Vegetation Cover Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dykes												
East, West, Portage South, Goose Island and 3 rd Portage Arm Dyke	Erosion and dyke removal activities may lead to further vegetation loss	Low	Local	Contin	Perman	Summer	No	Stabilize/contour terrestrial area(s) created by dykes to minimize erosion by wind and water; provide natural drainage patterns	Low likelihood of residual effects; most effects are POSITIVE	No	Certain	Undertake reclamation activities as outlined in Wildlife Management Plan (WMP) and integrate with Abandonment and Restoration Plan (A&R)
	POSITIVE - Vegetation will naturally become established	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake	NA since dewatering completed prior to closure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage Pit (3 rd Portage Lake)	NA since dewatering completed prior to closure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island (3 rd Portage Lake)	NA since dewatering completed prior to closure	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage and Goose Pits	Dykes will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation	Minor loss of vegetation cover in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	POSITIVE - Emergent vegetation may grow if a littoral zone is established around edges of pits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Vegetation loss and disturbance due to erosion and sedimentation	Low	Local	Contin	Long	Summer	No	Stabilize slopes, cap with finer material, suppress dust if an issue; recontour and revegetate with local plant species	Minor vegetation loss is possible on an ongoing basis	No	Moderat	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan

Table B6.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	POSITIVE - Natural revegetation of waste dump will occur	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailings Facilities (2 nd Portage Lake)	Possible wind erosion resulting in dispersion of potentially contaminated dust	Low	Regional	Cont	Perman	All Year	Yes	Cap facility with appropriate clean material; undertake a comprehensive revegetation plan; utilize dust suppression methods	Potential dust dispersion impacts reduced to local level; some minor contamination of vegetation downwind of tailings facility is possible	No	Certain	Monitor dust dispersion (modelling); monitor contaminant levels in vegetation
	POSITIVE – Vegetation may naturally recolonize the tailings deposit	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Scarify roads, remove culverts, restore drainage patterns, stabilize slopes, consider rehabilitation as esker habitat, suppress dust during reclamation	Some permanent alteration of vegetation cover likely	No	High	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Scarify roads, remove culverts, restore drainage patterns, stabilize slopes, consider rehabilitation as esker habitat, suppress dust during reclamation	Low potential for ongoing impacts to roadside vegetation	No	Moderat	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan

Table B6.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	Vegetation loss and disturbance	Low	Local	Contin	Perman	All Year	No	Airstrip may remain; not likely suitable esker habitat due to potential risk to aircraft and wildlife; efforts made to ensure drainage interferes as little as possible with local drainage patterns; determine allowable growth boundaries for recolonizing vegetation; utilize dust dispersion techniques as needed	Some permanent but localized loss of vegetation cover	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Perman	All Year	No	Maintain airstrip in usable condition	Low occurrence of impacts from dust and emissions on vegetation adjacent to airstrip	No	Moderat	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
Mine Plant and Associated Facilities	Concrete foundation and footprint of other ancillary facilities will result in permanent vegetation loss and disturbance	Low	Local	Contin	Perman	All Year	No	Remove any contaminationsources from around the plant; recontour surrounding area and restore original drainage patterns to the extent possible; stabilize slopes	Some permanent vegetation loss	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
Freshwater Intake and Pipeline	POSITIVE – Natural revegetation of previosuly disturbed area	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	POSITIVE – Natural revegetation of previously disturbed area	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B6.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	POSITIVE – Natural revegetation of previously disturbed area	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	Vegetation loss due to erosion and permafrost degradation	Low	Local	Contin	Perman	Summer	No	Maintain diversion facilities in such a way as to minimize potential for erosion	Minor vegetation loss and alteration	No	Moderat	Maintain integrity of diversion facilities; undertake reclamation activities on an as-needed basis
Fuel Storage (at Plant site)	Concrete foundation foundation will remain resulting in permanent vegetation loss	Low	Local	Contin	Perman	All Year	No	Remove all contaminated soil and recontour around foundation to encourage regrowth of natural vegetation	Minor permanent vegetation loss	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
Emulsion/AN Storage/ Explosives Magazines (assuming only minor leaks, no major spills, fires or explosions)	Permanent vegetation loss and disturbance associated with concrete foundation; minor spot contamination	Low	Local	Contin	Long	All Year	No	Remove all contaminated soil and recontour around foundation to encourage regrowth of natural vegetation	Minor permanent vegetation loss	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
Camps (North and South)	NA – Reclamation activities undertaken during Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dyke	Erosion and dyke removal activities may lead to further vegetation loss	Low	Local	Contin	Perman	Summer	No	Stabilize/contour terrestrial area(s) created by dykes to minimize erosion by wind and water; provide natural drainage patterns	Low likelihood of residual effects; most effects are POSITIVE	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
Dewatering	NA - Dewatering activities undertaken prior to Closure phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B6.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pit	Dyke will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation	Minor loss of vegetation cover in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	POSITIVE - Emergent vegetation may grow if a littoral zone is established around edges of pits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Vegetation loss and disturbance due to erosion and sedimentation	Low	Local	Contin	Long	Summer	No	Stabilize slopes, cap with finer material, suppress dust if an issue; recontour and revegetate with local plant species	Minor vegetation loss is possible on an ongoing basis	No	Moderat	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
	POSITIVE - Natural revegetation of waste dump will occur	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Vegetation loss and disturbance	Low	Local	Contin	Long	All Year	No	Scarify roads, remove culverts, restore drainage patterns, stabilize slopes, consider rehabilitation as esker habitat, suppress dust during reclamation	Some permanent alteration of vegetation cover likely	No	High	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Scarify roads, remove culverts, restore drainage patterns, stabilize slopes, consider rehabilitation as esker habitat, suppress dust during reclamation	Low potential for ongoing impacts to roadside vegetation	No	Moderat	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
Access Road Culvert (Turn Lake)	Possible disturbance to riparian vegetation during removal	Low	Local	Contin	Long	Summer	No	Minimize disturbance to nearshore vegetation during removal of culverts	Minor amount of vegetation loss	No	Moderat	As per Abandonment & Restoration Plan

Table B6.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Non-contact Diversion Facilities	Vegetation loss due to erosion and permafrost degradation	Low	Local	Contin	Perman	Summer	No	Maintain diversion facilities in such a way as to minimize potential for erosion	Minor vegetation loss and alteration	No	Moderat	Maintain integrity of diversion facilities; undertake reclamation activities on an as-needed basis
Mine Shop/ Office	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												
Winter Road and Traffic	Some compaction of vegetation cover possible, particularly in wind swept areas; reduced impact once winter road is no longer used	Low	Local	Contin	Long	Winter	No	Build up windswept areas with snow and ice to avoid disturbance of underlying vegetation communities	Impact of winter road on underlying vegetation communities is minimized	No	High	Regular monitoring of winter/ice road conditions
Baker Lake Access Road and Traffic	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dust and emissions may result in potential vegetation degradation and increased contaminant levels	Low	Local	Contin	Long	Summer	No	Minimize vehicular traffic and speeds; implement dust control measures; restrict off-road access and use	Limited and local habitat degradation	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads; continue phenology studies
	Introduction of non-native plant species	Low	Local	Infrqnt	Long	All Year	No	Ensure vehicles are washed and clean before being used on site	Low likelihood of occurrence due to hostile environment for non-native species	No	Moderat	Monitor plant species composition
Barge Landing Facility	Minor loss and disturbance of beach vegetation	Low	Local	Contin	Long	Summer	No	Provide facilities to restrict beach landing activities to one area to minimize vegetation disturbance over a larger area	Minor disturbance and alteration of vegetation communities	No	Certain	Revegetate areas disturbed during construction
Barge Traffic	NA - No terrestrial effects	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B6.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Explosives Magazine	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No further vegetation loss and disturbance	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Potential fuel spills may degrade surrounding vegetation and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B7.1: Ungulates Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Avoidance of foraging habitat (reduced habitat effectiveness); deflection from normal travel routes; energetic costs	Medium	Local	Contin	Medium	All Year	Yes	Minimize blast and engine noises; maintain and ensure vehicles are properly muffled; establish speed limits, establish blasting windows if possible; give ungulates right-of-way; minimize activities off access roads	With mitigation, the magnitude of potential effects is low	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; reports of aggregations along roads and near facilities
Dykes												
East Dyke	Minor habitat loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of shorelines encroached by dykes	Alteration of foraging habitats on a local level	No	Certain	Revegetate disturbed areas if necessary
West Dyke	Minor habitat loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of shorelines encroached by dykes	Minor loss and alteration of vegetation communities	No	Certain	Revegetate disturbed areas if necessary
Portage South Dyke	Minor habitat loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of shorelines encroached by dykes	Minor loss and alteration of vegetation communities	No	Certain	Revegetate disturbed areas if necessary
Goose Island and 3 rd Portage Arm Dykes	NA – Activity occurs during the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake	Minor habitat loss and/or disturbance in shoreline areas, and areas where pumps and pipelines are located	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduce disturbance of habitat	Minor residual effects anticipated to foraging habitat for ungulates as potentially disturbed areas will return to pre-development conditions rapidly.	No	High	Revegetate on an as-needed basis

Table B7.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage Pit (3 rd Portage Lake)	Minor habitat loss and/or disturbance in shoreline areas, and areas where pumps and pipelines are located	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduce disturbance of habitat	Minor residual effects anticipated to foraging habitats for ungulates as potentially disturbed areas will return to pre-development conditions rapidly.	No	High	Revegetate on an as-needed basis
Goose Island (3 rd Portage Lake)	NA – Activity occurs during the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage Pit	Habitat loss and disturbance from stripping activities	Low	Local	Contin	Long	All Year	No	Minimize width of pits to reduce overall foraging habitat loss	Permanent habitat loss on local level	No	Certain	None recommended
Goose Island Pit	NA – Activity occurs during the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Habitat loss and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent foraging habitat alteration and loss on a local level	No	Certain	Monitor success of reclamation activities
Tailings Facilities (2 nd Portage Lake)	NA – Tailings will not be deposited until the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B7.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Long	All Year	No	Minimize required roads and reduce road dimensions; do not use obstructive berms along road edges	Residual effect expected to be minor	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction
	Mortality due to vehicle/ungulate collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor ungulate movements and aggregations; drivers need to report any collisions and near misses with ungulates
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Animals are expected to become habituated to noise therefore residual impacts are expected to be minor	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; rports of aggregations along roads and near facilities
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since ungulates are wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads

Table B7.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Long	All Year	No	Minimize width and length of runway	Residual effects are expected to be minor	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction
	Mortality due to air traffic/ungulate collisions	Low	Local	Infrqnt	Short	All Year	No	Minimize number of take-offs and landings; monitor ungulate occurrence and aggregations in the vicinity of airstrip; use scare tactics to move ungulates off airstrip and approaches	Mortality due to collisions is extremely unlikely	No	Moderat	Pilots required to report all ungulate/plane near misses and caribou and muskox sighted in the area; maintain a wildlife sighting log book
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize number of take-offs and landings; use defined flight corridors; establish minimum altitude and no harassment policies	Avoidance of areas adjacent to airstrip are not expected due to the low frequency of flights	No	Moderat	Monitor ungulate distribution and behaviour in Local Study Area
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in forage species	Low	Local	Contin	Long	Summer	No	Minimize number of take-offs and landings; use dust suppressants if necessary	Any residual effects will be restricted to habitats in close proximity to the airstrip	No	Moderat	Monitor contaminant levels in vegetation adjacent to airstrip
Mine Plant and Associated Facilities	Loss and avoidance of foraging habitat; deflection from normal travel routes; energetic costs	Low	Local	Contin	Long	All Year	No	Mimimize footprint of mine plant site and ancillary facilities; comply with construction plan and schedule; minimize degradation of surrounding area	Residual effects limited to a localized area	No	Certain	Monitor ungulate distribution and abundance in Local Study Area; revegetate areas disturbed during construction
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in food sources	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	Monitor ungulate distribution and abundance; monitor contaminant levels in vegetation adjacent to mine site
Freshwater Intake and Pipeline	Minor loss of habitat; deflection of normal movement patterns	Low	Local	Contin	Long	All Year	No	Construct pipeline to minimize impact to terrestrial environment	Minor alteration of vegetation communities	No	Certain	Revegetate areas disturbed during construction

Table B7.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Discharge Facilities and Pipeline(s)	Minor loss or habitat; deflection of normal movement patterns	Low	Local	Contin	Long	All Year	No	Construct pipeline to minimize impact to terrestrial environment	Minor alteration of vegetation communities	No	Certain	Revegetate areas disturbed during construction
Non-contact Diversion Facilities	Minor habitat loss and disturbance associated with diversion ditches and associated structures	Low	Local	Contin	Perman	Summer	No	Construct diversion ditches in such a way as to minimize potential for erosion	Minor foraging habitat loss and alteration	No	Certain	Revegetate areas disturbed during construction; natural revegetation will likely occur
Fuel Storage (at Plant site)	Small area of habitat loss	Low	Local	Contin	Long	All Year	No	Minimize size of fuel storage area	Negligible residual effects anticipated	No	Certain	Revegetate areas disturbed during construction
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	Small area of habitat loss	Low	Local	Contin	Long	All Year	No	Minimize storage areas	Negligible residual effects on ungulates	No	Certain	Revegetate areas disturbed during construction
	Potential spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Medium	All Year	No	Ecological awareness programs for all employees; walkways or designated trails between tents; minimize disturbance to surrounding area when dismantling camp	Minor residual effects are limited to a very localized areas	No	Certain	Enforce use of designated trail system; maintain trail system; monitor development of 'bandit' trails; revegetate camp areas no longer in use

Table B7.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Sewage and Solid Waste Disposal	Small area of habitat loss	Low	Local	Contin	Long	All Year	No	Minimize storage areas	Negligible residual effects on ungulates	No	Certain	Revegetate areas disturbed during construction
	May attract predators with potential increased local depredation rates on ungulates	Low	Local	Contin	Long	All Year	No	Incinerate all garbage and food waste; minimize potential for predators to be attracted to the area through various mitigation measures (see Wildlife Management Plan)	An increase in predator populations is unlikely to occur	No	Moderat	Monitor predator populations within camp; conduct quality control assessments of effectiveness of incineration process
VAULT FACILITIES												
Noise and Activity	Avoidance of foraging habitat (reduced habitat effectiveness); deflection from normal travel routes; energetic costs	Medium	Local	Contin	Medium	All Year	Yes	Minimize blast and engine noises; maintain and ensure vehicles are properly muffled; establish speed limits, establish blasting windows if possible; give ungulates right-of-way; minimize activities off access roads	With mitigation, the magnitude of potential effects is low	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; rports of aggregations along roads and near facilities
Dyke	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	NA since no terrestrial activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	NA - Not until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Habitat loss and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent foraging habitat alteration and loss on a local level	No	Certain	Monitor success of reclamation activities

Table B7.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Long	All Year	No	Minimize required roads and reduce road dimensions; do not use obstructive berms along road edges	Residual effect expected to be minor	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction
	Mortality due to vehicle/ungulate collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulated have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor ungulate movements and aggregations; drivers need to report any collisions and near misses with ungulates
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Animals are expected to become habituated to noise therefore residual impacts are expected to be minor	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; rports of aggregations along roads and near facilities
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since ungulates are wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads
Non-contact Diversion Facilities	Minor habitat loss and disturbance associated with diversion ditches and associated structures	Low	Local	Contin	Perman	Summer	No	Construct diversion ditches in such a way as to minimize potential for erosion	Minor foraging habitat loss and alteration	No	Certain	Revegetate areas disturbed during construction; natural revegetation will likely occur
Mine Shop/ Office	Small area of habitat loss	Low	Local	Contin	Long	All Year	No	Minimize footprint area	Negligible residual effects on ungulates	No	Certain	Revegetate areas disturbed during construction
OTHER FACILITIES												

Table B7.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Winter Road and Traffic	Ungulates may use roads as travel corridors resulting in increased mortality from predators	Low	Local	Frequent	Long	Winter	No	Do not berm roads to reduce crossing barriers	Negligible residual effects anticipated	No	Moderat	Winter road drivers must report ungulate sightings; maintain wildlife log of all wildlife sightings
	Increased hunting pressure; mortality from vehicles	Low	Regional	Frequent	Long	Winter	Yes	Limit use of winter road to mine employees; prohibit mine employees from hunting; enforce speed limits; yield right of way to ungulates and all wildlife; confine traffic to winter road	Reduced potential for mortality with change in frequency of impact to Infrequent	No	Moderat	Report all ungulate/vehicle collisions; enforcement of no-hunting policy along winter road
Baker Lake Access Road and Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Long	All Year	No	Minimize required roads and reduce road dimensions; do not use obstructive berms along road edges	Residual effect expected to be minor	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction
	Mortality due to vehicle/ungulate collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor ungulate movements and aggregations; drivers need to report any collisions and near misses with ungulates
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Animals are expected to become habituated to noise therefore residual impacts are expected to be minor	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; rports of aggregations along roads and near facilities
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since ungulates are wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads

Table B7.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Landing Facility	Small area of habitat loss	Low	Local	Contin	Long	All Year	No	Minimize footprint area	Negligible residual effects on ungulates	No	Certain	Revegetate areas disturbed during construction
Barge Traffic	NA since no terrestrial component	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
In-town Staging Facility	Loss and avoidance of foraging habitat; deflection from normal travel routes; energetic costs	Low	Local	Contin	Long	All Year	No	Mimimize footprint of staging facilities; comply with construction plan and schedule; minimize degradation of surrounding area	Residual effects limited to a localized area	No	Certain	Monitor ungulate distribution and abundance in Local Study Area; revegetate areas disturbed during construction
Explosives Magazine	Small area of habitat loss	Low	Local	Contin	Long	All Year	No	Minimize storage areas	Negligible residual effects on ungulates	No	Certain	Revegetate areas disturbed during construction
	Potential spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	Small area of habitat loss	Low	Local	Contin	Long	All Year	No	Minimize size of fuel storage area	Negligible residual effects anticipated	No	Certain	Revegetate areas disturbed during construction
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B7.2: Ungulates Impact Matrix – Operation

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Avoidance of foraging habitat (reduced habitat effectiveness); deflection from normal travel routes; energetic costs	Medium	Local	Contin	Medium	All Year	Yes	Minimize blast and engine noises; maintain and ensure vehicles are properly muffled; establish speed limits, establish blasting windows if possible; give ungulates right-of-way; minimize activities off access roads	With mitigation, the magnitude of potential effects is low	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; reports of aggregations along roads and near facilities
Dykes												
East, West and Portage South Dykes	No additional habitat loss anticipated during Operation phase	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	POSITIVE - Dyke may be used as refuge area from predators	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	Minor habitat loss and disturbance	Low	Local	Contin	Long	All Year	No	Minimize area of shorelines encroached by dykes	Alteration of foraging habitats on a local level	No	Certain	Revegetate disturbed areas if necessary
Dewatering												
2 nd Portage Lake	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage Pit (3 rd Portage Lake)	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island (3 rd Portage Lake)	Minor habitat loss and/or disturbance in shoreline areas, and areas where pumps and pipelines are located	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduce disturbance of habitat	Minor residual effects anticipated to reduce need for foraging habitats for ungulates as potentially disturbed areas will return to pre-development conditions rapidly.	No	High	Revegetate on an as-needed basis
Pits												

Table B7.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Portage and Goose Island Pits	Disruption of normal travel routes	Low	Local	Contin	Long	All Year	No	No mitigation recommended	Low residual effects	No	High	Wildlife logs; monitor ungulate distribution, abundance and aggregations
	Possible injury or mortality from encounters with pits	Low	Local	Contin	Long	All Year	No	Fences, berms or other barriers to caribou movement are not acceptable to Baker Lake residents	Potential for residual effects is very low	No	Moderate	As above
Waste Dump (Portage/Goose)	Habitat loss and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent foraging habitat alteration and loss on a local level	No	Certain	Monitor success of reclamation activities
Tailings Facilities (2 nd Portage Lake)	Exposure to contaminants if water is drunk from tailings pond; potential for occurrence is low because few ungulates are present in the vicinity of the mine site for most of the ice-free season; exposure in the fall is the most likely	Medium	Local	Infrqnt	Long	Summer	No	Use aversive techniques to prevent animals accessing tailings ponds	Mitigation measures will reduce the potential magnitude of the effect to Low; residual effects are expected to be very low	No	Moderat	Wildlife logs; monitor ungulate distribution, abundance and aggregations; report all interactions and take further mitigation action (e.g., more regular monitoring of ungulate distribution) to reduce potential effects
	Trauma or death resulting from animals getting stuck in soft tailings; thawed tailings will only be available for a short time during the growing season which is also a time when few ungulates are in the area	Low	Local	Infrqnt	Long	Summer	No	Use aversive techniques to prevent animals from accessing tailings ponds	Residual effects (i.e., animal mortality) is very unlikely to occur	No	Low	Wildlife logs; monitor ungulate distribution, abundance and aggregations; report all interactions and take further mitigation action (e.g., more regular monitoring of ungulate distribution) to reduce potential effects

Table B7.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Long	All Year	No	Minimize required roads and reduce road dimensions; do not use obstructive berms along road edges	Residual effect expected to be minor	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction
	Mortality due to vehicle/ungulate collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulated have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor ungulate movements and aggregations; drivers need to report any collisions and near misses with ungulates
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Animals are expected to become habituated to noise therefore residual impacts are expected to be minor	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; rports of aggregations along roads and near facilities
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since ungulates are wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads

Table B7.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Long	All Year	No	Mimimize width and length of runway	Residual effects are expected to be minor	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction
	Mortality due to air traffic/ungulate collisions	Low	Local	Infrqnt	Short	All Year	No	Minimize number of take-offs and landings; monitor ungulate occurrence and aggregations in the vicinity of airstrip; use scare tactics to move ungulates off airstrip and approaches	Mortality due to collisions is extremely unlikely	No	Moderat	Pilots required to report all ungulate/plane near misses and caribou and muskox sighted in the area; maintain a wildlife sighting log book
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize number of take-offs and landings; use defined flight corridors; establish minimum altitude and no harassment policies	Avoidance of areas adjacent to airstrip are not expected due to the low frequency of flights	No	Moderat	Monitor ungulate distribution and behaviour in Local Study Area
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in forage species	Low	Local	Contin	Long	Summer	No	Minimize number of take-offs and landings; use dust suppressants if necessary	Any residual effects will be restricted to habitats in close proximity to the airstrip	No	Moderat	Monitor contaminant levels in vegetation adjacent to airstrip
Mine Plant and Associated Facilities	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in food sources	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	Monitor ungulate distribution and abundance; monitor contaminant levels in vegetation adjacent to mine site
Freshwater Intake and Pipeline	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B7.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	Minor habitat loss and disturbance associated with short reclaim pipeline	Low	Local	Contin	Long	All Year	No	Construct pipeline in a manner to minimize impacts to vegetation	Minor alteration of habitat	No	Certain	Revegetate disturbed areas
Non-contact Diversion Facilities	Minor habitat loss and disturbance associated with diversion ditches and associated structures	Low	Local	Contin	Perman	Summer	No	Construct diversion ditches in such a way as to minimize potential for erosion	Minor foraging habitat loss and alteration	No	Certain	Maintain diversion ditches on a regular basis; natural revegetation will likely occur
Fuel Storage (at Plant site)	Potential fuel spills may degrade surrounding habitat and increase contaminant levels; ungulates may eat contaminated vegetation	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines ; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	Potential spills may degrade surrounding habitat and increase contaminant levels; ungulates may eat contaminated vegetation	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines ; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	POSITIVE - Increased habitat availability and reduced disturbance as camps are removed and habitat reclamation is undertaken	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	May attract predators with potential increased local depredation rates on ungulates	Low	Local	Contin	Long	All Year	No	Incinerate all garbage and food waste; minimize potential for predators to be attracted to the area through various mitigation measures (see Wildlife Management Plan)	An increase in predator populations is unlikely to occur	No	Moderat	Monitor predator populations within camp; conduct quality control assessments of effectiveness of incineration process

Table B7.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
VAULT FACILITIES												
Noise and Activity	Avoidance of foraging habitat (reduced habitat effectiveness); deflection from normal travel routes; energetic costs	Medium	Local	Contin	Medium	All Year	Yes	Minimize blast and engine noises; maintain and ensure vehicles are properly muffled; establish speed limits, establish blasting windows if possible; give ungulates right-of-way; minimize activities off access roads	With mitigation, the magnitude of potential effects is low	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; reports of aggregations along roads and near facilities
Dyke(s)	POSITIVE - Dyke may be used as refuge area from predators	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Dewatering	NA since no terrestrial activity	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Pit	Habitat loss and disturbance from stripping activities	Low	Local	Contin	Long	All Year	No	Minimize width of pits to reduce overall foraging habitat loss	Permanent habitat loss on local level	No	Certain	None recommended
Waste Dump	Habitat loss and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent foraging habitat alteration and loss on a local level	No	Certain	Monitor success of reclamation activities

Table B7.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Long	All Year	No	Minimize required roads and reduce road dimensions; do not use obstructive berms along road edges	Residual effect expected to be minor	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction
	Mortality due to vehicle/ungulate collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulated have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor ungulate movements and aggregations; drivers need to report any collisions and near misses with ungulates
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Animals are expected to become habituated to noise therefore residual impacts are expected to be minor	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; rports of aggregations along roads and near facilities
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since ungulates are wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads
Non-contact Diversion Facilities	Minor habitat loss and disturbance associated with diversion ditches and associated structures	Low	Local	Contin	Perman	Summer	No	Construct diversion ditches in such a way as to minimize potential for erosion	Minor foraging habitat loss and alteration	No	Certain	Maintain diversion ditches on a regular basis; natural revegetation will likely occur
Mine Shop/ Office	No additional loss or disturbance of terrestrial foraging habitat anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
OTHER FACILITIES												

Table B7.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Winter Road and Traffic	Ungulates may use roads as travel corridors resulting in increased mortality from predators	Low	Local	Frequent	Long	Winter	No	Do not berm roads to reduce crossing barriers	Negligible residual effects anticipated	No	Moderat	Winter road drivers must report ungulate sightings; maintain wildlife log of all wildlife sightings
	Increased hunting pressure; mortality from vehicles	Low	Regional	Frequent	Long	Winter	Yes	Limit use of winter road to mine employees; prohibit mine employees from hunting; enforce speed limits; yield right of way to ungulates and all wildlife; confine traffic to winter road	Reduced potential for mortality with change in frequency of impact to Infrequent	No	Moderat	Report all ungulate/vehicle collisions; enforcement of no-hunting policy along winter road
Baker Lake Access Road and Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions; do not use obstructive berms along road edges	Residual effect expected to be minor	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction
	Mortality due to vehicle/ungulate collisions	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds; ungulated have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor ungulate movements and aggregations; drivers need to report any collisions and near misses with ungulates
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Animals are expected to become habituated to noise therefore residual impacts are expected to be minor	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; rports of aggregations along roads and near facilities
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since ungulates are wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads

Table B7.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Landing Facility	Small area of habitat loss	Low	Local	Contin	Long	All Year	No	Minimize footprint area	Negligible residual effects on ungulates	No	Certain	Revegetate areas disturbed during construction
Barge Traffic	NA since no terrestrial effects	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
In-town Staging Facility	No additional habitat loss or disturbance anticipated during operation phase	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Explosives Magazine	Potential spills may degrade surrounding habitat and increase contaminant levels; ungulates may eat contaminated vegetation	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines ; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	Potential fuel spills may degrade surrounding habitat and increase contaminant levels; ungulates may eat contaminated vegetation	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines ; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B7.3: Ungulates Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Closure activity and noise may result in avoidance of the area and deflection; behavioral changes, followed by re-use of the area after closure	Medium	Local	Contin	Medium	All Year	No	Minimize engine noises and noises associated with dismantling buildings and infrastructure, maintain and ensure vehicles are properly muffled, establish speed limits, expedite decommissioning	With mitigation, magnitude of potential effects is low	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; reports of aggregations along roads and near facilities
Dykes	Erosion and dyke removal activities may lead to further habitat loss	Low	Local	Contin	Perman	Summer	No	Stabilize/contour terrestrial area(s) created by dykes to minimize erosion by wind and water; provide natural drainage patterns	Low likelihood of residual effects; most effects are POSITIVE	No	Certain	Undertake reclamation activities as outlined in Wildlife Management Plan (WMP) and integrate with Abandonment and Restoration Plan (A&R)
	POSITIVE - Vegetation will naturally become established providing foraging opportunities for ungulates	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Dykes will be used as a refugia from insects durign the summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake, Portage Pit (3 rd Portage Lake) and Goose Island (3 rd Portage Lake)	NA since dewatering completed prior to closure phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage and Goose Pits	Dykes will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in a loss of foraging habitat for ungulates	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increased foraging opportunities for ungulates	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan

Table B7.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Residual Effects/ Influence of Mitigation			Significance of Residual Impacts	Probability		
		Magnitude	Spatial Extent	Frequency	Duration	Timing							
	Possible injury or mortality from encounters with pits	Low	Local	Contin	Perman	All Year	No	If possible, slope nearshore areas of flooded pits at a low gradient to prevent accidental drowning once pits have been filled	The likelihood of this event is extremely low	No	Moderate	Wildlife Management Plan	
	POSITIVE - Emergent vegetation may grow if a littoral zone is established around edges of pits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
	POSITIVE - Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Waste Dump (Portage/Goose)	Habitat loss and disturbance due to erosion and sedimentation	Low	Local	Contin	Long	Summer	No	Stabilize slopes, cap with finer material, suppress dust if an issue; recontour and revegetate with local plant species	Minor vegetation loss is possible on an ongoing basis	No	Moderate	Reclamation activities as outlined in WMP and A&R	
	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing increased foraging opportunities for ungulates	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Tailings Facilities (2 nd Portage Lake)	Habitat loss and disturbance due to erosion and sedimentation	Low	Local	Contin	Long	Summer	No	Stabilize slopes, cap with finer material, suppress dust if an issue; recontour and revegetate with local plant species	Minor vegetation loss is possible on an ongoing basis	No	Moderate	Reclamation activities as outlined in WMP and A&R	
	POSITIVE – Native vegetation will naturally become reestablished on the tailings beach	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	
Roads and Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs; risks and disturbances to ungulates from traffic during closure and post-closure will decrease and ultimately become minimal	Low	Local	Contin	Long	All Year	No	Scarify roads, remove culverts, restore drainage patterns, stabilize slopes, consider rehabilitation as esker habitat, suppress dust during reclamation	Some permanent habitat alteration likely	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction; reclamation activities as outlined in WMP and A&R	

Table B7.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Mortality due to vehicle/ungulate collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor ungulate movements and aggregations; drivers need to report any collisions and near misses with ungulates
	Reduced habitat effectiveness in adjacent areas due to noise and activity; reduced potential for effect as site is decommissioned	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Animals are expected to become habituated to noise therefore residual impacts are expected to be minor	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; rports of aggregations along roads and near facilities
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since ungulates are wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads
Airstrip and Air Traffic	Habitat loss and disturbance	Low	Local	Contin	Perman	All Year	No	Airstrip may remain; not likely suitable esker habitat due to potential risk to aircraft and wildlife; efforts made to ensure drainage interferes as little as possible with local drainage patterns; determine allowable growth boundaries for recolonizing vegetation; utilize dust dispersion techniques as needed	Some permanent but localized loss of vegetation cover	No	Certain	Reclamation activities as outlined in WMP and A&R

Table B7.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Dust and emissions may result in potential habitat degradation and increased contaminant levels	Low	Local	Contin	Perman	All Year	No	Maintain airstrip in usable condition; minimize use of runway; confine ground traffic to minimal areas around airstrip.	Low occurrence of impacts from dust and emissions on vegetation adjacent to airstrip	No	Moderat	Reclamation activities as outlined in WMP and A&R
Mine Plant and Associated Facilities	Concrete foundation and footprint of other ancillary facilities will result in permanent habitat loss and disturbance	Low	Local	Contin	Perman	All Year	No	Remove any contamination sources from around the plant; recontour surrounding area and restore original drainage patterns to the extent possible; stabilize slopes	Some permanent vegetation loss	No	Certain	Reclamation activities as outlined in WMP and A&R
	POSITIVE - With closure of the mine, risks and disturbances to ungulates will decrease (e.g., avoidance of foraging habitat, deflection from normal travel routes, energetic costs)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Freshwater Intake and Pipeline	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	Habitat loss due to erosion and permafrost degradation	Low	Local	Contin	Perman	Summer	No	Maintain diversion facilities in such a way as to minimize potential for erosion	Minor habitat loss and alteration	No	Moderat	Maintain integrity of diversion facilities; undertake reclamation activities on an as-needed basis

Table B7.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Fuel Storage (at Plant site)	Concrete foundation foundation will remain resulting in permanent habitat loss	Low	Local	Contin	Perman	All Year	No	Remove all contaminated soil and recontour around foundation to encourage regrowth of natural vegetation and improve habitat	Minor permanent habitat loss	No	Certain	Reclamation activities as outlined in WMP and A&R
Emulsion/AN Storage/ Explosives Magazines (assuming only minor leaks, no major spills, fires or explosions)	Permanent habitat loss and disturbance associated with concrete foundation; minor spot contamination	Low	Local	Contin	Long	All Year	No	Remove all contaminated soil and recontour around foundation to encourage regrowth of natural vegetation and improve habitat	Minor permanent habitat loss	No	Certain	Reclamation activities as outlined in WMP and A&R
Camps (North and South)	NA – Reclamation activities undertaken during Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	Closure activity and noise may result in avoidance of the area and deflection; behavioral changes, followed by re-use of the area after closure	Medium	Local	Contin	Medium	All Year	No	Minimize engine noises and noises associated with dismantling buildings and infrastructure, maintain and ensure vehicles are properly muffled, establish speed limits, expedite decommissioning	With mitigation, magnitude of potential effects is low	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; reports of aggregations along roads and near facilities
Dyke	Erosion and dyke removal activities may lead to further habitat loss	Low	Local	Contin	Perman	Summer	No	Stabilize/contour terrestrial area(s) created by dykes to minimize erosion by wind and water; provide natural drainage patterns	Low likelihood of residual effects; most effects are POSITIVE	No	Certain	Undertake reclamation activities as outlined in Wildlife Management Plan (WMP) and integrate with Abandonment and Restoration Plan (A&R)

Table B7.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	POSITIVE - Vegetation will naturally become established providing limited foraging opportunities for ungulates	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	NA since activity occurred during operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	Dyke will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in a loss of foraging habitat for ungulates	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increased foraging opportunities for ungulates	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	Possible injury or mortality from encounters with pits	Low	Local	Contin	Perman	All Year	No	If possible, slope nearshore areas of flooded pits at a low gradient to prevent accidental drowning once pits have been filled	The likelihood of this event is extremely low	No	Moderate	Wildlife Management Plan
	POSITIVE - Emergent vegetation may grow if a littoral zone is established around edges of pits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Habitat loss and disturbance due to erosion and sedimentation	Low	Local	Contin	Long	Summer	No	Stabilize slopes, cap with finer material, suppress dust if an issue; recontour and revegetate with local plant species	Minor vegetation loss is possible on an ongoing basis	No	Moderat	Reclamation activities as outlined in WMP and A&R
	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing increased foraging opportunities for ungulates	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B7.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs; risks and disturbances to ungulates from traffic during closure and post-closure will decrease and ultimately become minimal	Low	Local	Contin	Long	All Year	No	Scarify roads, remove culverts, restore drainage patterns, stabilize slopes, consider rehabilitation as esker habitat, suppress dust during reclamation	Some permanent habitat alteration likely	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction; reclamation activities as outlined in WMP and A&R
	Mortality due to vehicle/ungulate collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures and eventual complete decommissioning of roads	No	Moderat	Monitor ungulate movements and aggregations; drivers need to report any collisions and near misses with ungulates
	Reduced habitat effectiveness in adjacent areas due to noise and activity; reduced potential for effect as site is decommissioned	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Animals are expected to become habituated to noise therefore residual impacts are expected to be minor; site decommissioned during closure	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; reports of aggregations along roads and near facilities
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species; reduced potential for effect as site is decommissioned	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since ungulates are wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads
Non-contact Diversion Facilities	Habitat loss due to erosion and permafrost degradation	Low	Local	Contin	Perman	Summer	No	Maintain diversion facilities in such a way as to minimize potential for erosion	Minor habitat loss and alteration	No	Moderat	Maintain integrity of diversion facilities; undertake reclamation activities on an as-needed basis

Table B7.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Shop/ Office	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												
Winter Road and Traffic	Some compaction of vegetation cover possible, particularly in wind swept areas; no effect once winter road is no longer used	Low	Local	Contin	Long	Winter	No	Build up windswept areas with snow and ice to avoid disturbance of underlying vegetation communities	Impact of winter road on underlying vegetation communities is minimized	No	High	Regular monitoring of winter/ice road conditions
	Ungulates may use roads as travel corridors resulting in increased mortality from predators; no effect once winter road is no longer used	Low	Local	Frequent	Long	Winter	No	Do not berm roads to reduce crossing barriers	Negligible residual effects anticipated	No	Moderat	Winter road drivers must report ungulate sightings; maintain wildlife log of all wildlife sightings
	Increased hunting pressure; mortality from vehicles; reducing threat as need for winter road decreases	Low	Regional	Frequent	Long	Winter	Yes	Limit use of winter road to mine employees; prohibit mine employees from hunting; enforce speed limits; yield right of way to ungulates and all wildlife; confine traffic to winter road	Reduced potential for mortality with change in frequency of impact to Infrequent	No	Moderat	Report all ungulate/vehicle collisions; enforcement of no-hunting policy along winter road
	POSITIVE - Natural reclamation of habitat degraded by compaction with closing of winter road	NA	NA	NA	NA	NA	NA	NA	NA		NA	NA

Table B7.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road and Traffic	Ongoing loss and avoidance of foraging habitat, deflection from normal travel routes, energetic costs	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds; ungulated have right-of-way at all times	Residual effect expected to be minor	No	Certain	Monitor ungulate movements and aggregations; revegetate areas disturbed during construction
	Mortality due to vehicle/ungulate collisions	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds; ungulated have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor ungulate movements and aggregations; drivers need to report any collisions and near misses with ungulates
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds; ungulates have right-of-way at all times	Animals are expected to become habituated to noise therefore residual impacts are expected to be minor	No	High	Daily logs of ungulates, locations, numbers, sex and direction of travel; rports of aggregations along roads and near facilities
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since ungulates are wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation adjacent to roads
Barge Landing Facility	No measureable effects anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Barge Traffic	NA since no terrestrial effects	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
In-town Staging Facility	NA since no additional habitat loss or disturbance anticipated – permanent facility	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA

Table B7.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Explosives Magazine	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B8.1: Predatory Mammals Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Avoidance of foraging habitat (reduced habitat effectiveness); deflection from normal travel routes; energetic costs; disturbance of denning animals	Medium	Local	Contin	Medium	All Year	Yes	Minimize blast and engine noises; maintain and ensure vehicles are properly muffled; establish speed limits, establish blasting windows if possible; give predatory mammals right-of-way; minimize activities off access roads; manage noise and activity around active den sites	With mitigation, the magnitude of potential effects is low; as well, potential for denning predatory mammals in vicinity of mine site is very low and no dens have been located during baseline surveys	No	High	Daily logs of predatory mammal locations, numbers, and direction of travel; monitor locations of active den sites; monitor response of denning predatory mammals to noise and activity
Dykes												
East, West and Portage South Dykes	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	NA – Activity occurs during the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake and Portage Pit (3 rd Portage Lake)	Minor habitat loss and/or disturbance in shoreline areas, and areas where pumps and pipelines are located; potential decline in prey populations	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduce disturbance of habitat	Minor residual effects anticipated to foraging opportunities for predatory mammals as potentially disturbed areas will return to pre-development conditions rapidly and prey populations are not expected to be impacted	No	High	Revegetate on an as-needed basis

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island (3 rd Portage Lake)	NA – Activity occurs during the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage Pit	Habitat loss and associated decline in prey populations and disturbance from stripping activities	Low	Local	Contin	Long	All Year	No	Minimize width of pits to reduce overall foraging habitat loss	Permanent habitat loss on local level with potential declines in prey populations	No	Certain	None recommended
Goose Island Pit	NA – Activity occurs during the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Habitat loss and associated decline in prey populations and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent habitat alteration and loss on a local level with possible reductions in local prey populations	No	Certain	Monitor success of reclamation activities; monitor prey populations
Tailings Facilities (2 nd Portage Lake)	NA – Tailings will not be deposited until the Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Loss and avoidance of habitat and associated prey populations; deflection from normal travel routes; energetic costs	Low	Local	Contin	Long	All Year	No	Minimize required roads and reduce road dimensions	Residual effect expected to be minor	No	Certain	Monitor predatory mammal movements; revegetate areas disturbed during construction
	Mortality due to vehicle/predatory mammal collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor predatory mammal movements; drivers need to report any collisions and near misses with predatory mammals

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Animals are expected to become somewhat habituated to noise or occur at very low densities in the project area, therefore residual impacts are expected to be minor	No	High	Daily logs of predatory mammals, locations, numbers, and direction of travel
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since predatory mammals are very wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation and other indicators adjacent to roads
Airstrip and Air Traffic	Loss and avoidance of habitat and associated prey populations; deflection from normal travel routes; energetic costs	Low	Local	Contin	Long	All Year	No	Mimimize width and length of runway	Residual effects are expected to be minor	No	Certain	Monitor predatory mammal movements; revegetate areas disturbed during construction
	Mortality due to vehicle/predatory mammal collisions	Low	Local	Infrqnt	Short	All Year	No	Minimize number of take-offs and landings; monitor predatory mammal occurrence in the vicinity of airstrip; use scare tactics to move predatory mammals away from airstrip and approaches	Mortality due to collisions is extremely unlikely	No	Moderat	Pilots required to report all predatory mammal/plane near misses and predatory mammals sighted in the area; maintain a wildlife sighting log book

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize number of take-offs and landings; use defined flight corridors; establish minimum altitude and no harassment policies	Avoidance of areas adjacent to airstrip are not expected due to the low frequency of flights	No	Moderat	Monitor predatory mammal distribution and behaviour in Local Study Area
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Long	Summer	No	Minimize number of take-offs and landings; use dust suppressants if necessary	Any residual effects will be restricted to habitats in close proximity to the airstrip	No	Moderat	Monitor contaminant levels in vegetation adjacent to airstrip
Mine Plant and Associated Facilities	Loss and avoidance of habitat and associated prey populations; deflection from normal travel routes; energetic costs	Low	Local	Contin	Long	All Year	No	Mimimize footprint of mine plant site and ancillary facilities; comply with construction plan and schedule; minimize degradation of surrounding area	Residual effects limited to a localized area	No	Certain	Monitor predatory mammal distribution and abundance in Local Study Area; revegetate areas disturbed during construction
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in food sources	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	Monitor predatory mammal distribution and abundance; monitor contaminant levels in vegetation adjacent to mine site
Freshwater Intake and Pipeline	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to fuel spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Camps (North and South)	Loss and avoidance of habitats and associated prey populations; deflection from normal travel routes; energetic costs	Low	Local	Contin	Medium	All Year	No	Ecological awareness programs for all employees; walkways or designated trails between tents; minimize disturbance to surrounding area when dismantling camp	Minor residual effects are limited to a very localized areas	No	Certain	Enforce use of designated trail system; maintain trail system; monitor development of 'bandit' trails; revegetate camp areas no longer in use
Sewage and Solid Waste Disposal	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Food and other camp wastes attract scavengers including Grizzly Bear and Wolverine, increasing risk to human safety; mortality of animals may occur if they are deemed to be problem.	High	Local	Contin	Perman	All Year	Yes	Incinerate all garbage and food wastes; maintain a clean camp and mine site; facility is attached to main mine building to facilitate transfer of wastes; facility has apron to ground to prevent animals from crawling underneath; implement camp bear safety procedures and train staff	With mitigation measures, probability of attracting large scavengers is low, therefore magnitude is low	No	High	Monitor success of food and garbage handling procedures; monitor predatory mammals occurrence in the vicinity of mine facilities; enforce protocols to reduce potential for attracting predatory mammals; implement employee awareness programs
VAULT FACILITIES												

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Noise and Activity	Avoidance of foraging habitat (reduced habitat effectiveness); deflection from normal travel routes; energetic costs; disturbance of denning animals	Medium	Local	Contin	Medium	All Year	Yes	Minimize blast and engine noises; maintain and ensure vehicles are properly muffled; establish speed limits, establish blasting windows if possible; give predatory mammals right-of-way; minimize activities off access roads; manage noise and activity around active den sites	With mitigation, the magnitude of potential effects is low; as well, potential for denning predatory mammals in vicinity of mine site is very low and no dens have been located during baseline surveys	No	High	Daily logs of predatory mammal locations, numbers, and direction of travel; monitor locations of active den sites; monitor response of denning predatory mammals to noise and activity
Dyke	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	NA since no terrestrial activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	NA - Not until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Habitat loss and associated decline in prey populations and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent habitat alteration and loss on a local level with possible reductions in local prey populations	No	Certain	Monitor success of reclamation activities; monitor prey populations
Roads and Traffic	Loss and avoidance of habitat and associated prey populations; deflection from normal travel routes; energetic costs	Low	Local	Contin	Long	All Year	No	Minimize required roads and reduce road dimensions	Residual effect expected to be minor	No	Certain	Monitor predatory mammal movements; revegetate areas disturbed during construction
	Mortality due to vehicle/predatory mammal collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor predatory mammal movements; drivers need to report any collisions and near misses with predatory mammals

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Animals are expected to become somewhat habituated to noise or occur at very low densities in the project area, therefore residual impacts are expected to be minor	No	High	Daily logs of predatory mammals, locations, numbers, and direction of travel
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since predatory mammals are very wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation and other indicators adjacent to roads
Non-contact Diversion Facilities	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												
Winter Road and Traffic	Small area of habitat alteration not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Increased hunting pressure; mortality from vehicles	Medium	Regional	Frequent	Long	Winter	Yes	Limit use of winter road to mine employees; prohibit mine employees from hunting; enforce speed limits; yield right of way to predatory mammals and all wildlife; confine traffic to winter road	Reduced potential for mortality with change in frequency of impact to Infrequent	No	Moderat	Report all predatory mammal/vehicle collisions; enforcement of no-hunting policy along winter road
Baker Lake Access Road and Traffic	Loss and avoidance of habitat and associated prey populations; deflection from normal travel routes; energetic costs	Low	Local	Contin	Long	All Year	No	Minimize required roads and reduce road dimensions	Residual effect expected to be minor	No	Certain	Monitor predatory mammal movements; revegetate areas disturbed during construction
	Mortality due to vehicle/predatory mammal collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor predatory mammal movements; drivers need to report any collisions and near misses with predatory mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Animals are expected to become somewhat habituated to noise or occur at very low densities in the project area, therefore residual impacts are expected to be minor	No	High	Daily logs of predatory mammals, locations, numbers, and direction of travel

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since predatory mammals are very wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation and other indicators adjacent to roads
Barge Landing Facility	No measurable effects anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
In-town Staging Facility	Loss and avoidance of habitat; deflection from normal travel routes; energetic costs	Low	Local	Contin	Long	All Year	No	Mimimize footprint of staging facilities; comply with construction plan and schedule; minimize degradation of surrounding area	Residual effects limited to a localized area	No	Certain	Monitor predatory mammal distribution and abundance in Local Study Area; revegetate areas disturbed during construction
Explosives Magazine	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B8.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to fuel spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B8.2: Predatory Mammals Impact Matrix – Operation

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Avoidance of foraging habitat (reduced habitat effectiveness); deflection from normal travel routes; energetic costs; disturbance of denning animals	Medium	Local	Contin	Medium	All Year	Yes	Minimize blast and engine noises; maintain and ensure vehicles are properly muffled; establish speed limits, establish blasting windows if possible; give predatory mammals right-of-way; minimize activities off access roads; manage noise and activity around active den sites	With mitigation, the magnitude of potential effects is low; as well, potential for denning predatory mammals in vicinity of mine site is very low and no dens have been located during baseline surveys	No	High	Daily logs of predatory mammal locations, numbers, and direction of travel; monitor locations of active den sites; monitor response of denning predatory mammals to noise and activity
Dykes												
East, West and Portage South Dykes	No further habitat loss during operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake and Portage Pit (3 rd Portage Lake)	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island (3 rd Portage Lake)	Minor habitat loss and/or disturbance in shoreline areas, and areas where pumps and pipelines are located; potential decline in prey populations	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduce disturbance of habitat	Minor residual effects anticipated to foraging opportunities for predatory mammals as potentially disturbed areas will return to pre-development conditions rapidly and prey populations are not expected to be impacted	No	High	Revegetate on an as-needed basis
Pits												
Portage and Goose Island Pits	No obvious effects anticipated with the exception of noise and activity above	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Ongoing habitat loss and associated decline in prey populations and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent habitat alteration and loss on a local level with possible reductions in local prey populations	No	Certain	Monitor success of reclamation activities; monitor prey populations
Tailings Disposal (Facilities & Pond)	Exposure to contaminants if water is drunk from tailings pond; potential for occurrence is low because very few predatory mammals are present in the vicinity of the mine site for most of the ice-free season; exposure in the fall is the most likely	Medium	Local	Infrqnt	Long	Summer	No	Use aversive techniques to prevent animals accessing tailings ponds	Mitigation measures will reduce the potential magnitude of the effect to Low; residual effects are expected to be very low	No	Moderat	Wildlife logs; monitor predatory mammal occurrence and distribution; report all interactions and take further mitigation action (e.g., more regular monitoring) to reduce potential effects
	Trauma or death resulting from animals getting stuck in soft tailings; thawed tailings will only be available for a short time during the growing season	Low	Local	Infrqnt	Long	Summer	No	Use aversive techniques to prevent animals from accessing tailings ponds	Residual effects (i.e., animal mortality) is very unlikely to occur	No	Low	Wildlife logs; monitor predatory mammal occurrence and distribution; report all interactions and take further mitigation action (e.g., more regular monitoring) to reduce potential effects

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated during the operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/predatory mammal collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor predatory mammal movements; drivers need to report any collisions and near misses with predatory mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Animals are expected to become somewhat habituated to noise or occur at very low densities in the project area, therefore residual impacts are expected to be minor	No	High	Daily logs of predatory mammals, locations, numbers, and direction of travel
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since predatory mammals are very wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation and other indicators adjacent to roads

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	No additional habitat loss or disturbance anticipated during the operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/predatory mammal collisions	Low	Local	Infrqnt	Short	All Year	No	Minimize number of take-offs and landings; monitor predatory mammal occurrence in the vicinity of airstrip; use scare tactics to move predatory mammals away from airstrip and approaches	Mortality due to collisions is extremely unlikely	No	Moderat	Pilots required to report all predatory mammal/plane near misses and predatory mammals sighted in the area; maintain a wildlife sighting log book
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize number of take-offs and landings; use defined flight corridors; establish minimum altitude and no harassment policies	Avoidance of areas adjacent to airstrip are not expected due to the low frequency of flights	No	Moderat	Monitor predatory mammal distribution and behaviour in Local Study Area
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Long	Summer	No	Minimize number of take-offs and landings; use dust suppressants if necessary	Any residual effects will be restricted to habitats in close proximity to the airstrip	No	Moderat	Monitor contaminant levels in vegetation adjacent to airstrip
Mine Plant and Associated Facilities	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in food sources	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	Monitor predatory mammal distribution and abundance; monitor contaminant levels in vegetation adjacent to mine site

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Freshwater Intake and Pipeline	No further habitat loss anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	No further habitat loss anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Non-contact Diversion Facilities	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	Potential fuel spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to fuel spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Emulsion/AN Storage/ Explosives Magazines	Potential spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	POSITIVE - Increased habitat availability and reduced disturbance as camps are removed and habitat reclamation is undertaken	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	Food and other camp wastes attract scavengers including Grizzly Bear and Wolverine, increasing risk to human safety; mortality of animals may occur if they are deemed to be problem.	High	Local	Contin	Perman	All Year	Yes	Incinerate all garbage and food wastes; maintain a clean camp and mine site; facility is attached to main mine building to facilitate transfer of wastes; facility hs apron to ground to prevent animals from crawling underneath; implement camp bear safety procedures and train staff	With mitigation measures, probability of attracting large scavengers is low, therefore magnitude is low	No	High	Monitor success of food and garbage handling procedures; monitor predatory mammals occurrecne in the vicinity of mine facilities; enforce protocols to reduce potential for attracting predatory mammals; implement employee awareness programs

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
VAULT FACILITIES												
Noise and Activity	Avoidance of foraging habitat (reduced habitat effectiveness); deflection from normal travel routes; energetic costs; disturbance of denning animals	Medium	Local	Contin	Medium	All Year	Yes	Minimize blast and engine noises; maintain and ensure vehicles are properly muffled; establish speed limits, establish blasting windows if possible; give predatory mammals right-of-way; minimize activities off access roads; manage noise and activity around active den sites	With mitigation, the magnitude of potential effects is low; as well, potential for denning predatory mammals in vicinity of mine site is very low and no dens have been located during baseline surveys	No	High	Daily logs of predatory mammal locations, numbers, and direction of travel; monitor locations of active den sites; monitor response of denning predatory mammals to noise and activity
Dyke	No further habitat loss during operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	No obvious effects anticipated with the exception of noise and activity above	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Ongoing habitat loss and associated decline in prey populations and disturbance from overburden stripping	Low	Local	Contin	Long	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation	Permanent habitat alteration and loss on a local level with possible reductions in local prey populations	No	Certain	Monitor success of reclamation activities; monitor prey populations

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated during the operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/predatory mammal collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor predatory mammal movements; drivers need to report any collisions and near misses with predatory mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Animals are expected to become somewhat habituated to noise or occur at very low densities in the project area, therefore residual impacts are expected to be minor	No	High	Daily logs of predatory mammals, locations, numbers, and direction of travel
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since predatory mammals are very wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation and other indicators adjacent to roads
Non-contact Diversion Facilities	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	No additional loss or disturbance of terrestrial foraging habitat anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Winter Road and Traffic	Small area of habitat alteration not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Increased hunting pressure; mortality from vehicles	Medium	Regional	Frequent	Long	Winter	Yes	Limit use of winter road to mine employees; prohibit mine employees from hunting; enforce speed limits; yield right of way to predatory mammals and all wildlife; confine traffic to winter road	Reduced potential for mortality with change in frequency of impact to Infrequent	No	Moderate	Report all predatory mammal/vehicle collisions; enforcement of no-hunting policy along winter road; follow up on all reports of illegal hunting

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road and Traffic	No additional habitat loss or disturbance anticipated during the operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/predatory mammal collisions	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Mortality due to collisions is unlikely given various mitigation measures	No	Moderat	Monitor predatory mammal movements; drivers need to report any collisions and near misses with predatory mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way at all times	Animals are expected to become somewhat habituated to noise or occur at very low densities in the project area, therefore residual impacts are expected to be minor	No	High	Daily logs of predatory mammals, locations, numbers, and direction of travel
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Long	All Year	No	Minimize vehicular traffic and speeds; use dust suppressants; maintain vehicles in good operating condition	Residual impacts limited to habitats near roads; since predatory mammals are very wide ranging, exposure to contamination is expected to be very limited	No	Moderat	Monitor contaminant levels in vegetation and other indicators adjacent to roads
Barge Landing Facility	No measurable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in food sources	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	Monitor predatory mammal distribution and abundance; monitor contaminant levels in vegetation adjacent to mine site

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Explosives Magazine	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B8.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	Small area of habitat loss not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to fuel spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B8.3: Predatory Mammals Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Closure activity and noise may result in avoidance of the area and deflection; behavioral changes, followed by re-use of the area after closure	Medium	Local	Contin	Medium	All Year	No	Minimize engine noises and noises associated with dismantling buildings and infrastructure, maintain and ensure vehicles are properly muffled, establish speed limits, expedite decommissioning	With mitigation, magnitude of potential effects is low	No	High	Daily logs of predatory mammal locations, numbers, and direction of travel
Dykes												
East, West, South Portage, Goose Island and 3 rd Portage Arm Dykes	Dykes will be breached, any terrestrial habitat created by them will be flooded	Low	Local	Contin	Perman	All Year	Low	Minimize terrestrial habitat lost to breaching of dykes	Residual impact will be small since marginal terrestrial habitat lost was only available during the operation phase	No	Moderat	Avoid breaching dams during times of active denning in areas to be flooded, if any exist; monitor location sof active den sites
	POSITIVE - Vegetation will naturally become established providing foraging opportunities for prey species	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake, Portage Pit (3 rd Portage Lake) and Goose Island (3 rd Portage Lake)	NA since dewatering completed prior to closure phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage Pit	Dykes will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging habitat for raptors	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases in prey populations	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	POSITIVE – Emergent vegetation may grow if a littoral zone is established around edges of pits; riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits; these changes will provide living and nesting opportunities for prey species of predatory mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved living conditions for prey of predatory mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Facilities (2 nd Portage Lake)	POSITIVE – Native vegetation will naturally become reestablished on the tailings beach providing improved living conditions for prey of predatory mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vegetation growing on tailings may be contaminated leading to elevated contaminant levels in prey of predatory mammals	Low	Local	Contin	Perman	All year	No	Ensure that tailings deposit is capped with clean material	With reduced contaminant uptake in vegetation, potential impacts are considered to be of low magnitude; predatory mammals are widely dispersed and are unlikely to take a large number of prey from contaminated areas	Low	High	Monitor contaminant levels in vegetation and possibly other indicators

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Mortality due to vehicle/predatory mammal collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way	Potential for vehicle/predatory mammal collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with predatory mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of predatory mammals to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; the potential for this effect will reduce substantially after mine closure; some potential contamination if they utilize reclaimed road surfaces (see below)	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition; ensure that road materials are inert and do not contribute unacceptable contaminant levels into the environment;	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of predatory mammals will likely be low; potential exposure is seasonal for most predatory mammal species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	No additional habitat loss or disturbance anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/predatory mammal collisions; risk of this effect will decline substantially after mine closure	Low	Local	Infrqnt	Short	All Year	No	Minimize number of take-offs and landings; monitor predatory mammal occurrence in the vicinity of airstrip; use scare tactics to move predatory mammals away from airstrip and approaches	Mortality due to collisions is extremely unlikely	No	Moderat	Pilots required to report all predatory mammal/plane near misses and predatory mammals sighted in the area; maintain a wildlife sighting log book
	Reduced habitat effectiveness in adjacent areas due to noise and activity; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Long	All Year	No	Minimize number of take-offs and landings; use defined flight corridors; establish minimum altitude and no harassment policies	Avoidance of areas adjacent to airstrip are not expected due to the low frequency of flights	No	Moderat	Monitor predatory mammal distribution and behaviour in Local Study Area
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Long	Summer	No	Minimize number of take-offs and landings; use dust suppressants if necessary	Any residual effects will be restricted to habitats in close proximity to the airstrip	No	Moderat	Monitor contaminant levels in vegetation adjacent to airstrip
Mine Plant and Associated Facilities	Concrete foundation and footprint of other ancillary facilities will result in permanent habitat loss and disturbance with some potential effect on prey populations	Low	Local	Contin	Perman	All Year	No	Remove any contamination sources from around the plant; recontour surrounding area and restore original drainage patterns to the extent possible; stabilize slopes	Some permanent vegetation loss	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & restoration Plan
	POSITIVE - With closure of the mine, risks and disturbances to predatory mammals will decrease (e.g., avoidance of foraging habitat, deflection from normal travel routes, energetic costs)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Freshwater Intake and Pipeline	POSITIVE – Small gain in habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	POSITIVE – Small gain in habitat	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved habitat and prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	Small degree of habitat loss due to erosion and permafrost degradation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	No measurable effect anticipated from small area of habitat loss; potential for spills is substantially reduced	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage/ Explosives Magazines	No measurable effect anticipated from small area of habitat loss; no further potential for spills	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camps (North and South)	NA – Reclamation activities undertaken during Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Food and other camp wastes attract scavengers including grizzly bear and wolverine, increasing risk to human safety; mortality of animals may occur if they are deemed to be problem; the potential for effects is reduced greatly once the mine has been fully closed	High	Local	Contin	Perman	All Year	Yes	Incinerate all garbage and food wastes; maintain a clean camp and mine site; facility is attached to main mine building to facilitate transfer of wastes; facility has apron to ground to prevent animals from crawling underneath; implement camp bear safety procedures and train staff	With mitigation measures, probability of attracting large scavengers is low, therefore magnitude is low	No	High	Monitor success of food and garbage handling procedures; monitor predatory mammals occurrence in the vicinity of mine facilities; enforce protocols to reduce potential for attracting predatory mammals; implement employee awareness programs

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
VAULT FACILITIES												
Noise and Activity	Closure activity and noise may result in avoidance of the area and deflection; behavioral changes, followed by re-use of the area after closure	Medium	Local	Contin	Medium	All Year	No	Minimize engine noises and noises associated with dismantling buildings and infrastructure, maintain and ensure vehicles are properly muffled, establish speed limits, expedite decommissioning	With mitigation, magnitude of potential effects is low	No	High	Daily logs of predatory mammal locations, numbers, and direction of travel
Dyke	Dykes will be breached, any terrestrial habitat created by them will be flooded	Low	Local	Contin	Perman	All Year	Low	Minimize terrestrial habitat lost to breaching of dykes	Residual impact will be small since marginal terrestrial habitat lost was only available during the operation phase	No	Moderat	Avoid breaching dams during times of active denning in areas to be flooded, if any exist; monitor location sof active den sites
	POSITIVE - Vegetation will naturally become established providing foraging opportunities for prey species	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	NA since dewatering completed prior to closure phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pit	Dyke will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging habitat for raptors	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases in prey populations	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	POSITIVE – Emergent vegetation may grow if a littoral zone is established around edges of pit; riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pit; these changes will provide living and nesting opportunities for prey species of predatory mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved living conditions for prey of predatory mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Mortality due to vehicle/predatory mammal collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way	Potential for vehicle/predatory mammal collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with predatory mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of predatory mammals to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; the potential for this effect will reduce substantially after mine closure; some potential contamination if they utilize reclaimed road surfaces (see below)	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition; ensure that road materials are inert and do not contribute unacceptable contaminant levels into the environment;	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of predatory mammals will likely be low; potential exposure is seasonal for most predatory mammal species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Non-contact Diversion Facilities	Small degree of habitat loss due to erosion and permafrost degradation	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	Small gain in reclaimed habitat	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
OTHER FACILITIES												

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Winter Road and Traffic	Small area of habitat alteration not expected to result in measurable effect on prey populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Increased hunting pressure; mortality from vehicles; no risk of vehicle collisions post-closure	Medium	Regional	Frequent	Long	Winter	Yes	Limit use of winter road to mine employees; prohibit mine employees from hunting; enforce speed limits; yield right of way to predatory mammals and all wildlife; confine traffic to winter road	Reduced potential for mortality with change in frequency of impact to Infrequent	No	Moderat	Report all predatory mammal/vehicle collisions; enforcement of no-hunting policy along winter road; follow up on all reports of illegal hunting

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road and Traffic	Mortality due to vehicle/predatory mammal collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; predatory mammals have right-of-way	Potential for vehicle/predatory mammal collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with predatory mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of predatory mammals to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; the potential for this effect will reduce substantially after mine closure; some potential contamination if they utilize reclaimed road surfaces (see below)	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition; ensure that road materials are inert and do not contribute unacceptable contaminant levels into the environment;	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of predatory mammals will likely be low; potential exposure is seasonal for most predatory mammal species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Barge Landing Facility	No measureable effects anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
In-town Staging Facility	NA since no additional habitat loss or disturbance anticipated – permanent facility	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA

Table B8.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Explosives Magazine	No further habitat loss anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No further habitat loss anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
	Predatory mammals such as Wolverine may be attracted to fuel spills	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B9.1: Small Mammals Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of small mammals if present in close proximity to development areas	Medium	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity	With mitigation, magnitude of impacts is considered to be low; small mammals are readily habituated to noise and activity	No	Moderate	Monitor population levels of small mammals; implement employee awareness programs
Dykes												
East, West and Portage South Dykes	Minor loss and disturbance of living and foraging habitat on islands and where dykes key into shorelines	Low	Local	Contin	Medium	Summer	No	Minimize area of shorelines encroached by dykes	Small area of terrestrial impact may affect some local small mammal populations, but overall residual effect is considered to be low	No	Certain	Monitor population levels of small mammals
	POSITIVE - Improved wildlife movement and dispersal opportunities along dykes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	NA – dykes are not constructed until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake and Portage Pit (3 rd Portage Lake)	Minor loss and disturbance of terrestrial living and foraging habitat; disruption of movement and dispersal; reduced habitat effectiveness	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduces habitat disturbance	Due to small amount of terrestrial habitat impacted, residual effects are considered to be small; raised pipelines will permit small mammal dispersal	No	High	None specific to small mammals recommended; revegetate on an as-required basis

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island (3 rd Portage Lake)	NA since activity does not occur until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage Pit	Loss and disturbance of terrestrial living and foraging habitat due to overburden stripping; disruption of movement and dispersal	Low	Local	Contin	Perman	All Year	No	Minimize width of pits and overall habitat loss	Loss of some terrestrial habitat is permanent but considered to be low	No	Certain	Monitor small mammal populations; revegetate on an as-required basis
Goose Island Pit	NA since pit is not developed until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Loss and disturbance of terrestrial living and foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	Monitor small mammal populations; revegetate on an as-required basis
Tailings Facilities (2 nd Portage Lake)	NA since activity not until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat; disruption of movement and dispersal	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging habitat	No	Certain	Monitor small mammal populations; see Vegetation Cover matrices for more habitat-specific recommendations
	Mortality due to vehicle/small mammal collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; small mammals have right-of-way; convoy shipments whenever possible; limit random traffic	Potential for vehicle/small mammal collisions is expected to be low	No	Moderat	Drivers will report any collisions and near misses with small mammals; a wildlife sighting log book will be maintained
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of small mammals to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey or forage species within diet of locally resident small mammals will likely be low	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on road edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	Loss and disturbance of terrestrial foraging habitat; disruption of movement and dispersal	Low	Local	Contin	Perman	All Year	No	Minimize required airstrip size	Minor alteration and loss of foraging habitat; some disruption of small mammal movement and dispersal	No	Certain	None specific to small mammals recommended
	Mortality due to air traffic/small mammal collisions	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings	The potential for a plane/small mammal collision is considered to be relatively low	No	Moderat	Pilots are required to report all small mammal/plane collisions and near misses
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent, therefore noise and activity will be intermittent	No	High	None specific to small mammals recommended
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident small mammals are not likely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on airstrip edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities	Loss of foraging and nesting habitat	Low	Local	Contin	Perman	All Year	No	Minimize footprint of mine facilities; clearly delineate footprint to reduce habitat degradation in surrounding areas	Permanent foraging and living habitat loss on a local level	No	Certain	Revegetate areas disturbed during construction
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	All Year	No	Use dust suppressant techniques on an as-needed basis; maintain vehicles in good operating condition	Potential for exposure to contaminated prey or forage species is low	No	High	Monitor contaminant levels in vegetation and possible other indicators
Freshwater Intake and Pipeline	Minor loss and disturbance of nesting and foraging habitat; possible disruption of movement and dispersal	Low	Local	Contin	Medium	Summer	No	Construct pipeline in a manner to minimize impact to terrestrial environment and avoid disruption of wildlife movement and dispersal	Small areas of impact may effect a few small mammals but impact is not evident over a wide area	No	Certain	None specific to small mammals recommended
Discharge Facilities and Pipeline(s)	Minor loss and disturbance of nesting and foraging habitat; possible disruption of movement and dispersal	Low	Local	Contin	Medium	Summer	No	Construct pipeline in a manner to minimize impact to terrestrial environment and avoid disruption of wildlife movement and dispersal	Small areas of impact may effect a few small mammals but impact is not evident over a wide area	No	Certain	None specific to small mammals recommended
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss; disruption of small mammal movement and dispersal unlikely	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Power Lines and Poles	Improved perching opportunities for raptors may result in increased depredation rates on small mammals in a localized area	Low	Local	Infreqnt	Long	All Year	No	None recommended	Potential for increased depredation rates is low and then only at a localized level	No	Moderat	Report all raptors perching on power poles, lines and other mine facilities

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Fuel Storage (at Plant site)	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	Minor loss and disturbance of living and foraging habitat; sensory disturbance may result in reduced habitat effectiveness	Low	Local	Contin	Medium	Summer	No	Designate tent sites and walking trails; use pallets or raised walkways in areas with heath, sedge or other vegetation sensitive to trampling	Small area of impact and proposed mitigation measures will ensure that residual effects are low	No	Certain	Regular maintenance of designated trail system; monitor development of 'bandit' trails
Sewage and Solid Waste Disposal	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Food and other camp wastes attract small mammals such as voles, lemmings and ground squirrels; mortality of animals may occur if they are deemed to be problem.	Medium	Local	Contin	Perman	All Year	Yes	Incinerate all garbage and food wastes; maintain a clean camp and mine site; facility is attached to main mine building to facilitate transfer of wastes	With mitigation measures, probability of attracting small mammals is low, therefore magnitude is low	No	High	Monitor success of food and garbage handling procedures; enforce protocols to reduce potential for attracting small mammals; implement employee awareness programs

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of small mammals if present in close proximity to development areas	Medium	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity	With mitigation, magnitude of impacts is considered to be low; small mammals are readily habituated to noise and activity	No	Moderate	Monitor population levels of small mammals; implement employee awareness programs
Dyke	Minor loss and disturbance of living and foraging habitat on islands and where dykes key into shorelines	Low	Local	Contin	Medium	Summer	No	Minimize area of shorelines encroached by dykes	Small area of terrestrial impact may affect some local small mammal populations, but overall residual effect is considered to be low	No	Certain	Monitor population levels of small mammals
	POSITIVE - Improved wildlife movement and dispersal opportunities along dykes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	Minor loss and disturbance of terrestrial living and foraging habitat; disruption of movement and dispersal; reduced habitat effectiveness	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduces habitat disturbance	Due to small amount of terrestrial habitat impacted, residual effects are considered to be small; raised pipelines will permit small mammal dispersal	No	High	None specific to small mammals recommended; revegetate on an as-required basis
Pit	NA since pit construction will occur during operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Loss and disturbance of terrestrial foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	Monitor small mammal popualtions; revegetate on an as-required basis

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat; disruption of movement and dispersal	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging habitat	No	Certain	Monitor small mammal populations; see Vegetation Cover matrices for more habitat-specific recommendations
	Mortality due to vehicle/small mammal collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; small mammals have right-of-way; convoy shipments whenever possible; limit random traffic	Potential for vehicle/small mammal collisions is expected to be low	No	Moderat	Drivers will report any collisions and near misses with small mammals; a wildlife sighting log book will be maintained
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of small mammals to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey or forage species within diet of locally resident small mammals will likely be low	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on road edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Shop/ Office	Minor loss and disturbance of living and foraging habitat	Low	Local	Contin	Medium	Summer	No	Minimize footprint	Small habitat loss is expected to have a low residual effect on local small mammal populations	No	Certain	None specific to small mammals recommended
OTHER FACILITIES												
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/small mammals collisions is expected to be very low because only Arctic hare is present above the snow during the winter	Low	Regional	Contin	Short	Winter	No	Minimize vehicular traffic and speeds; Arctic hare have the right-of-way	Potential for vehicle/Arctic hare collisions in winter is expected to be low	No	Low	Drivers will report any collisions and near misses with Arctic hare

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road and Traffic	Loss and disturbance of terrestrial foraging habitat; disruption of movement and dispersal	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging habitat	No	Certain	Monitor small mammal populations; see Vegetation Cover matrices for more habitat-specific recommendations
	Mortality due to vehicle/small mammal collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; small mammals have right-of-way; convoy shipments whenever possible; limit random traffic	Potential for vehicle/small mammal collisions is expected to be low	No	Moderat	Drivers will report any collisions and near misses with small mammals; a wildlife sighting log book will be maintained
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of small mammals to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey or forage species within diet of locally resident small mammals will likely be low	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on road edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Landing Facility	Limited habitat suitability for small mammals; some disruption of movement and dispersal along lakeshore possible	Low	Local	Contin	Short	Summer	No	Streamline unloading and loading activities to minimize the amount of time barge is beached	Residual effects are very low	No	Moderat	None recommended
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	Loss of foraging and living habitat	Low	Local	Contin	Perman	All Year	No	Minimize footprint of facilities; clearly delineate footprint to reduce habitat degradation in surrounding areas	Permanent foraging and living habitat loss on a local level	No	Certain	Revegetate areas disturbed during construction
Explosives Magazine	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B9.2: Small Mammals Impact Matrix – Operation

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of small mammals if present in close proximity to development areas	Medium	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity	With mitigation, magnitude of impacts is considered to be low; small mammals are readily habituated to noise and activity	No	Moderate	Monitor population levels of small mammals; implement employee awareness programs
Dykes												
East, West and Portage South Dykes	No additional habitat loss antipated during operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	Minor loss and disturbance of living and foraging habitat on islands and where dykes key into shorelines	Low	Local	Contin	Medium	Summer	No	Minimize area of shorelines encroached by dykes	Small area of terrestrial impact may affect some local small mammal populations, but overall residual effect is considered to be low	No	Certain	Monitor population levels of small mammals
	POSITIVE - Improved wildlife movement and dispersal opportunities along dykes	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake and Portage Pit (3 rd Portage Lake)	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Increased terrestrial habitat in dewatered areas may provide a temporary improvement in food availability for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island (3 rd Portage Lake)	Minor loss and disturbance of terrestrial living and foraging habitat; disruption of movement and dispersal; reduced habitat effectiveness	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduces habitat disturbance	Due to small amount of terrestrial habitat impacted, residual effects are considered to be small; raised pipelines will permit small mammal dispersal	No	High	None specific to small mammals recommended; revegetate on an as-required basis
	POSITIVE – Increased terrestrial habitat in dewatered areas may provide a temporary improvement in food availability for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage Pit	No additional measurable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island Pit	Loss and disturbance of terrestrial living and foraging habitat due to overburden stripping; disruption of movement and dispersal	Low	Local	Contin	Perman	All Year	No	Minimize width of pits and overall habitat loss	Loss of some terrestrial habitat is permanent but considered to be low	No	Certain	Monitor small mammal populations; revegetate on an as-required basis
Waste Dump (Portage/Goose)	Continued loss and disturbance of terrestrial living and foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump; create small mammal habitat on slopes of waste dump	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	Monitor small mammal populations; revegetate on an as-required basis
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) in rock pile areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Facilities (2 nd Portage Lake)	Loss and disturbance of terrestrial foraging habitat around edge of lake to four metres above current lake elevation	Low	Local	Contin	Perman	All Year	No	Minimize encroachment of tailings into shoreline areas of 2 nd Portage Lake; berm edges if necessary; create small mammal habitat on slopes of tailings deposit	Residual effect includes permanent loss of vegetation around the shoreline of 2 nd Portage Lake	No	Certain	Environmental monitoring to ensure that only designated areas are impacted by the tailings beach
	Natural revegetation of potentially contaminated tailings beach may occur; small mammals may be exposed to elevated contaminant levels	Low	Local	Contin	Perman	All Year	No	Cap facility with appropriate clean material; undertake progressive reclamation activities to improve habitats on areas of tailings deposit that has reached its maximum height	With adequate measures, the potential for contamination is very low	No	Low	Monitor contaminant levels in vegetation on tailings beach; adjust capping material composition and distribution as appropriate

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/small mammal collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; small mammals have right-of-way; convoy shipments whenever possible; limit random traffic	Potential for vehicle/small mammal collisions is expected to be low	No	Moderat	Drivers will report any collisions and near misses with small mammals; a wildlife sighting log book will be maintained
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of small mammals to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey or forage species within diet of locally resident small mammals will likely be low	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on road edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to air traffic/small mammal collisions	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings	The potential for a plane/small mammal collision is considered to be relatively low	No	Moderat	Pilots are required to report all small mammal/plane collisions and near misses
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent, therefore noise and activity will be intermittent	No	High	None specific to small mammals recommended
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident small mammals are not likely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on airstrip edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	All Year	No	Use dust suppressant techniques on an as-needed basis; maintain vehicles in good operating condition	Potential for exposure to contaminated prey or forage species is low	No	High	Monitor contaminant levels in vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) in or under mine structures and facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Small mammals (e.g., Arctic Hare) may find refuge from predators under buildings and structures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss; disruption of small mammal movement and dispersal unlikely	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	Minor loss and disturbance of nesting and foraging habitat; possible disruption of movement and dispersal	Low	Local	Contin	Medium	Summer	No	Construct pipeline in a manner to minimize impact to terrestrial environment and avoid disruption of wildlife movement and dispersal	Small areas of impact may effect a few small mammals but impact is not evident over a wide area	No	Certain	None specific to small mammals recommended
Power Lines and Poles	Improved perching opportunities for raptors may result in increased depredation rates on small mammals in a localized area	Low	Local	Infreqnt	Long	All Year	No	None recommended	Potential for increased depredation rates is low and then only at a localized level	No	Moderat	Report all raptors perching on power poles, lines and other mine facilities

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Fuel Storage (at Plant site)	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	POSITIVE – Increased habitat availability and reduced disturbance as camps are removed and habitat reclamation is undertaken	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	Food and other camp wastes attract small mammals such as voles, lemmings and ground squirrels; mortality of animals may occur if they are deemed to be problem.	Medium	Local	Contin	Perman	All Year	Yes	Incinerate all garbage and food wastes; maintain a clean camp and mine site; facility is attached to main mine building to facilitate transfer of wastes	With mitigation measures, probability of attracting small mammals is low, therefore magnitude is low	No	High	Monitor success of food and garbage handling procedures; enforce protocols to reduce potential for attracting small mammals; implement employee awareness programs

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of small mammals if present in close proximity to development areas	Medium	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity	With mitigation, magnitude of impacts is considered to be low; small mammals are readily habituated to noise and activity	No	Moderate	Monitor population levels of small mammals; implement employee awareness programs
Dyke	No additional habitat loss antipated during operation phase	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Dewatering	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Increased terrestrial habitat in dewatered areas may provide a temporary improvement in food availability for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	Loss and disturbance of terrestrial living and foraging habitat due to overburden stripping	Low	Local	Contin	Perman	All Year	No	Minimize width of pits and overall habitat loss	Loss of some terrestrial habitat is permanent but considered to be low	No	Certain	Monitor population levels of small mammals; revegetate on an as-required basis
Waste Dump	Continued loss and disturbance of terrestrial living and foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump; create small mammal habitat on slopes of waste dump	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	Monitor small mammal populations; revegetate on an as-required basis
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) in rock pile areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/small mammal collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; small mammals have right-of-way; convoy shipments whenever possible; limit random traffic	Potential for vehicle/small mammal collisions is expected to be low	No	Moderat	Drivers will report any collisions and near misses with small mammals; a wildlife sighting log book will be maintained
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of small mammals to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey or forage species within diet of locally resident small mammals will likely be low	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on road edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Access Road Culverts (Turn Lake)	POSITIVE – Some improved wildlife movement opportunities across Turn Lake in summer	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.2 Continued

TABLE D6-2 (continued)

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss; disruption of small mammal movement and dispersal unlikely	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	No additional loss or disturbance of terrestrial foraging or living habitat anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Small mammals (e.g., Arctic Hare) may find refuge from predators under buildings and structures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/small mammals collisions is expected to be very low because only Arctic hare is present above the snow during the winter	Low	Regional	Contin	Short	Winter	No	Minimize vehicular traffic and speeds; Arctic hare have the right-of-way	Potential for vehicle/Arctic hare collisions in winter is expected to be low	No	Low	Drivers will report any collisions and near misses with Arctic hare

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/small mammal collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; small mammals have right-of-way; convoy shipments whenever possible; limit random traffic	Potential for vehicle/small mammal collisions is expected to be low	No	Moderat	Drivers will report any collisions and near misses with small mammals; a wildlife sighting log book will be maintained
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of small mammals to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey or forage species within diet of locally resident small mammals will likely be low	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on road edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Landing Facility	Limited habitat suitability for small mammals; some disruption of movement and dispersal along lakeshore possible	Low	Local	Contin	Short	Summer	No	Streamline unloading and loading activities to minimize the amount of time barge is beached	Residual effects are very low	No	Moderat	None recommended

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	All Year	No	Use dust suppressant techniques on an as-needed basis; maintain vehicles in good operating condition	Potential for exposure to contaminated prey or forage species is low	No	High	Monitor contaminant levels in vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) in or under facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Small mammals (e.g., Arctic Hare) may find refuge from predators under buildings and structures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B9.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B9.3: Small Mammals Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of small mammals if present in close proximity to development areas; minimal effects once mine is fully closed	Medium	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity	With mitigation, magnitude of impacts is considered to be low; small mammals are readily habituated to noise and activity	No	Moderate	Monitor population levels of small mammals; implement employee awareness programs
Dykes												
East, West, Portage South, Goose Island and 3 rd Portage Arm Dykes	Dykes will be breached, any terrestrial habitat created by them (i.e., dewatered areas) will be inundated	Low	Local	Contin	Perman	All Year	No	Minimize terrestrial habitat lost to breaching of dykes	Residual impact will be small since marginal terrestrial habitat lost was only available during the operation phase	No	Certain	None specific to small mammals recommended
	POSITIVE - Vegetation will naturally become established on dykes providing living areas for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake, Portage Pit (3 rd Portage Lake) and Goose Island (3 rd Portage Lake)	NA since dewatering completed during construction or operation phases; see loss of terrestrial habitat above with dyke breaching	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage and Goose Island Pits	Dykes will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging and living habitat	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases local small mammal populations	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	POSITIVE – Emergent vegetation may grow if a littoral zone is established around edges of pits providing living opportunities for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits providing living opportunities for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved living conditions for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – habitat created on slopes of waste rock piles (e.g., rock piles providing security cover and living areas) will benefit small mammal populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailings Facilities (2 nd Portage Lake)	POSITIVE – Native vegetation will naturally become reestablished on the tailings beach providing improved living conditions for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – habitat created on slopes of tailings facility (e.g., rock piles providing security cover and living areas) will benefit small mammal populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vegetation growing on tailings may be contaminated leading to elevated contaminant levels in small mammals	Medium	Local	Contin	Perman	All year	Yes	Ensure that tailings deposit is capped with clean material	With reduced contaminant uptake in vegetation, potential impacts are considered to be of low magnitude	Low	High	Monitor contaminant levels in vegetation and possibly other indicators

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Mortality due to vehicle/small mammal collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; small mammals have right-of-way	Potential for vehicle/small mammal collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with small mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of small mammals to become habituated to noise and activity	No	High	None specific to small mammals recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey and forage species; the potential for this effect will reduce substantially after mine closure; some potential contamination if small mammals utilize reclaimed road surfaces (see below)	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition; ensure that road materials are inert and do not contribute unacceptable contaminant levels into the environment	Potential area of contamination is very small; proportion of potentially contaminated prey or forage species within diet of locally resident small mammals will likely be low	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on road edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	POSITIVE – Small mammals may be attracted to reclaimed road bed areas for living and foraging once vegetation has become reestablished; reclaim activities will involve scarifying roads, restoring drainage, suppressing dust, and considering rehabilitation of roads as esker-like habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Airstrip and Air Traffic	No additional habitat loss or disturbance anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to air traffic/small mammal collisions; risk of this effect will decline substantially after mine closure	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings	The potential for a plane/small mammal collision is considered to be low	No	Moderat	Pilots are required to report all small mammal/plane collisions and near misses
	Reduced habitat effectiveness in adjacent areas due to noise and activity; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent	No	High	None specific to small mammals recommended
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey and forage species; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident small mammals are unlikely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on airstrip edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities	Concrete foundation and footprint of other ancillary facilities will result in permanent habitat loss and disturbance	Low	Local	Contin	Perman	All Year	No	Remove any contamination sources from around the plant; recontour surrounding area and restore original drainage patterns to the extent possible; stabilize slopes; consider creation of small mammal habitats	Some permanent vegetation loss	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) in or under mine structures and facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging and living habitat; removal of potential obstructions to movement and dispersal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging and living habitat; removal of potential obstructions to movement and dispersal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss; disruption of small mammal movement and dispersal unlikely	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat; removal of potential obstructions to movement and dispersal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	Potential for spills is substantially reduced; no effects once mine is fully shut down	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Recontouring and revegetation of disturbed area, removal of contaminated soil and creation of small mammal habitat will be beneficial	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Emulsion/AN Storage/ Explosives Magazines	Potential for spills is substantially reduced; no effects once mine is fully shut down	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Recontouring and revegetation of disturbed area, removal of contaminated soil and creation of small mammal habitat will be beneficial	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camps (North and South)	NA – Reclamation activities undertaken during Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Food and other camp wastes attract small mammals such as voles, lemmings and ground squirrels; mortality of animals may occur if they are deemed to be problem; potential effects will not occur after the mine is fully closed	Medium	Local	Contin	Perman	All Year	Yes	Incinerate all garbage and food wastes; maintain a clean camp and mine site; facility is attached to main mine building to facilitate transfer of wastes	With mitigation measures, probability of attracting small mammals is low, therefore magnitude is low	No	High	Monitor success of food and garbage handling procedures; enforce protocols to reduce potential for attracting small mammals; implement employee awareness programs
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of small mammals if present in close proximity to development areas; minimal effects once mine is fully closed	Medium	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity	With mitigation, magnitude of impacts is considered to be low; small mammals are readily habituated to noise and activity	No	Moderate	Monitor population levels of small mammals; implement employee awareness programs
Dyke	Dyke will be breached, any terrestrial habitat created by them (i.e., dewatered areas) will be inundated	Low	Local	Contin	Perman	All Year	No	Minimize terrestrial habitat lost to breaching of dykes	Residual impact will be small since marginal terrestrial habitat lost was only available during the operation phase	No	Certain	None specific to small mammals recommended
	POSITIVE - Vegetation will naturally become established on dykes providing living areas for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering	NA since dewatering completed during construction or operation phases; see loss of terrestrial habitat above with dyke breaching	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	Dykes will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging and living habitat	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases local small mammal populations	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	POSITIVE – Emergent vegetation may grow if a littoral zone is established around edges of pits providing living opportunities for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits providing living opportunities for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved living conditions for small mammals	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – habitat created on slopes of waste rock piles (e.g., rock piles providing security cover and living areas) will benefit small mammal populations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Mortality due to vehicle/small mammal collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; small mammals have right-of-way	Potential for vehicle/small mammal collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with small mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of small mammals to become habituated to noise and activity	No	High	None specific to small mammals recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey and forage species; the potential for this effect will reduce substantially after mine closure; some potential contamination if small mammals utilize reclaimed road surfaces (see below)	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition; ensure that road materials are inert and do not contribute unacceptable contaminant levels into the environment	Potential area of contamination is very small; proportion of potentially contaminated prey or forage species within diet of locally resident small mammals will likely be low	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on road edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	POSITIVE – Small mammals may be attracted to reclaimed road bed areas for living and foraging once vegetation has become reestablished; reclaim activities will involve scarifying roads, restoring drainage, suppressing dust, and considering rehabilitation of roads as esker-like habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Access Road Culverts (Turn Lake)	POSITIVE – Culverts will be removed and the land recontoured, drainage patterns restored, and animal movement patterns reduced but restored to original configurations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss; disruption of small mammal movement and dispersal unlikely	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/small mammals collisions is expected to be very low because only Arctic hare is present above the snow during the winter; potential effects will not occur once mine is closed and winter road is no longer in operation	Low	Regional	Contin	Short	Winter	No	Minimize vehicular traffic and speeds; Arctic hare have the right-of-way	Potential for vehicle/Arctic hare collisions in winter is expected to be low	No	Low	Drivers will report any collisions and near misses with Arctic hare

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road and Traffic	Mortality due to vehicle/small mammal collisions; the potential for this effect is expected to decline after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; small mammals have right-of-way	Potential for vehicle/small mammal collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with small mammals
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect is expected to decline after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of small mammals to become habituated to noise and activity	No	High	None specific to small mammals recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey and forage species; the potential for this effect is expected to decline after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition; ensure that road materials are inert and do not contribute unacceptable contaminant levels into the environment	Potential area of contamination is very small; proportion of potentially contaminated prey or forage species within diet of locally resident small mammals will likely be low	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE – Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) on road edges and rock fill areas	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Landing Facility	Limited habitat suitability for small mammals; some disruption of movement and dispersal along lakeshore possible; reduced effects once mine is closed	Low	Local	Contin	Short	Summer	No	Streamline unloading and loading activities to minimize the amount of time barge is beached	Residual effects are very low	No	Moderat	None recommended

Table B9.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	No further habitat loss or disturbance anticipated; facility will likely not be decommissioned	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey and forage species	Low	Local	Contin	Perman	All Year	No	Use dust suppressant techniques on an as-needed basis; maintain vehicles in good operating condition	Potential for exposure to contaminated prey or forage species is low	No	High	Monitor contaminant levels in vegetation and possible other indicators
	POSITIVE - Possible increased living opportunities for small mammals (e.g., Arctic ground squirrel) in or under facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Small mammals (e.g., Arctic Hare) may find refuge from predators under buildings and structures	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey and forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for small mammals to consume contaminated prey or forage species is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B10.1: Raptors Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significanc e of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active raptor nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active raptor nest sites; monitor response of nesting raptors to noise and activity; implement employee awareness programs
Dykes												
East Dyke	No measurable effect anticipated from small area of habitat loss; see Small Mammals and Vegetation Cover matrices for more information	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
West Dyke	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage South Dyke	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	NA – dykes are not constructed until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake and Portage Pit (3 rd Portage Lake)	Minor loss and disturbance of terrestrial foraging habitat; loss of wetland foraging habitat, however waterbird (i.e., prey) productivity is low	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduces habitat disturbance	Due to small amount of terrestrial habitat impacted and low prey productivity of dewatered lakes, residual effects are considered to be small	No	High	None specific to raptors recommended; revegetate on an as-required basis
Goose Island (3 rd Portage Lake)	NA since activity does not occur until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage Pit	Loss and disturbance of terrestrial foraging habitat due to overburden stripping	Low	Local	Contin	Perman	All Year	No	Minimize width of pits and overall habitat loss	Loss of some terrestrial habitat is permanent but considered to be low because habitat is not limiting and nesting raptors have not been documented in the area	No	Certain	None specific to raptors recommended; revegetate on an as-required basis

Table B10.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significanc e of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island Pit	NA since pit is not developed until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Loss and disturbance of terrestrial foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	None specific to raptors recommended; revegetate on an as-required basis
Tailings Facilities (2 nd Portage Lake)	NA since activity not until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging habitat	No	Certain	None specific to raptors recommended (see Vegetation Cover matrices for more habitat-specific recommendations
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; raptors have right-of-way	Potential for vehicle/raptor collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document raptor sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident raptors is very low; potential exposure is seasonal for most raptor species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators

Table B10.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required airstrip size	Minor alteration and loss of foraging habitat	No	Certain	None specific to raptors recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to air traffic/bird collisions	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings; report all raptors observed in area to pilots	Due to low densities of raptors in the area and no known active nests, the likelihood of a plane/raptor collisions is considered extremely unlikely	No	Moderat	Pilots are required to report all raptor/plane collisions and near misses; habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting raptors
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent and raptors have not been observed nesting in the vicinity of the airstrip	No	High	Habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting raptors
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident raptors are extremely unlikely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip

Table B10.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities	Loss of foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize footprint of mine facilities; clearly delineate footprint to reduce habitat degradation in surrounding areas	Permanent foraging habitat loss on a local level	No	Certain	Revegetate areas disturbed during construction
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	All Year	No	Use dust suppressant techniques on an as-needed basis; maintain vehicles in good operating condition	Potential for exposure to contaminated prey is very low because of low raptor densities in the area and the unlikely event that resident raptors will be supported by a high percentage of prey from contaminated areas	No	High	Monitor contaminant levels in vegetation and possible other indicators
Freshwater Intake and Pipeline	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Power Lines and Poles	Potential for electrocution and collision resulting in mortality	Low	Local	Infreqnt	Short	All Year	No	Powerlines will be built in such a way that (e.g., placement of electric wires) that the potential for electrocution is minimized; consideration may be given to marking power lines to increase visibility to raptors, particularly in poor light conditions	With mitigation and because of low densities of raptors in the vicinity of the proposed mine, the potential residual effects (i.e., raptor mortality) is very low.	No	Moderat	Report all bird strikes or mortalities related to power lines
	POSITIVE - Improved perching opportunities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for raptors to consume contaminated prey is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for raptors to consume contaminated prey is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active raptor nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active raptor nest sites; monitor response of nesting raptors to noise and activity; implement employee awareness programs
Dyke	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	NA since dewatering will not occur until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	NA since pit construction will occur during operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significanc e of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Waste Dump	Loss and disturbance of terrestrial foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	None specific to raptors recommended; revegetate on an as-required basis
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging habitat	No	Certain	None specific to raptors recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; raptors have right-of-way	Potential for vehicle/raptor collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document raptor sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident raptors is very low; potential exposure is seasonal for most raptor species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												

Table B10.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/bird collisions is expected to be very low because of the extremely low densities of raptors occurring in winter	Low	Regional	Contin	Short	Winter	No	Minimize vehicular traffic and speeds; Raptors have the right-of-way	Potential for vehicle/raptor collisions in winter is expected to be very low	No	Improb	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
Baker Lake Access Road and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging habitat	No	Certain	None specific to raptors recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; raptors have right-of-way	Potential for vehicle/raptor collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document raptor sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident raptors is very low; potential exposure is seasonal for most raptor species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Barge Landing Facility	No measurable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Potential Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
In-town Staging Facility	Minor loss and disturbance of terrestrial foraging and possible nesting (Parasitic Jaeger) habitat	Low	Local	Contin	Perman	All Year	No	Minimize footprint of facilities; clearly delineate footprint to reduce habitat degradation in surrounding areas	Permanent foraging habitat loss on a local level	No	Certain	Revegetate areas disturbed during construction; monitor the locations of nesting raptors (including jaegers) in the area
Explosives Magazine	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for raptors to consume contaminated prey is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for raptors to consume contaminated prey is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B10.2: Raptors Impact Matrix – Operation

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active raptor nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active raptor nest sites; monitor response of nesting raptors to noise and activity; implement employee awareness programs
Dykes												
East, West and Portage South Dykes	No measurable effect anticipated due to small loss of terrestrial habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – natural revegetation of dyke areas may provide living opportunities for prey and foraging opportunities for raptors; dykes may also provide roosting locations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake	NA since dewatering completed prior to operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage Pit (3 rd Portage Lake)	NA since dewatering completed prior to operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island (3 rd Portage Lake)	Minor loss and disturbance of terrestrial foraging habitat; loss of wetland foraging habitat, however waterbird (i.e., prey) productivity is low	Low	Local	Infreqnt	Short	Summer	No	None recommended	Due to small amount of terrestrial habitat impacted and low prey productivity of dewatered lakes, residual effects are considered to be small	No	High	None specific to raptors recommended; revegetate on an as-required basis
Pits												
Portage and Goose Island Pits	No obvious effects anticipated with the exception of noise and activity above	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Possible increased nesting and perching opportunities for raptors on pit walls	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Waste Dump (Portage/Goose)	Loss and disturbance of terrestrial foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	None specific to raptors recommended; revegetate on an as-required basis
Tailings Facilities (2 nd Portage Lake)	Loss and disturbance of terrestrial foraging habitat around edge of lake to four metres above current lake elevation	Low	Local	Contin	Perman	All Year	No	Minimize encroachment of tailings into shoreline areas of 2 nd Portage Lake; berm edges if necessary	Residual effect includes permanent loss of vegetation around the shoreline of 2 nd Portage Lake	No	Certain	Environmental monitoring to ensure that only designated areas are impacted by the tailings beach
	Natural revegetation of potentially contaminated tailings beach may occur; prey attracted to these habitats may have elevated contaminant levels	Low	Local	Contin	Perman	All Year	No	Cap facility with appropriate clean material; undertake progressive reclamation activities to improve habitats on areas of tailings deposit that has reached its maximum height	With adequate measures, the potential for raptor contamination is very low	No	Low	Monitor contaminant levels in vegetation on tailings beach; adjust capping material composition and distribution as appropriate

Table B10.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; raptors have right-of-way	Potential for vehicle/raptor collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document raptor sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident raptors is very low; potential exposure is seasonal for most raptor species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators

Table B10.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to air traffic/bird collisions	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings; report all raptors observed in area to pilots	Due to low densities of raptors in the area and no known active nests, the likelihood of a plane/raptor collisions is considered extremely unlikely	No	Moderat	Pilots are required to report all raptor/plane collisions and near misses; habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting raptors
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent and raptors have not been observed nesting in the vicinity of the airstrip	No	High	Habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting raptors
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident raptors are extremely unlikely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip

Table B10.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dust and emissions may cause habitat degradation and increased contaminant loading in prey	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	Monitor raptor nest locations; monitor contaminant levels in vegetation adjacent to mine site
	POSITIVE - Possible increased nesting and perching opportunities for raptors on mine structures and facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Power Lines and Poles	Potential for electrocution and collision resulting in mortality	Low	Local	Infreqnt	Short	All Year	No	Powerlines will be built in such a way that (e.g., placement of electric wires) that the potential for electrocution is minimized; consideration may be given to marking power lines to increase visibility to raptors, particularly in poor light conditions	With mitigation and because of low densities of raptors in the vicinity of the proposed mine, the potential residual effects (i.e., raptor mortality) is very low.	No	Moderat	Report all bird strikes or mortalities related to power lines
	POSITIVE - Improved perching opportunities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Fuel Storage (at Plant site)	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for raptors to consume contaminated prey is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	Potential spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for raptors to consume contaminated prey is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	POSITIVE - Increased habitat availability and reduced disturbance as camps are removed and habitat reclamation is undertaken	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active raptor nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active raptor nest sites; monitor response of nesting raptors to noise and activity; implement employee awareness programs
Dyke(s)	No further disturbance of terrestrial habitat anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering	Minor loss and disturbance of terrestrial foraging habitat; loss of wetland foraging habitat, however waterbird (i.e., prey) productivity is low	Low	Local	Infreqnt	Short	Summer	No	None recommended	Due to small amount of terrestrial habitat impacted and low prey productivity of dewatered lakes, residual effects are considered to be small	No	High	None specific to raptors recommended; revegetate on an as-required basis
Pit	Minor loss and disturbance of terrestrial foraging habitat; loss of wetland foraging habitat, however waterbird (i.e., prey) productivity is low	Low	Local	Infreqnt	Short	Summer	No	None recommended	Due to small amount of terrestrial habitat impacted and low prey productivity of dewatered lakes, residual effects are considered to be small	No	High	None specific to raptors recommended; revegetate on an as-required basis
	POSITIVE - Possible increased nesting and perching opportunities for raptors on pit walls	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Loss and disturbance of terrestrial foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump; undertake progressive reclamation activities	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	None specific to raptors recommended; revegetate progressively and on an as-required basis

Table B10.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; raptors have right-of-way	Potential for vehicle/raptor collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document raptor sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident raptors is very low; potential exposure is seasonal for most raptor species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	No additional loss or disturbance of terrestrial foraging habitat anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
OTHER FACILITIES												
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/bird collisions is expected to be very low because of the extremely low densities of raptors occurring in winter	Low	Regional	Contin	Short	Winter	No	Minimize vehicular traffic and speeds; Raptors have the right-of-way	Potential for vehicle/raptor collisions in winter is expected to be very low	No	Improb	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
Baker Lake Access Road and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; raptors have right-of-way	Potential for vehicle/raptor collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document raptor sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident raptors is very low; potential exposure is seasonal for most raptor species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators

Table B10.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Landing Facility	Potential disruption of raptors (e.g., Parasitic Jaeger) that may be nesting in area	Low	Local	Contin	Short	Summer	No	Streamline unloading and loading activities to minimize amount of time barge is beached	Low probability that parasitic jaegers or other raptors will nest in proximity to facilities	No	Moderat	Monitor the locations of nesting raptors (including jaegers) in the area
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Possible increased nesting and perching opportunities for raptors on structures and facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	Potential spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for raptors to consume contaminated prey is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for raptors to consume contaminated prey is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B10.3: Raptors Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas; minimal effects once mine is fully closed	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active raptor nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active raptor nest sites; monitor response of nesting raptors to noise and activity; implement employee awareness programs
Dykes												
East, West, Portage South, Goose Island and 3 rd Portage Arm Dykes	POSITIVE - Vegetation will naturally become established on dykes providing living areas for small mammals and small birds and foraging opportunities for raptors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake, Portage Pit (3 rd Portage Lake) and Goose Island (3 rd Portage Lake)	NA since dewatering completed prior to closure phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage and Goose Pits	Dykes will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging habitat for raptors	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases in small mammal and bird prey for raptors	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	Pits walls used for nesting or perching by raptors will be inundated with water	High	Local	Rare	Perman	All Year	Yes	Ensure that raptors are discouraged from nesting on pit walls during operations phase	If no nesting raptors are present, magnitude of impacts is low	No	Certain	See Abandonment & Restoration Plan
	POSITIVE - Emergent vegetation may grow if a littoral zone is established around edges of pits providing living and nesting opportunities for small mammals and birds, potential prey for raptors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits providing living and nesting opportunities for small mammals and birds, potential prey for raptors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved living conditions for raptor prey such as small mammals and small birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailings Facilities (2 nd Portage Lake)	POSITIVE – Native vegetation will naturally become reestablished on the tailings beach providing improved living conditions for raptor prey such as small mammals and small birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vegetation growing on tailings may be contaminated leading to elevated contaminant levels in small mammals and birds and possibly raptors	Medium	Local	Contin	Perman	All year	Yes	Ensure that tailings deposit is capped with clean material	With reduced contaminant uptake in vegetation, potential impacts are considered to be of low magnitude	Low	High	Monitor contaminant levels in vegetation and possibly other indicators

Table B10.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; raptors have right-of-way	Potential for vehicle/raptor collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document raptor sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; the potential for this effect will reduce substantially after mine closure; some potential contamination if they utilize reclaimed road surfaces (see below)	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident raptors is very low; potential exposure is seasonal for most raptor species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Prey species (e.g., passerines and ptarmigan) may be attracted to reclaimed road bed areas for roosting, foraging and possibly nesting once vegetation has become reestablished	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	No additional habitat loss or disturbance anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to air traffic/bird collisions; risk of this effect will decline substantially after mine closure	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings; report all raptors observed in area to pilots	Due to low densities of raptors in the area and no known active nests, the likelihood of a plane/raptor collision is considered extremely unlikely	No	Moderat	Pilots are required to report all raptor/plane collisions and near misses; habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting raptors
	Reduced habitat effectiveness in adjacent areas due to noise and activity; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent and raptors have not been observed nesting in the vicinity of the airstrip	No	High	Habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting raptors
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident raptors are extremely unlikely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip

Table B10.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities	Concrete foundation and footprint of other ancillary facilities will result in permanent habitat loss and disturbance	Low	Local	Contin	Perman	All Year	No	Remove any contamination sources from around the plant; recontour surrounding area and restore original drainage patterns to the extent possible; stabilize slopes	Some permanent vegetation loss	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
Freshwater Intake and Pipeline	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	No measurable effect anticipated from small area of habitat loss; potential for spills is substantially reduced	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage/ Explosives Magazines	No measurable effect anticipated from small area of habitat loss; no further potential for spills	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camps (North and South)	NA – Reclamation activities undertaken during Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas; minimal effects once mine is fully closed	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active raptor nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active raptor nest sites; monitor response of nesting raptors to noise and activity; implement employee awareness programs

Table B10.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dyke	POSITIVE - Vegetation will naturally become established on dyke providing living areas for small mammals and small birds and foraging opportunities for raptors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering	NA since dewatering completed prior to closure phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	Dyke will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging habitat for raptors	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases in small mammal and bird prey for raptors	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	Pits walls used for nesting or perching by raptors will be inundated with water	High	Local	Rare	Perman	All Year	Yes	Ensure that raptors are discouraged from nesting on pit walls during operations phase	If no nesting raptors are present, magnitude of impacts is low	No	Certain	See Abandonment & Restoration Plan
	POSITIVE - Emergent vegetation may grow if a littoral zone is established around edges of pits providing living and nesting opportunities for small mammals and birds, potential prey for raptors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits providing living and nesting opportunities for small mammals and birds, potential prey for raptors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved living conditions for raptor prey such as small mammals and small birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved living conditions for raptor prey such as small mammals and small birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; raptors have right-of-way	Potential for vehicle/raptor collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document raptor sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; the potential for this effect will reduce substantially after mine closure; some potential contamination if rey utilize reclaimed road surfaces (see below)	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident raptors is very low; potential exposure is seasonal for most raptor species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Prey species (e.g., passerines and ptarmigan) may be attracted to reclaimed road bed areas for roosting, foraging and possibly nesting once vegetation has become reestablished	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
OTHER FACILITIES												
Winter Road and Traffic	The probability of mortality due to vehicle/bird collisions is expected to be very low because of the extremely low densities of raptors occurring in winter, and reduce use following mine closure	Low	Regional	Contin	Short	Winter	No	Minimize vehicular traffic and speeds; Raptors have the right-of-way	Potential for vehicle/raptor collisions in winter is expected to be very low	No	Improb	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
Baker Lake Access Road and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions; the potential for this effect is expected to decline after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; raptors have right-of-way	Potential for vehicle/raptor collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with raptors; a wildlife log will be maintained to document raptor sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect is expected to decline after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document raptor sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; the potential for this effect is expected to decline after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident raptors is very low; potential exposure is seasonal for most raptor species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Barge Landing Facility	No measureable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B10.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
In-town Staging Facility	No further habitat loss or disturbance anticipated; facility will likely not be decommissioned	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Possible increased nesting and perching opportunities for raptors on structures and facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B11.1: Waterfowl Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active waterfowl nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active waterfowl nest sites; monitor response of nesting waterfowl to noise and activity; implement employee awareness programs
Dykes												
East Dyke	No measurable effect anticipated from small area of habitat loss; see Small Mammals and Vegetation Cover matrices for more information	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Disruption of natural movement patterns along lakeshores and across lakes	Low	Local	Contin	Short	Summer	No	None recommended	Some disruption of waterfowl movement, however, waterfowl populations are at low densities in the study area	No	High	None recommended
West Dyke	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Disruption of natural movement patterns along lakeshores and across lakes	Low	Local	Contin	Short	Summer	No	None recommended	Some disruption of waterfowl movement, however, waterfowl populations are at low densities in the study area	No	High	None recommended
Portage South Dyke	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Disruption of natural movement patterns along lakeshores and across lakes	Low	Local	Contin	Short	Summer	No	None recommended	Some disruption of waterfowl movement, however, waterfowl populations are at low densities in the study area	No	High	None recommended
Goose Island and 3 rd Portage Arm Dykes	NA – dykes are not constructed until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering												
2 nd Portage Lake and Portage Pit (3 rd Portage Lake)	Major loss of wetland foraging and roosting habitat	High	Local	Infreqnt	Perman	Summer	Yes	Ensure that nesting waterfowl are not directly impacted by drawdown	Because of low breeding densities of waterfowl in the study area, it is unlikely that significant residual effect swill occur, therefore magnitude and residual effects will likely be low	No	High	Undertake waterfowl nest surveys to reduce possibility that nesting birds are impacted by dewatering activities
	Minor loss and disturbance of terrestrial foraging, roosting and nesting habitat	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduces habitat disturbance	Due to small amount of terrestrial habitat impacted, residual effects are considered to be small	No	High	None specific to waterfowl recommended; revegetate on an as-required basis
Goose Island (3 rd Portage Lake)	NA since activity does not occur until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage Pit	Loss and disturbance of terrestrial foraging, roosting and nesting habitat due to overburden stripping	Low	Local	Contin	Perman	All Year	No	Minimize width of pits and overall habitat loss	Loss of some terrestrial habitat is permanent but considered to be low because habitat is not limiting and nesting waterfowl have not been documented in the area	No	Certain	None specific to waterfowl recommended; revegetate on an as-required basis
Goose Island Pit	NA since pit is not developed until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Loss and disturbance of terrestrial foraging, roosting and nesting habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump	Residual effect is permanent loss of some terrestrial and wetland habitat types	No	Certain	None specific to waterfowl recommended; revegetate on an as-required basis

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Facilities (2 nd Portage Lake)	NA since activity not until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging and roosting habitat	No	Certain	None specific to waterfowl recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; waterfowl have right-of-way	Potential for vehicle/waterfowl collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with waterfowl; a wildlife log will be maintained to document waterfowl sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document waterfowl sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required airstrip size	Minor alteration and loss of foraging and roosting habitat	No	Certain	None specific to waterfowl recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to air traffic/bird collisions	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings; report all waterfowl (e.g., congregations of Canada and snow geese) observed in area to pilots; use aversive techniques to move roosting flocks of geese away from the runway area	Due to low densities of waterfowl in the area and no known active nests, the likelihood of plane/waterfowl collisions during the breeding seasons is unlikely; potential collisions during the migratory period (particularly in the fall) is somewhat more likely but will be mitigated by using aversive techniques when geese are observed in the area	No	Moderat	Pilots are required to report all waterfowl/plane collisions and near misses; habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting or roosting waterfowl
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent and waterfowl have not been observed nesting in the vicinity of the airstrip	No	High	Habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting waterfowl
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities Freshwater Intake and Pipeline Discharge Facilities and Pipeline(s) Non-contact Diversion Facilities Power Lines and Poles	Loss and avoidance of foraging and roosting habitat	Low	Local	Contin	Long	All Year	No	Mimimize footprint of mine plant site and ancillary facilities; comply with construction plan and schedule; minimize degradation of surrounding area	Residual effects limited to a localized area	No	Certain	None specific to waterfowl recommended; revegetate areas disturbed during construction
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in food sources	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	None specific to waterfowl recommended; monitor contaminant levels in vegetation adjacent to mine site
	Minor loss of foraging and roosting habitat	Low	Local	Contin	Long	All Year	No	Construct pipeline to minimize impact to terrestrial environment	Minor alteration of vegetation communities	No	Certain	Revegetate areas disturbed during construction
	Minor loss of foraging and roosting habitat	Low	Local	Contin	Long	All Year	No	Construct pipeline to minimize impact to terrestrial environment	Minor alteration of vegetation communities	No	Certain	Revegetate areas disturbed during construction
	Minor habitat loss and disturbance associated with diversion ditches and associated structures	Low	Local	Contin	Perman	Summer	No	Construct diversion ditches in such a way as to minimize potential for erosion	Minor foraging habitat loss and alteration	No	Certain	Revegetate areas disturbed during construction; natural revegetation will likely occur

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Potential for electrocution and collision resulting in mortality particularly where lines are situated in close proximity to lakes and ponds	Low	Local	Infreqnt	Long	All Year	No	Powerlines will be built in such a way that (e.g., placement of electric wires) that the potential for electrocution is minimized; consideration may be given to marking power lines to increase visibility to waterfowl, particularly in poor light conditions	With mitigation and because of low densities of waterfowl in the vicinity of the proposed mine, the potential residual effects (i.e., waterfowl mortality) is very low.	No	Moderat	Report all bird strikes or mortalities related to power lines
	Improved perching opportunities for raptors may result in increased depredation rates on waterfowl in a localized area	Low	Local	Infreqnt	Long	All Year	No	None recommended	Potential for increased depredation rates is low and then only at a localized level	No	Moderat	Report all raptors perching on power poles, lines and other mine facilities
Fuel Storage (at Plant site)	No measurable effect anticipated from small area of habitat loss and low quality of habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for waterfowl to consume contaminated forage species is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Emulsion/AN Storage/ Explosives Magazines	No measurable effect anticipated from small area of habitat loss and low quality of habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for waterfowl to consume contaminated forage species is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	No measurable effect anticipated from small area of habitat loss and low quality of habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	No measurable effect anticipated from small area of habitat loss and low quality of habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active waterfowl nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active waterfowl nest sites; monitor response of nesting waterfowl to noise and activity; implement employee awareness programs
Dyke	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Disruption of natural movement patterns along lakeshores and across lakes	Low	Local	Contin	Short	Summer	No	None recommended	Some disruption of waterfowl movement, however, waterfowl populations are at low densities in the study area	No	High	None recommended
Dewatering	NA since dewatering will not occur until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	NA since pit construction will occur during operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Waste Dump	Loss and disturbance of terrestrial foraging, roosting and nesting habitat and a small amount of wetland habitat from overburden stripping	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump	Residual effect is permanent loss of some terrestrial and wetland habitat types	No	Certain	None specific to waterfowl recommended; revegetate on an as-required basis
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging and roosting habitat	No	Certain	None specific to waterfowl recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; waterfowl have right-of-way	Potential for vehicle/waterfowl collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with waterfowl; a wildlife log will be maintained to document waterfowl sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document waterfowl sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Access Road Culverts (Turn Lake)	Disruption of movement opportunities for waterfowl	Low	Local	Contin	Medium	Summer	No	None recommended	Residual effects are considered to be low due to low waterfowl densities and ability for waterfowl to fly around obstructions	No	Certain	None recommended

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Non-contact Diversion Facilities	Minor habitat loss and disturbance associated with diversion ditches and associated structures	Low	Local	Contin	Perman	Summer	No	Construct diversion ditches in such a way as to minimize potential for erosion	Minor foraging habitat loss and alteration	No	Certain	Revegetate areas disturbed during construction; natural revegetation will likely occur
Mine Shop/ Office	No measurable effect anticipated from small area of habitat loss and low quality of habitat affected	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/bird collisions is nil due to the absence of waterfowl in the area during winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baker Lake Access Road and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging and roosting habitat	No	Certain	None specific to waterfowl recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; waterfowl have right-of-way	Potential for vehicle/waterfowl collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with waterfowl; a wildlife log will be maintained to document waterfowl sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document waterfowl sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Landing Facility	Disruption of movement opportunities for waterfowl moving along Baker Lake foreshore	Low	Local	Contin	Medium	Summer	No	None recommended	Barge landings are very infrequent, therefore potential for disruption of waterfowl movement is considered to be very low	No	Moderat	None recommended
Barge Traffic	Displacement of waterfowl roosting in marine areas and on Baker Lake	Low	Regiona l	Infreqnt	Short	Summer	No	None recommended	Potential for interactions between waterfowl and barges is expected to be extremely low	No	Low	None recommended
In-town Staging Facility	Loss and avoidance of foraging and roosting habitat	Low	Local	Contin	Long	All Year	No	Mimimize footprint of facilities; comply with construction plan and schedule; minimize degradation of surrounding area	Residual effects limited to a localized area	No	Certain	None specific to waterfowl recommended; revegetate areas disturbed during construction
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in food sources	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	None specific to waterfowl recommended; monitor contaminant levels in vegetation adjacent to mine site
Explosives Magazine	No measurable effect anticipated from small area of habitat loss and low quality foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for waterfowl to consume contaminated forage species is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B11.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for waterfowl to consume contaminated forage species is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B11.2: Waterfowl Impact Matrix – Operation

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active waterfowl nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active waterfowl nest sites; monitor response of nesting waterfowl to noise and activity; implement employee awareness programs
Dykes												
East, West and Portage South Dykes	No measurable effect anticipated due to small loss of terrestrial habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Disruption of natural movement patterns along lakeshores and across lakes	Low	Local	Contin	Short	Summer	No	None recommended	Some disruption of waterfowl movement, however, waterfowl populations are at low densities in the study area	No	High	None recommended
	POSITIVE – natural revegetation of dyke areas may provide foraging and roosting opportunities for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Disruption of natural movement patterns along lakeshores and across lakes	Low	Local	Contin	Short	Summer	No	None recommended	Some disruption of waterfowl movement, however, waterfowl populations are at low densities in the study area	No	High	None recommended
Dewatering												
2 nd Portage Lake	NA since dewatering completed prior to operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Portage Pit (3 rd Portage Lake)	NA since dewatering completed prior to operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island (3 rd Portage Lake)	Loss of wetland foraging and roosting habitat	Medium	Local	Infreqnt	Perman	Summer	No	Ensure that nesting waterfowl are not directly impacted by drawdown	Because of low breeding densities of waterfowl in the study area, it is unlikely that significant residual effects will occur, therefore magnitude and residual effects will likely be low	No	High	Undertake waterfowl nest surveys to reduce possibility that nesting birds are impacted by dewatering activities
	Minor loss and disturbance of terrestrial foraging, roosting and nesting habitat	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduces habitat disturbance	Due to small amount of terrestrial habitat impacted, residual effects are considered to be small	No	High	None specific to waterfowl recommended; revegetate on an as-required basis

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage and Goose Island Pit	Waterfowl may be attracted to ponded and potentially contaminated water at the bottom of pits	High	Local	Contin	Short	Summer	Yes	Pump water out of pits to tailings pond; use aversive techniques to keep waterfowl away from potentially contaminated water	Due to low waterfowl densities in the study area and the presence of abundant habitat outside the impact area, waterfowl are unlikely to utilize ponded areas at the bottom of pits; for birds that do, aversive techniques will minimize waterfowl exposure to potential contamination; with mitigation, magnitude is low	No	Moderat	Monitor use of pit ponds by waterfowl; use sirens or other noise device to scare waterfowl away
Waste Dump (Portage/Goose)	Ongoing loss and disturbance of terrestrial foraging, roosting and nesting habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump	Residual effect is permanent loss of some terrestrial and wetland habitat types	No	Certain	None specific to waterfowl recommended; revegetate on an as-required basis

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tailings Facilities (2 nd Portage Lake)	Waterfowl may be attracted to tailings pond with elevated levels of contaminated water	High	Local	Contin	Short	Summer	Yes	Use aversive techniques to keep waterfowl away from potentially contaminated water	Due to low waterfowl densities in the study area and the presence of abundant habitat outside the impact area, waterfowl are not expected to congregate on the tailings pond; for birds that attempt to, aversive techniques will minimize waterfowl exposure to potential contamination; with mitigation, magnitude is low	No	Moderat	Monitor use of tailing ponds by waterfowl; use sirens or other noise device to scare waterfowl away
	Loss and disturbance of terrestrial foraging and roosting habitat around edge of lake to four metres above current lake elevation	Low	Local	Contin	Perman	All Year	No	Minimize encroachment of tailings into shoreline areas of 2 nd Portage Lake; berm edges if necessary	Residual effect includes permanent loss of vegetation around the shoreline of 2 nd Portage Lake	No	Certain	Environmental monitoring to ensure that only designated areas are impacted by the tailings beach

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Natural revegetation of potentially contaminated tailings beach may occur; waterfowl may be exposed to contamination if contaminants are elevated in plant species	Low	Local	Contin	Perman	All Year	No	Cap facility with appropriate clean material; undertake progressive reclamation activities to improve habitats on areas of tailings deposit that has reached its maximum height	With adequate measures, the potential for waterfowl contamination is very low	No	Low	Monitor contaminant levels in vegetation on tailings beach; adjust capping material composition and distribution as appropriate
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging and roosting habitat	No	Certain	None specific to waterfowl recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; waterfowl have right-of-way	Potential for vehicle/waterfowl collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with waterfowl; a wildlife log will be maintained to document waterfowl sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document waterfowl sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required airstrip size	Minor alteration and loss of foraging and roosting habitat	No	Certain	None specific to waterfowl recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to air traffic/bird collisions	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings; report all waterfowl (e.g., congregations of Canada and snow geese) observed in area to pilots; use aversive techniques to move roosting flocks of geese away from the runway area	Due to low densities of waterfowl in the area and no known active nests, the likelihood of plane/waterfowl collisions during the breeding seasons is unlikely; potential collisions during the migratory period (particularly in the fall) is somewhat more likely but will be mitigated by using aversive techniques when geese are observed in the area	No	Moderat	Pilots are required to report all waterfowl/plane collisions and near misses; habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting or roosting waterfowl

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent and waterfowl have not been observed nesting in the vicinity of the airstrip	No	High	Habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting waterfowl
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip
Mine Plant and Associated Facilities	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dust and emissions may cause habitat degradation and increased contaminant loading in forage species	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	Monitor waterfowl nest locations; monitor contaminant levels in vegetation adjacent to mine site
Freshwater Intake and Pipeline	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Discharge Facilities and Pipeline(s)	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Contaminant levels may be elevated in receiving environment in vicinity of discharge point and may impact waterfowl using the area	Low	Local	Contin	Long	Summer	No	Discharge will be treated to ensure that contaminant levels meet regulatory guidelines (see Mine Waste and Water Management Plan)	Low likelihood of waterfowl presence in the vicinity of the discharge point and treatment of discharge effluent will ensure that residual impacts are very low	No	Moderat	Mine Waste and Water Management Plan
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	Waterfowl may be attracted to reclaim pond with elevated levels of contaminated water	High	Local	Contin	Short	Summer	Yes	Use aversive techniques to keep waterfowl away from potentially contaminated water	Due to low waterfowl densities in the study area and the presence of abundant habitat outside the impact area, waterfowl are not expected to congregate on the reclaim pond; for birds that attempt to, aversive techniques will minimize waterfowl exposure to potential contamination; with mitigation, magnitude is low	No	Moderat	Monitor use of reclaim pond by waterfowl; use sirens or other noise device to scare waterfowl away

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Power Lines and Poles	Potential for electrocution and collision resulting in mortality particularly where lines are situated in close proximity to lakes and ponds	Low	Local	Infreqnt	Long	All Year	No	Powerlines will be built in such a way that (e.g., placement of electric wires) that the potential for electrocution is minimized; consideration may be given to marking power lines to increase visibility to waterfowl, particularly in poor light conditions	With mitigation and because of low densities of waterfowl in the vicinity of the proposed mine, the potential residual effects (i.e., waterfowl mortality) is very low.	No	Moderat	Report all bird strikes or mortalities related to power lines
	Improved perching opportunities for raptors may result in increased depredation rates on waterfowl in a localized area	Low	Local	Infreqnt	Long	All Year	No	None recommended	Potential for increased depredation rates is low and then only at a localized level	No	Moderat	Report all raptors perching on power poles, lines and other mine facilities
Fuel Storage (at Plant site)	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in forage species	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contaminatio n is low and potential for waterfowl to consume contaminated forage species is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	Potential spills may degrade surrounding habitats and increase contaminant loading in forage specie	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contaminatio n is low and potential for waterfowl to consume contaminated forage species is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	POSITIVE - Increased habitat availability and reduced disturbance as camps are removed and habitat reclamation is undertaken	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Sewage and Solid Waste Disposal	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active waterfowl nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active waterfowl nest sites; monitor response of nesting waterfowl to noise and activity; implement employee awareness programs
Dyke	No measurable effect anticipated due to small loss of terrestrial habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Disruption of natural movement patterns along lakeshores and across lakes	Low	Local	Contin	Short	Summer	No	None recommended	Some disruption of waterfowl movement, however, waterfowl populations are at low densities in the study area	No	High	None recommended
	POSITIVE – natural revegetation of dyke areas may provide foraging and roosting opportunities for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering	Major loss of wetland foraging and roosting habitat	High	Local	Infreqnt	Perman	Summer	Yes	Ensure that nesting waterfowl are not directly impacted by drawdown	Because of low breeding densities of waterfowl in the study area, it is unlikely that significant residual effects will occur, therefore magnitude and residual effects will likely be low	No	High	Undertake waterfowl nest surveys to reduce possibility that nesting birds are impacted by dewatering activities
	Minor loss and disturbance of terrestrial foraging, roosting and nesting habitat	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduces habitat disturbance	Due to small amount of terrestrial habitat impacted, residual effects are considered to be small	No	High	None specific to waterfowl recommended; revegetate on an as-required basis

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pit	Waterfowl may be attracted to ponded and potentially contaminated water at the bottom of pit	High	Local	Contin	Short	Summer	Yes	Use aversive techniques to keep waterfowl away from potentially contaminated water	Due to low waterfowl densities in the study area and the presence of abundant habitat outside the impact area, waterfowl are unlikely to utilize ponded areas at the bottom of the pit; for birds that do, aversive techniques will minimize waterfowl exposure to potential contamination; with mitigation, magnitude is low	No	Moderat	Monitor use of pit pond by waterfowl; use sirens or other noise device to scare waterfowl away
Waste Dump	Ongoing loss and disturbance of terrestrial foraging, roosting and nesting habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump	Residual effect is permanent loss of some terrestrial and wetland habitat types	No	Certain	None specific to waterfowl recommended; revegetate on an as-required basis

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging and roosting habitat	No	Certain	None specific to waterfowl recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; waterfowl have right-of-way	Potential for vehicle/waterf owl collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with waterfowl; a wildlife log will be maintained to document waterfowl sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document waterfowl sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Access Road Culverts (Turn Lake)	Disruption of movement opportunities for waterfowl	Low	Local	Contin	Medium	Summer	No	None recommended	Residual effects are considered to be low due to low waterfowl densities and ability for waterfowl to fly around obstructions	No	Certain	None recommended
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	No additional loss or disturbance of terrestrial foraging habitat anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/bird collisions is nil due to the absence of waterfowl in the area during winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baker Lake Access Road and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions	Minor alteration and loss of foraging and roosting habitat	No	Certain	None specific to waterfowl recommended (see Vegetation Cover matrices for more habitat-specific recommendations)
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; waterfowl have right-of-way	Potential for vehicle/waterfowl collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with waterfowl; a wildlife log will be maintained to document waterfowl sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document waterfowl sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Barge Landing Facility	Disruption of movement opportunities for waterfowl moving along Baker Lake foreshore	Low	Local	Contin	Medium	Summer	No	None recommended	Barge landings are very infrequent, therefore potential for disruption of waterfowl movement is considered to be very low	No	Moderat	None recommended

Table B11.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Barge Traffic	Displacement of waterfowl roosting in marine areas and on Baker Lake	Low	Regional	Infrequent	Short	Summer	No	None recommended	Potential for interactions between waterfowl and barges is expected to be extremely low	No	Low	None recommended
In-town Staging Facility	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	Potential spills may degrade surrounding habitats and increase contaminant loading in forage species	Low	Local	Infrequent	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for waterfowl to consume contaminated forage species is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in forage species	Low	Local	Infrequent	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for waterfowl to consume contaminated forage species is much lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B11.3: Waterfowl Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan	
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects	Residual Effects/ Influence of Mitigation		Significance of Residual Impacts	Probability			
		Magnitude	Spatial Extent	Frequency	Duration						Timing		
MAIN FACILITIES													
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas; minimal effects once mine is fully closed	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active waterfowl nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active waterfowl nest sites; monitor response of nesting waterfowl to noise and activity; implement employee awareness programs	
Dykes													
East, West, Portage South, Goose Island and 3 rd Portage Arm Dykes	Waterfowl (e.g. Canada Goose and Snow Goose) may be attracted to dyke areas during migration for roosting and foraging; risk of exposure to elevated contaminants in dyke materials	Low	Local	Contin	Perman	Summer	No	Ensure that dyke materials are inert and do not contribute unacceptable contaminant levels into the environment; see Mine Waste and Water Management Plan (EIA Appendix ??)	Elevated contaminant levels are not expected in vegetation growing on dykes, therefore residual effects are considered to be low	No	High	Sample vegetation on dyke areas to determine contaminant levels; see Wildlife Management Plan	
	Minor loss and disturbance of potential roosting and nesting habitat on dykes when dykes are breached for reflooding of Portage and Goose Island pits	Low	Local	Infreqnt	Medium	Summer	No	Do not breach dykes in areas identified during operations as providing high quality nesting habitat for waterfowl; do not breach dykes during the nesting period if nesting waterfowl are identified in the area	Due to low densities of breeding waterfowl in the study area, residual effects of dyke breaching are expected to be low	No	Moderat	Monitor waterfowl nest locations	
	POSITIVE - Vegetation will naturally become established on dykes providing living areas waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Creation of natural movement patterns within localized area (i.e., in areas once isolated by dykes)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering												
2 nd Portage Lake, Portage Pit (3 rd Portage Lake) and Goose Island (3 rd Portage Lake)	NA since dewatering completed prior to closure phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage Pit	Waterfowl will be attracted to lakes formed after reflooding of Portage and Goose pit and may be exposed to potentially contaminated water	Medium	Local	Contin	Perman	Summer	Yes	Ensure new lake waters do not contain unacceptable levels of contaminants; treat contaminated water inputs prior to discharge; see Aquatic Environmental Management Plan and Mine Waste and Water Management Plan	Residual impacts are expected to be low if mitigation measures are implemented and because waterfowl densities are low in the study area	No	High	Monitor use of lakes by waterfowl
	Dykes will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging habitat for waterfowl	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases in waterfowl use	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	POSITIVE - Emergent vegetation may grow if a littoral zone is established around edges of pits providing living and nesting opportunities for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits providing living and nesting opportunities for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Waste Dump (Portage/Goose)	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved foraging and roosting opportunities for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vegetation growing on waste rock piles may be contaminated leading to elevated contaminant levels in waterfowl	Medium	Local	Contin	Perman	All year	Yes	Ensure that capping materials are inert and do not contribute unacceptable contaminant levels into the environment	With reduced contaminant uptake in vegetation, potential impacts are considered to be of low magnitude	Low	High	Monitor contaminant levels in vegetation and possibly other indicators
Tailings Facilities (2 nd Portage Lake)	POSITIVE – Native vegetation will naturally become reestablished on the tailings providing improved foraging and roosting opportunities for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vegetation growing on tailings may be contaminated leading to elevated contaminant levels in waterfowl	Medium	Local	Contin	Perman	All year	Yes	Ensure that capping materials are inert and do not contribute unacceptable contaminant levels into the environment	With reduced contaminant uptake in vegetation, potential impacts are considered to be of low magnitude	Low	High	Monitor contaminant levels in vegetation and possibly other indicators

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; waterfowl have right-of-way	Potential for vehicle/waterf owl collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with waterfowl; a wildlife log will be maintained to document waterfowl sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document waterfowl sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated forage species within diet of locally resident waterfowl is likely low; potential exposure is very seasonal for most waterfowl species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE – Waterfowl may be attracted to reclaimed road bed areas for roosting, foraging and possibly nesting once vegetation has become reestablished	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	No additional habitat loss or disturbance anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to air traffic/bird collisions; risk of this effect will decline substantially after mine closure	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings; report all waterfowl observed in area to pilots	Due to low densities of waterfowl in the area and no known active nests, the likelihood of a plane/waterfo wl collision is considered extremely unlikely	No	Moderat	Pilots are required to report all waterfowl/plane collisions and near misses; habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting waterfowl
	Reduced habitat effectiveness in adjacent areas due to noise and activity; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent and waterfowl have not been observed nesting in the vicinity of the airstrip	No	High	Habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting waterfowl
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in forage species; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident waterfowl are extremely unlikely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities	Concrete foundation and footprint of other ancillary facilities will result in permanent habitat loss and disturbance	Low	Local	Contin	Perman	All Year	No	Remove any contamination sources from around the plant; recontour surrounding area and restore original drainage patterns to the extent possible; stabilize slopes	Some permanent vegetation loss	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan
Freshwater Intake and Pipeline	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Reduction in contaminant levels in receiving environment in vicinity of discharge point	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	Waterfowl may be attracted to reclaim pond with elevated levels of contaminated water, although levels of contamination are expected to decline significantly followign closure	High	Local	Contin	Short	Summer	Yes	Use aversive techniques to keep waterfowl away from potentially contaminated water	Due to low waterfowl densities in the study area and the presence of abundant habitat outside the impact area, waterfowl are not expected to congregate on the reclaim pond; for birds that attempt to, aversive techniques will minimize waterfowl exposure to potential contamination ; with mitigation, magnitude is low	No	Moderat	Monitor use of reclaim pond by waterfowl; use sirens or other noise device to scare waterfowl away

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	No measurable effect anticipated from small area of habitat loss; potential for spills is substantially reduced	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage/ Explosives Magazines	No measurable effect anticipated from small area of habitat loss; no further potential for spills	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camps (North and South)	NA – Reclamation activities undertaken during Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas; minimal effects once mine is fully closed	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active waterfowl nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active waterfowl nest sites; monitor response of nesting waterfowl to noise and activity; implement employee awareness programs

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dyke	Waterfowl (e.g. Canada Goose and Snow Goose) may be attracted to dyke areas during migration for roosting and foraging; risk of exposure to elevated contaminants in dyke materials	Low	Local	Contin	Perman	Summer	No	Ensure that dyke materials are inert and do not contribute unacceptable contaminant levels into the environment; see Mine Waste and Water Management Plan	Elevated contaminant levels are not expected in vegetation growing on dykes, therefore residual effects are considered to be low	No	High	Sample vegetation on dyke areas to determine contaminant levels; see Wildlife Management Plan
	Minor loss and disturbance of potential roosting and nesting habitat on dyke when dyke are breached for reflooding of Vault pit	Low	Local	Infreqnt	Medium	Summer	No	Do not breach dyke in areas identified during operations as providing high quality nesting habitat for waterfowl; do not breach dyke during the nesting period if nesting waterfowl are identified in the area	Due to low densities of breeding waterfowl in the study area, residual effects of dyke breaching are expected to be low	No	Moderat	Monitor waterfowl nest locations
	POSITIVE - Vegetation will naturally become established on dyke providing living areas for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Creation of natural movement patterns within localized area (i.e., in areas once isolated by dykes)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering	NA since dewatering completed prior to closure phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	Waterfowl will be attracted to lakes formed after reflooding of Vault pit and may be exposed to potentially contaminated water	Medium	Local	Contin	Perman	Summer	Yes	Ensure new lake waters do not contain unacceptable levels of contaminants; treat contaminated water inputs prior to discharge; see Aquatic Environmental Management Plan and Mine Waste and Water Management Plan	Residual impacts are expected to be low if mitigation measures are implemented and because waterfowl densities are low in the study area	No	High	Monitor use of lakes by waterfowl
	Dyke will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging habitat for waterfowl	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases in waterfowl use	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	POSITIVE – Emergent vegetation may grow if a littoral zone is established around edges of pits providing living and nesting opportunities for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits providing living and nesting opportunities for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Waste Dump	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved foraging and roosting opportunities for waterfowl	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vegetation growing on waste rock piles may be contaminated leading to elevated contaminant levels in waterfowl	Medium	Local	Contin	Perman	All year	Yes	Ensure that capping materials are inert and do not contribute unacceptable contaminant levels into the environment	With reduced contaminant uptake in vegetation, potential impacts are considered to be of low magnitude	Low	High	Monitor contaminant levels in vegetation and possibly other indicators

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; waterfowl have right-of-way	Potential for vehicle/waterf owl collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with waterfowl; a wildlife log will be maintained to document waterfowl sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document waterfowl sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated forage species within diet of locally resident waterfowl is likely low; potential exposure is very seasonal for most waterfowl species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE – Waterfowl may be attracted to reclaimed road bed areas for roosting, foraging and possibly nesting once vegetation has become reestablished	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
OTHER FACILITIES												
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/bird collisions is nil due to the absence of waterfowl in the area during winter	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baker Lake Access Road and Traffic	No additional habitat loss or disturbance anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions; the potential for this effect will decline after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; waterfowl have right-of-way	Potential for vehicle/waterf owl collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with waterfowl; a wildlife log will be maintained to document waterfowl sightings
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will decline after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and absence of nesting birds in the area	No	High	A wildlife log will be maintained to document waterfowl sightings
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in forage species; the potential for this effect will decline after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated forage species within diet of locally resident waterfowl is likely low; potential exposure is very seasonal for most waterfowl species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Barge Landing Facility	No measureable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B11.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
In-town Staging Facility	No further habitat loss or disturbance anticipated; facility will likely not be decommissioned	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B12.1: Other Breeding Birds Impact Matrix – Construction

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active nest sites of songbirds, shorebirds and ptarmigan; monitor response of nesting birds to noise and activity; implement employee awareness programs
Dykes												
East Dyke	Minor loss and disturbance of nesting and foraging habitat on islands and where dykes key into shorelines	Low	Local	Contin	Medium	Summer	No	Minimize area of shorelines encroached by dykes; don't build dykes during the active nesting period or ensure that birds are not nesting in areas that will be disturbed	Small area of terrestrial impact may affect some local breeding pairs of birds, but overall residual effect is considered to be low	No	Certain	Identify and monitor active nest sites of songbirds, shorebirds and ptarmigan
West Dyke	Minor loss and disturbance of nesting and foraging habitat on islands and where dykes key into shorelines	Low	Local	Contin	Medium	Summer	No	Minimize area of shorelines encroached by dykes; don't build dykes during the active nesting period or ensure that birds are not nesting in areas that will be disturbed	Small area of terrestrial impact may affect some local breeding pairs of birds, but overall residual effect is considered to be low	No	Certain	Identify and monitor active nest sites of songbirds, shorebirds and ptarmigan
Portage South Dyke	Minor loss and disturbance of nesting and foraging habitat on islands and where dykes key into shorelines	Low	Local	Contin	Medium	Summer	No	Minimize area of shorelines encroached by dykes; don't build dykes during the active nesting period or ensure that birds are not nesting in areas that will be disturbed	Small area of terrestrial impact may affect some local breeding pairs of birds, but overall residual effect is considered to be low	No	Certain	Identify and monitor active nest sites of songbirds, shorebirds and ptarmigan

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island and 3 rd Portage Arm Dykes	NA – dykes are not constructed until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake and Portage Pit (3 rd Portage Lake)	Minor loss and disturbance of terrestrial foraging and nesting habitat	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduces habitat disturbance	Due to small amount of terrestrial habitat impacted, residual effects are considered to be small	No	High	None specific to birds recommended; revegetate on an as-required basis
Goose Island (3 rd Portage Lake)	NA since activity does not occur until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pits												
Portage Pit	Loss and disturbance of terrestrial foraging habitat due to overburden stripping	Low	Local	Contin	Perman	All Year	No	Minimize width of pits and overall habitat loss; avoid breeding bird window during construction; identify nest sites	Loss of some terrestrial habitat is permanent but considered to be low	No	Certain	Identify and monitor bird nests in proposed overburden stripping area; revegetate on an as-required basis
Goose Island Pit	NA since pit is not developed until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	Loss and disturbance of terrestrial foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump; avoid overburden stripping during breeding bird season; identify nest sites	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	Identify and monitor bird nests in proposed overburden stripping area; revegetate on an as-required basis
Tailings Facilities (2 nd Portage Lake)	NA since activity not until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions; avoid construction of roads during breeding bird season; identify active nests	Minor alteration and loss of foraging habitat	No	Certain	Identify and monitor active nests of songbirds, shorebirds and ptarmigan; see Vegetation Cover matrices for more habitat-specific recommendations

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; birds have right-of-way	Potential for vehicle/bird collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with birds
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of birds to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident birds will likely be low; potential exposure is seasonal for most bird species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Airstrip and Air Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required airstrip size; avoid construction during breeding bird season; identify active nests	Minor alteration and loss of foraging habitat	No	Certain	Identify and monitor active nests of songbirds, shorebirds and ptarmigan in the vicinity of the airstrip; see Vegetation Cover matrices for more habitat-specific recommendations

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Mortality due to air traffic/bird collisions	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings	The potential for a plane/bird collision is considered to be low	No	Moderat	Pilots are required to report all bird/plane collisions and near misses; habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting songbirds, shorebirds, and ptarmigan
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent	No	High	Habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting songbirds, shorebirds and ptarmigan
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident birds are extremely unlikely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip
Mine Plant and Associated Facilities	Loss of foraging and nesting habitat	Low	Local	Contin	Perman	All Year	No	Minimize footprint of mine facilities; clearly delineate footprint to reduce habitat degradation in surrounding areas	Permanent foraging habitat loss on a local level	No	Certain	Revegetate areas disturbed during construction

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	All Year	No	Use dust suppressant techniques on an as-needed basis; maintain vehicles in good operating condition	Potential for exposure to contaminated prey is low	No	High	Monitor contaminant levels in vegetation and possible other indicators
Freshwater Intake and Pipeline	Minor loss and disturbance of nesting and foraging habitat	Low	Local	Contin	Medium	Summer	No	Construct pipeline in a manner to minimize impact to terrestrial environment; avoid constrtuction during the breeding bird season; identify active nests	Small areas of impact may effect a few breeding pairs but impact is not evident over a wide area	No	Certain	Identify and monitor active nests of songbirds, shorebirds and ptarmigan in the vicinity
Discharge Facilities and Pipeline(s)	Minor loss and disturbance of nesting and foraging habitat	Low	Local	Contin	Medium	Summer	No	Construct pipeline in a manner to minimize impact to terrestrial environment; avoid constrtuction during the breeding bird season; identify active nests	Small areas of impact may effect a few breeding pairs but impact is not evident over a wide area	No	Certain	Identify and monitor active nests of songbirds, shorebirds and ptarmigan in the vicinity
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Power Lines and Poles	Potential for collision resulting in mortality	Low	Local	Infreqnt	Short	All Year	No	Consideration may be given to marking power lines to increase visibility, particularly in poor or low light conditions	The potential residual effects (i.e., bird mortality) are expected to be very low.	No	Moderat	Report all bird strikes or mortalities related to power lines
	Improved perching opportunities for raptors may result in increased depredation rates on birds in a localized area	Low	Local	Infreqnt	Long	All Year	No	None recommended	Potential for increased depredation rates is low and then only at a localized level	No	Moderat	Report all raptors perching on power poles, lines and other mine facilities

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	POSITIVE - Improved perching opportunities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for birds to consume contaminated prey is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for birds to consume contaminated prey is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	Minor loss and disturbance of nesting and foraging habitat; sensory disturbance may result in reduced habitat effectiveness	Low	Local	Contin	Medium	Summer	No	Designate tent sites and walking trails; use pallets or raised walkways in areas with heath, sedge or other vegetation sensitive to trampling	Small area of impact and proposed mitigation measures will ensure that residual effects are low	No	Certain	Regular maintenance of designated trail system; monitor development of 'bandit' trails; identify and monitor active nest sites
Sewage and Solid Waste Disposal	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active nest sites of songbirds, shorebirds and ptarmigan; monitor response of nesting birds to noise and activity; implement employee awareness programs
Dyke	Minor loss and disturbance of nesting and foraging habitat on islands and where dykes key into shorelines	Low	Local	Contin	Medium	Summer	No	Minimize area of shorelines encroached by dykes; don't build dykes during the active nesting period or ensure that birds are not nesting in areas that will be disturbed	Small area of terrestrial impact may affect some local breeding pairs of birds, but overall residual effect is considered to be low	No	Certain	Identify and monitor active nest sites of songbirds, shorebirds and ptarmigan
Dewatering	NA since activity does not occur until operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	NA since pit construction will occur during operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	Loss and disturbance of terrestrial foraging habitat and a small amount of wetland habitat	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump; avoid overburden stripping during breeding bird season; identify nest sites	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	Identify and monitor bird nests in proposed overburden stripping area; revegetate on an as-required basis
Roads and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions; avoid construction of roads during breeding bird season; identify active nests	Minor alteration and loss of foraging habitat	No	Certain	Identify and monitor active nests of songbirds, shorebirds and ptarmigan; see Vegetation Cover matrices for more habitat-specific recommendations
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; birds have right-of-way	Potential for vehicle/bird collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with birds

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of birds to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident birds will likely be low; potential exposure is seasonal for most bird species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	Minor loss and disturbance of nesting and foraging habitat	Low	Local	Contin	Medium	Summer	No	Minimize footprint; avoid construction during breeding bird season; identify active nests	Small habitat loss is expected to have a low residual effect on local bird populations	No	Certain	Identify and monitor active bird nests
OTHER FACILITIES												
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	The probability of mortality due to vehicle/bird collisions is expected to be very low because only ptarmigan is present during the winter	Low	Regional	Contin	Short	Winter	No	Minimize vehicular traffic and speeds; ptarmigan have the right-of-way	Potential for vehicle/ptarmigan collisions in winter is expected to be low	No	Low	Drivers will report any collisions and near misses with ptarmigan
Baker Lake Access Road and Traffic	Loss and disturbance of terrestrial foraging habitat	Low	Local	Contin	Perman	All Year	No	Minimize required roads and reduce road dimensions; avoid construction of roads during breeding bird season; identify active nests	Minor alteration and loss of foraging habitat	No	Certain	Identify and monitor active nests of songbirds, shorebirds and ptarmigan; see Vegetation Cover matrices for more habitat-specific recommendations
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; birds have right-of-way	Potential for vehicle/bird collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with birds
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of birds to become habituated to noise and activity	No	High	None recommended

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident birds will likely be low; potential exposure is seasonal for most bird species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Barge Landing Facility	No measurable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	Loss of foraging and nesting habitat	Low	Local	Contin	Perman	All Year	No	Minimize footprint of facilities; clearly delineate footprint to reduce habitat degradation in surrounding areas	Permanent foraging habitat loss on a local level	No	Certain	Revegetate areas disturbed during construction
Explosives Magazine	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for birds to consume contaminated prey is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B12.1 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Tank Farm	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	Potential for contamination is low and potential for birds to consume contaminated prey is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B12.2: Other Breeding Birds Impact Matrix – Operation

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects	Residual Effects/ Influence of Mitigation		Significance of Residual Impacts	Probability		
		Magnitude	Spatial Extent	Frequency	Duration						Timing	
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active nest sites of songbirds, shorebirds and ptarmigan; monitor response of nesting birds to noise and activity; implement employee awareness programs
Dykes												
East, West and Portage South Dykes	No additional habitat loss antipated during operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island and 3 rd Portage Arm Dykes	Minor loss and disturbance of nesting and foraging habitat on islands and where dykes key into shorelines	Low	Local	Contin	Medium	Summer	No	Minimize area of shorelines encroached by dykes; don't build dykes during the active nesting period or ensure that birds are not nesting in areas that will be disturbed	Small area of terrestrial impact may affect some local breeding pairs of birds, but overall residual effect is considered to be low	No	Certain	Identify and monitor active nest sites of songbirds, shorebirds and ptarmigan
Dewatering												
2 nd Portage Lake and Portage Pit (3 rd Portage Lake)	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Goose Island (3 rd Portage Lake)	Minor loss and disturbance of terrestrial foraging and nesting habitat	Low	Local	Infreqnt	Short	Summer	No	Aerial transport of pumps, pipe and other equipment to reduce need for road access; placement of pipeline on pallets which reduces habitat disturbance	Due to small amount of terrestrial habitat impacted, residual effects are considered to be small	No	High	None specific to birds recommended; revegetate on an as-required basis
Pits												
Portage Pit	No additional measurable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B12.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Goose Island Pit	Loss and disturbance of terrestrial foraging habitat due to overburden stripping	Low	Local	Contin	Perman	All Year	No	Minimize width of pits and overall habitat loss; avoid breeding bird window during construction; identify nest sites	Loss of some terrestrial habitat is permanent but considered to be low	No	Certain	Identify and monitor bird nests in proposed overburden stripping area; revegetate on an as-required basis
Waste Dump (Portage/Goose)	Continued loss and disturbance of nesting and foraging habitat as waste dump expands	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump; avoid overburden stripping during breeding bird season; identify nest sites	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	Identify and monitor bird nests in proposed overburden stripping area; revegetate on an as-required basis
Tailings Facilities (2 nd Portage Lake)	Loss and disturbance of terrestrial foraging habitat around edge of lake to four metres above current lake elevation	Low	Local	Contin	Perman	All Year	No	Minimize encroachment of tailings into shoreline areas of 2 nd Portage Lake; berm edges if necessary	Residual effect includes permanent loss of vegetation around the shoreline of 2 nd Portage Lake	No	Certain	Environmental monitoring to ensure that only designated areas are impacted by the tailings beach
	Natural revegetation of potentially contaminated tailings beach may occur; birds may be exposed to elevated contaminant levels	Low	Local	Contin	Perman	All Year	No	Cap facility with appropriate clean material; undertake progressive reclamation activities to improve habitats on areas of tailings deposit that has reached its maximum height	With adequate measures, the potential for contamination is very low	No	Low	Monitor contaminant levels in vegetation on tailings beach; adjust capping material composition and distribution as appropriate

Table B12.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; birds have right-of-way	Potential for vehicle/bird collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with birds
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of birds to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident birds will likely be low; potential exposure is seasonal for most bird species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators

Table B12.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to air traffic/bird collisions	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings	The potential for a plane/bird collision is considered to be low	No	Moderat	Pilots are required to report all bird/plane collisions and near misses; habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting songbirds, shorebirds, and ptarmigan
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent	No	High	Habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting songbirds, shorebirds and ptarmigan
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident birds are extremely unlikely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip

Table B12.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Mine Plant and Associated Facilities	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dust and emissions may cause habitat degradation and increased contaminant loading in forage species	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; controlled blasting techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	Monitor bird nest locations; monitor contaminant levels in vegetation adjacent to mine site
	POSITIVE - Possible increased nesting and perching opportunities for birds on mine structures and facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Power Lines and Poles	Potential for collision resulting in mortality	Low	Local	Infreqnt	Short	All Year	No	Consideration may be given to marking power lines to increase visibility, particularly in poor or low light conditions	The potential residual effects (i.e., bird mortality) are expected to be very low.	No	Moderat	Report all bird strikes or mortalities related to power lines
	Improved perching opportunities for raptors may result in increased depredation rates on birds in a localized area	Low	Local	Infreqnt	Long	All Year	No	None recommended	Potential for increased depredation rates is low and then only at a localized level	No	Moderat	Report all raptors perching on power poles, lines and other mine facilities
	POSITIVE - Improved perching opportunities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B12.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Fuel Storage (at Plant site)	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow spill contingency guidelines	Potential for contamination is low and potential for birds to consume contaminated prey is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Emulsion/AN Storage/ Explosives Magazines	Potential spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow spill contingency guidelines	Potential for contamination is low and potential for birds to consume contaminated prey is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Camps (North and South)	POSITIVE - Increased habitat availability and reduced disturbance as camps are removed and habitat reclamation is undertaken	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active nest sites of songbirds, shorebirds and ptarmigan; monitor response of nesting birds to noise and activity; implement employee awareness programs
Dyke	No additional habitat loss antipated during operation phase	NA	NA	NA	NA	NA	NA	NA		NA	NA	NA
Dewatering	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	Loss and disturbance of terrestrial foraging habitat due to overburden stripping	Low	Local	Contin	Perman	All Year	No	Minimize width of pits and overall habitat loss; avoid breeding bird window during construction; identiv nest sites	Loss of some terrestrial habitat is permanent but considered to be low	No	Certain	Identify and monitor bird nests in proposed overburden stripping area; revegetate on an as-required basis

Table B12.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Waste Dump	Continued loss and disturbance of nesting and foraging habitat as waste dump expands	Low	Local	Contin	Perman	All Year	No	Minimize overall footprint of waste dump; avoid overburden stripping during breeding bird season; identify nest sites	Residual effect is permanent loss of some terrestrial habitat types	No	Certain	Identify and monitor bird nests in proposed overburden stripping area; revegetate on an as-required basis
Roads and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; birds have right-of-way	Potential for vehicle/bird collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with birds
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of birds to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident birds will likely be low; potential exposure is seasonal for most bird species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators

Table B12.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop/ Office	No additional loss or disturbance of terrestrial foraging habitat anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES												
Winter Road and Traffic	No measurable effect anticipated from small area of habitat alteration	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/bird collisions is expected to be very low because only ptarmigan is present during the winter	Low	Regional	Contin	Short	Winter	No	Minimize vehicular traffic and speeds; ptarmigan have the right-of-way	Potential for vehicle/ptarmigan collisions in winter is expected to be low	No	Low	Drivers will report any collisions and near misses with ptarmigan

Table B12.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Baker Lake Access Road and Traffic	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to vehicle/bird collisions	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; birds have right-of-way	Potential for vehicle/bird collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with birds
	Reduced habitat effectiveness in adjacent areas due to noise and activity	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of birds to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident birds will likely be low; potential exposure is seasonal for most bird species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Barge Landing Facility	No measurable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B12.2 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
In-town Staging Facility	No additional habitat loss or disturbance anticipated during operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Dust and emissions may cause habitat degradation and increased contaminant loading in forage species	Low	Local	Contin	Long	All Year	No	Dust suppression techniques; monitoring of air emissions	Residual effects expected to be minor and restricted to local area	No	High	Monitor bird nest locations; monitor contaminant levels in vegetation adjacent to facilities
	POSITIVE - Possible increased nesting and perching opportunities for birds on mine structures and facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	Potential spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow spill contingency guidelines	Potential for contamination is low and potential for birds to consume contaminated prey is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	Potential fuel spills may degrade surrounding habitats and increase contaminant loading in prey	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around fuel storage area; follow Hazardous Materials Handling Guidelines; follow spill contingency guidelines	Potential for contamination is low and potential for birds to consume contaminated prey is even lower	No	Low	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B12.3: Other Breeding Birds Impact Matrix – Closure & Post-Closure

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
MAIN FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas; minimal effects once mine is fully closed	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active nest sites of songbirds, shorebirds and ptarmigan; monitor response of nesting birds to noise and activity; implement employee awareness programs
Dykes												
East, West, Portage South, Goose Island and 3 rd Portage Arm Dykes	Dykes will be breached, any terrestrial habitat created by them will be inundated	Low	Local	Contin	Perman	All Year	No	Minimize terrestrial habitat lost to breaching of dykes, do not breach dykes during prime nesting periods	Residual impact will be small since marginal terrestrial habitat lost was only available during the operation phase	No	Certain	Locate and monitor active bird nests
Dykes	POSITIVE - Vegetation will naturally become established on dykes providing living areas for small mammals and small birds and foraging opportunities for raptors	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dewatering												
2 nd Portage Lake, Portage Pit (3 rd Portage Lake) and Goose Island (3 rd Portage Lake)	NA since dewatering completed during construction and operation phases	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B12.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Pits												
Portage and Goose Island Pits	Dykes will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging habitat for raptors	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases local bird populations	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	POSITIVE – Emergent vegetation may grow if a littoral zone is established around edges of pits providing living and nesting opportunities for birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits providing living and nesting opportunities for birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump (Portage/Goose)	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved living conditions for birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Tailings Facilities (2 nd Portage Lake)	POSITIVE – Native vegetation will naturally become reestablished on the tailings beach providing improved living conditions for birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Vegetation growing on tailings may be contaminated leading to elevated contaminant levels in birds	Medium	Local	Contin	Perman	All year	Yes	Ensure that tailings deposit is capped with clean material	With reduced contaminant uptake in vegetation, potential impacts are considered to be of low magnitude	Low	High	Monitor contaminant levels in vegetation and possibly other indicators

Table B12.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Roads and Traffic	Mortality due to vehicle/bird collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; birds have right-of-way	Potential for vehicle/bird collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with birds
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of birds to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; the potential for this effect will reduce substantially after mine closure; some potential contamination if they utilize reclaimed road surfaces (see below)	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition; ensure that road materials are inert and do not contribute unacceptable contaminant levels into the environment;	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident birds will likely be low; potential exposure is seasonal for most bird species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Passerines and ptarmigan may be attracted to reclaimed road bed areas for roosting, foraging and possibly nesting once vegetation has become reestablished	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B12.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Airstrip and Air Traffic	No additional habitat loss or disturbance anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Mortality due to air traffic/bird collisions; risk of this effect will decline substantially after mine closure	Low	Local	Infreqnt	Short	All Year	No	Minimize number of take-offs and landings	The potential for a plane/bird collision is considered to be low	No	Moderat	Pilots are required to report all bird/plane collisions and near misses; habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting songbirds, shorebirds, and ptarmigan
	Reduced habitat effectiveness in adjacent areas due to noise and activity; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize number of take-offs and landings; pilots will be required to observe approach height guidelines	Air plane arrivals and departures are expected to be infrequent	No	High	Habitats in the vicinity of the airstrip will be surveyed on a regular basis for the presence of nesting songbirds, shorebirds and ptarmigan
	Potential habitat degradation due to dust and emissions and potential for increased contaminant loading in prey; risk of this effect will decline substantially after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize number of take-offs and landings	Low utilization of the airstrip is not expected to result in notable contamination of adjacent habitats, and resident birds are extremely unlikely to have a high percentage of their diet coming from potentially contaminated areas	No	Moderat	Monitor contaminant levels in vegetation and possible other indicators adjacent to the airstrip
Mine Plant and Associated Facilities	Concrete foundation and footprint of other ancillary facilities will result in permanent habitat loss and disturbance	Low	Local	Contin	Perman	All Year	No	Remove any contamination sources from around the plant; recontour surrounding area and restore original drainage patterns to the extent possible; stabilize slopes	Some permanent vegetation loss	No	Certain	Reclamation activities as outlined in Wildlife Management Plan and Abandonment & Restoration Plan

Table B12.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Freshwater Intake and Pipeline	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Discharge Facilities and Pipeline(s)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Non-contact Diversion Facilities	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3 rd Portage Arm Tailings Attenuation Pond & Associated Reclaim Pipeline (yr 6+)	POSITIVE – Natural revegetation of previously disturbed area resulting in improved foraging habitat	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage (at Plant site)	No measurable effect anticipated from small area of habitat loss; potential for spills is substantially reduced	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage/ Explosives Magazines	No measurable effect anticipated from small area of habitat loss; no further potential for spills	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camps (North and South)	NA – Reclamation activities undertaken during Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES												
Noise and Activity	Activity and noise result in displacement and reduced habitat effectiveness; disruption of nesting birds if present in close proximity to development areas; minimal effects once mine is fully closed	High	Local	Contin	Medium	All Year	Yes	Minimize noise levels; manage noise and activity around active nest sites	With mitigation, magnitude of impacts is considered to be low	No	Moderate	Monitor locations of active nest sites of songbirds, shorebirds and ptarmigan; monitor response of nesting birds to noise and activity; implement employee awareness programs
Dyke	Dykes will be breached, any terrestrial habitat created by them will be inundated	Low	Local	Contin	Perman	All Year	No	Minimize terrestrial habitat lost to breaching of dykes, do not breach dykes during prime nesting periods	Residual impact will be small since marginal terrestrial habitat lost was only available during the operation phase	No	Certain	Locate and monitor active bird nests

Table B12.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Dewatering	NA since dewatering completed prior to operations	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit	Dykes will be breached and pit allowed to fill with water; terrestrial areas where vegetation has become established during the operation phase will be inundated resulting in minor loss of foraging habitat for raptors	Low	Local	Contin	Perman	All Year	No	Establish littoral zone around pit edge to encourage establishment of emergent vegetation and increases in small mammal and bird prey for raptors	Minor loss of habitat in disturbed areas	No	Certain	See Abandonment & Restoration Plan
	POSITIVE – Emergent vegetation may grow if a littoral zone is established around edges of pits providing living and nesting opportunities for birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Riparian and nearshore vegetation may colonize sorted substrates near edges of flooded pits providing living and nesting opportunities for birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Waste Dump	POSITIVE – Native vegetation will naturally become reestablished on the waste dump providing improved living conditions for birds	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Mortality due to vehicle/bird collisions; the potential for this effect will reduce substantially after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; birds have right-of-way	Potential for vehicle/bird collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with birds
Non-contact Diversion Facilities	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect will reduce substantially after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of birds to become habituated to noise and activity	No	High	None recommended
Mine Shop/ Office												
OTHER FACILITIES												
Winter Road and Traffic												
Baker Lake Access Road and Traffic												

Table B12.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; the potential for this effect will reduce substantially after mine closure; some potential contamination if they utilize reclaimed road surfaces (see below)	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition; ensure that road materials are inert and do not contribute unacceptable contaminant levels into the environment;	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident birds will likely be low; potential exposure is seasonal for most bird species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
	POSITIVE - Passerines and ptarmigan may be attracted to reclaimed road bed areas for roosting, foraging and possibly nesting once vegetation has become reestablished	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	No measurable effect anticipated from small area of habitat loss	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE – Natural revegetation of disturbed habitats	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	The probability of mortality due to vehicle/bird collisions is expected to be very low because only ptarmigan is present during the winter	Low	Regional	Contin	Short	Winter	No	Minimize vehicular traffic and speeds; ptarmigan have the right-of-way	Potential for vehicle/ptarmigan collisions in winter is expected to be low	No	Low	Drivers will report any collisions and near misses with ptarmigan
	Mortality due to vehicle/bird collisions; the potential for this effect is expected to decline after mine closure	Low	Local	Infreqnt	Short	Summer	No	Minimize vehicular traffic and speeds; birds have right-of-way	Potential for vehicle/bird collisions is expected to be very low	No	Moderat	Drivers will report any collisions and near misses with birds

Table B12.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
	Reduced habitat effectiveness in adjacent areas due to noise and activity; the potential for this effect is expected to decline after mine closure	Low	Local	Contin	Perman	All Year	No	Minimize vehicular traffic and speeds	Reduced habitat effectiveness is expected to be minimal due to small area of impact and tendency of birds to become habituated to noise and activity	No	High	None recommended
	Habitat degradation due to dust and exhaust and potential for increased contaminant loading in prey; the potential for this effect is expected to decline after mine closure	Low	Local	Contin	Perman	Summer	No	Minimize vehicular traffic and speeds; use dust suppressant techniques on an as-needed basis; maintain vehicle in good running condition; ensure that road materials are inert and do not contribute unacceptable contaminant levels into the environment	Potential area of contamination is very small; proportion of potentially contaminated prey within diet of locally resident birds will likely be low; potential exposure is seasonal for most bird species	No	Moderat	Monitor contaminant levels in road side vegetation and possible other indicators
Barge Landing Facility	No measureable effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Barge Traffic	No effects anticipated	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
In-town Staging Facility	No further habitat loss or disturbance anticipated; facility will likely not be decommissioned	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	POSITIVE - Possible increased nesting and perching opportunities for birds on structures and facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B12.3 Continued

Project Components	Potential Effects	Assessment of Unmitigated Effects						Proposed Mitigation	Assessment of Residual Effects			Wildlife Management and Monitoring Plan
		Spatial Boundaries		Temporal Boundaries			Significance of Unmitigated Effects		Residual Effects/ Influence of Mitigation	Significance of Residual Impacts	Probability	
		Magnitude	Spatial Extent	Frequency	Duration	Timing						
Explosives Magazine	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines
Tank Farm	No further habitat loss and disturbance	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
	Potential fuel spills may degrade surrounding habitat and increase contaminant levels	Low	Local	Infreqnt	Short	All Year	No	Provide containment berm around explosives magazine; follow Hazardous Materials Handling Guidelines; follow Spill Contingency Guidelines	No residual effects anticipated	No	Moderat	Regular maintenance checks; follow Hazardous Materials Handling Guidelines

Table B13.1: Fish Impact Matrix – Construction

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
MAIN FACILITIES											
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dike Construction											
Second Portage Lake East Dike	Disturbance of fine sediments beneath dike footprint causing increase in TSS. Compression of sediments releasing dissolved metals in pore water. Dispersion of fish away from the disturbed area (avoidance of TSS).	M	L	S	F	YES	Use silt curtains to contain sediments during dike construction and prevent fish from entering disturbed area, minimizing potential for exposure to higher dissolved metals in water. Eliminate overlap with sensitive time period with fish.	Possible escape of sediment beneath or around silt curtain causing local increase in TSS and impaired feeding efficiency. Evacuation of fish from disturbed area. Mitigation will eliminate overlap with sensitive timing, and decrease the magnitude and spatial extent of effects.	NO	High	AEMP will monitor water quality in dike near-field. Targeted study to address productivity of fish habitat on dike exterior. See NNL Habitat Report (2004) for details of compensation for habitat loss and implications for fish.
	Elimination of the westernmost connecting channel between Third and Second Portage lakes. Impaired fish movement between the lakes.	L	L	M*	I	NO	Improve fish passage at the remaining two connecting channels between Third and Second Portage lakes. See No Net Loss Report (2004) for full details.	Improved fish passage between Second and Third Portage lakes.	NO	High	Creation of an improved connection channel between the lakes is a key component of the No Net Loss of Fish Habitat program. A targeted study (AEMP Section x.x) will monitor movement of fish between Second and Third Portage lakes via the new channel
Second Portage Lake Tailings Dike	NA (See Post-Closure phase).	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Dike Construction – Third Portage Lake Portage Dike	Disturbance of fine sediments beneath dike footprint causing increase in TSS. Compression of sediments releasing dissolved metals in pore water. Dispersion of fish away from the disturbed area due to disturbance (avoidance of TSS).	L	L	S	F	NO	Use silt curtains to contain sediment during dike construction.	Possible escape of sediment beneath or around silt curtain causing local increase in TSS and impaired feeding efficiency. Evacuation of fish from disturbed area. Mitigation will eliminate overlap with sensitive timing, and decrease the magnitude and spatial extent of effects.	NO	High	AEMP will monitor water quality in dike near-field and assess impacts of TSS and metals in Third Portage Lake See NNL Habitat Report (2004) for habitat compensation assessment.
	Elimination of the westernmost connecting channel between Third and Second Portage lakes. Impaired fish movement between the lakes.	L	L	M*	I	NO	Improve fish passage at the remaining two connecting channels between Third and Second Portage lakes. See No Net Loss Report (2004) for full details.	Improved fish passage between Second and Third Portage lakes.	NO	High	Creation of an improved connection channel between the lakes is a key component of the No Net Loss of Fish Habitat program. A targeted study (see AEMP) will monitor movement of fish between Second and Third Portage lakes via the new channel

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Dike Construction – Third Portage Lake Goose Island	Disturbance of fine sediments beneath dike footprint causing increase in TSS. Compression of sediments releasing dissolved metals in pore water. Dispersion of fish away from the disturbed area due to disturbance, TSS.	L	L	S	F	NO	Use silt curtains to contain sediment during dike construction.	Possible escape of sediment beneath or around silt curtain causing local increase in TSS and impaired feeding efficiency. Evacuation of fish from disturbed area. Mitigation will eliminate overlap with sensitive timing, and decrease the magnitude and spatial extent of effects.	NO	High	AEMP will monitor water quality in dike near-field and assess impacts of TSS and metals in Third Portage Lake. See NNL Habitat Report (2004) for habitat compensation assessment.
	Introduction of nitrates from blasted rock used to construct dike. Increase in phytoplankton and zooplankton abundance may benefit fish.?	L	L	M*	F	NO	No mitigation possible to avoid nutrient input to during construction.	Small increase in fish productivity from nutrients.	NO	Mod	A targeted study has been proposed to monitor near-field water quality and assess changes in productivity (see AEMP).
Blasting											
Dike Construction and Pit Development	Blasting of rock to remove overburden and material, during pit development may cause mortality of fish and fish eggs on or near dikes habitat. Degree of impact depends upon setback from dike and stage of pit development which dictates distance between blast and fish bearing water.	L	L	M*	F	NO	Use smaller charges and blast holes, stagger detonations. Increase set back distance (see Blast Design Report).	Possible residual mortality of fish depending on blast frequency and peak particle velocity. Mitigation reduces magnitude, extent and frequency of effect.	NO	Mod	Monitoring of blasting effects on fish has been identified as a Targetted Study (see AEMP). Refer to Blast Design Report (Golder 2004).

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Pit Dewatering											
Dewatering of Second Portage North Arm	Discharge of 12 M m ³ of water behind the East Dike into Third Portage (north basin). During drawdown, entrained sediment and porewater metals may be discharged into the lake. Fish avoidance of these waters (TSS).	M	R	S	I	YES	Locate dewatering barge and pumps in an area of Second Portage Lake such that withdrawal of suspended sediments from water column is minimized.	Temporary increase in dissolved metals; increase in water column TSS, sedimentation and reduced light penetration resulting in impaired feeding by fish; temporary evacuation of fish from disturbed area. Mitigation will reduce magnitude and spatial extent of effects.	NO	Mod	Monitoring of water column TSS during dewatering of impoundment has been identified as a targeted study within the AEMP.
	Discharge of water drawn from Second Portage to Second and Third Portage (north basin) lakes will increase water levels and discharge to Third Portage Lake, increasing flow and velocity in connecting channel. Altered fish movements between lakes.	L	R	S	I	NO	Excavate connecting channel to Second Portage Lake to accommodate increased flow from Third Portage Lake.	Increase in flow rate through connecting channel. Given that passage by fish between is currently impaired, additional flow may assist fish movement.	NO	High	Routine monitoring of fish passage between Second and Third Portage lakes and between Second Portage and Tehek lakes has been incorporated as part of the AEMP.
Dewatering of Portage Pit into Third Portage Lake	Entrainment of sediment during draw down and pumping of impounded water within Portage pit into Third Portage Lake. Dispersal and reduction in feeding efficiency by fish.	L	L	S	I	NO	Locate dewatering barge and pumps in Third Portage Lake such that withdrawal of suspended sediments from water column is minimized.	Temporary increase in dissolved metals; increase in water column TSS, sedimentation and reduced light penetration resulting in impaired feeding by fish; temporary evacuation of fish from disturbed area.	NO	High	Monitoring of water column TSS during dewatering of Portage impoundment has been identified as a targeted study within the AEMP.

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Dewatering of Bay Zone Pit into Third Portage Lake	Entrainment of sediment during draw down and pumping of impounded water within Bay Zone pit into Third Portage Lake. Dispersal and reduction in feeding efficiency by fish.	L	L	S	I	NO	Locate dewatering barge and pumps in Third Portage Lake such that withdrawal of suspended sediments from water column is minimized.	Temporary increase in dissolved metals; increase in water column TSS, sedimentation and reduced light penetration resulting in impaired feeding by fish; temporary evacuation of fish from disturbed area. Mitigation will reduce magnitude and spatial extent of effects.	NO	High	Monitoring of water column TSS during dewatering of Bay Zone impoundment has been identified as a targeted study within the AEMP.
Dewatering of Goose Island Pit into Third Portage Lake	Entrainment of sediment during draw down and pumping of impounded water within Goose Island pit into Third Portage Lake. Dispersal and reduction in feeding efficiency by fish.	L	L	S	I	NO	Locate dewatering barge and pumps in Third Portage Lake to minimize entrainment of suspended sediment.	Temporary increase in dissolved metals; increase in water column TSS, sedimentation and reduced light penetration resulting in impaired feeding by fish; temporary evacuation of fish from disturbed area. Mitigation will reduce magnitude and spatial extent of effects.	NO	High	Monitoring of water column TSS during dewatering of Goose Island impoundment has been identified as a targeted study within the AEMP.

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Pit Development											
Second Portage Pit	Pit development will result in medium-term loss of fish in pit footprint at Second Portage Lake.	M	L	M*	F	YES	Loss of fish in Second Portage Lake from pit footprint will be compensated for by improving access by fish to Third Portage Lake. Fishway to Dogleg Lake to be connected to system, and further offsite habitat compensation at Baker Lake. See No Net Loss Report (2004) for details.	Mitigation will reduce the net loss of fish biomass. Net loss is partially offset by habitat area and value created along dike exterior (operation) and from additional habitat at Baker L., Dogleg L. and connecting channel.	YES	High	The NNL Habitat Report (2004) addresses net impacts to fish over mine life during operation and post-closure.

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Bay Zone Pit	Pit development will result in loss of fish beneath pit footprint in Third Portage Lake. (Bay Zone pit will be incorporated into Goose Island pit after Year 5.)	L	L	M*	F	NO	Loss of fish in Third Portage Lake from pit footprint will be compensated for by improving access by fish to Third Portage Lake. Fishway to Dogleg Lake to be connected to system, and further offsite habitat compensation will be at Baker Lake.	Loss within pit footprint is offset by habitat area and value created along dike exterior (operation) and interior (post-closure) in Third Portage Lake.	NO	High	The NNL Habitat Report (2004) addresses net impacts to fish over mine life during operation and post-closure.
Goose Island Pit	Pit development will result in loss of fish beneath pit footprint in Third Portage Lake.	L	L	M*	F	NO	Loss of fish in Third Portage Lake from pit footprint will be compensated for by improving access by fish to Third Portage Lake. Fishway to Dogleg Lake to be connected to system, and further offsite habitat compensation will be at Baker Lake.	Loss within pit footprint is offset by habitat area and value created along dike exterior (operation) and interior (post-closure) in Third Portage Lake.	NO	High	The NNL Habitat Report (2004) addresses net impacts to fish over mine life during operation and post-closure.

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Tailings Facility											
Second Portage Tailings Facility	Permanent loss of fish in north arm of Second Portage Lake.	H	L	P	F	YES	Permanent loss of fish biomass in pit footprint will be compensated for by creating enhanced dike habitat and a connection to Dogleg Lake. See No Net Loss Report (2004) for full details.	Reduce aerial proportion of fish habitat loss by connecting Dogleg Lake by a connecting channel and habitat at Baker L.; mitigation reduces magnitude of habitat loss.	YES	High	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish from elimination of isolated lakes due to waste rock storage facility.
Rock Storage											
Portage – Goose Island Rock Storage Facility	Waste rock disposal will result in permanent loss of fish within Lake NP-2. However, because NP-2 is isolated from Second Portage, there is negligible loss of fish to system. Contact water runoff from disturbed terrain and the waste rock pile could introduce low pH water with elevated metals concentrations into Third Portage Lake, leading to localized fish mortality.	L	L	M*	F	YES	Loss of fish in NP-2 will be compensated for by creating access by fish to Dogleg Lake. See No Net Loss Report (2004) for full details. All contact water with Rock Storage facility will be directed to the Second Portage Lake attenuation pond to eliminate impacts to habitat from introduction of low pH, high metals surface water drainage.	Loss of fish will partially be offset by increased access by fish from Second Portage Lake to habitat in Dogleg Lake, which was previously unavailable. Reduced magnitude, extent, and frequency of effects.	NO	High	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish from elimination of isolated lakes due to waste rock storage facility.
Mine Site Infrastructure											

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Borrow Pit/Quarry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, road dust. Smothering of fish eggs, impaired feeding efficiency by fish; toxicity due to metals introduction.	L	L	S	F	NO	Construction activities in and around waterways will be avoided. No direct contact of vehicles in lakes. Dust suppressants applied to roads. Other dust control measures for aerial emissions. Perimeter ditches will direct all contact water to tailings pond.	Negligible ecological effects on fish. Because all contact water is captured and routed to the attenuation pond, there is no direct runoff to the receiving environment and no routine monitoring is required. Mitigation will reduce magnitude, extent, and frequency of effects.	NO	High	Targeted monitoring during road construction will be implemented if necessary. See AEMP.
Airstrip and Air Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, introduction of dust from runoff from airstrip. Smothering of fish eggs, impaired feeding efficiency by fish; toxicity due to metals introduction.	L	L	S	F	NO	Dust suppressants applied to airstrip. Perimeter ditches to direct contact runoff with roads, waste piles, airstrip, etc. to attenuation pond.	Collection of contact water and diversion by ditches to attenuation pond to eliminate exposure pathway. Mitigation will reduce magnitude, extent and duration of effects. Negligible residual ecological effects.	NO	High	Water quality monitoring in Portage lakes near to air strip will be conducted routinely. See AEMP.
Mine Plant and Associated Facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Freshwater Intake and Pipeline	Construction of water intake pipe in Third Portage Lake resulting in fish disturbance and avoidance of immediate area; loss of fish eggs directly under pipe.	L	L	S	R	NO	Minimize disturbance of bottom, timing installation during open water (not fall or winter).	Negligible impacts on fish.	NO	High	No monitoring required.
Discharge Facility and Pipeline	Installation of a pipeline, barge and dock in Third Portage Lake, resulting in fish disturbance and avoidance of immediate area; loss of fish eggs in directly affected area.	L	L	S	R	NO	Minimize disturbance of bottom, timing installation during open water (not fall or winter).	Negligible impacts on fish.	NO	High	No monitoring required.
Non-Contact Diversion Facility	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage at Site	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage / Explosives Magazines	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camps (North and South)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES											
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dike Construction											

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Dike Construction – Vault Lake	Minor disturbance to nearshore area of Wally Lake/Vault Lake beneath dike footprint with potential for minor increase in TSS. Dispersion of fish away from the disturbed area.	L	L	S	I	NO	Use silt curtains to contain sediments during dike construction.	Low potential for escape of sediment beneath or around silt curtain because of boulder substrate, Low possibility of increase in TSS and impaired feeding efficiency by fish. Nearshore area impacted is very small and potential for residual effects in Wally Lake is negligible.	NO	High	AEMP will monitor water quality in dike near-field. See No NNL Habitat Report (2004) for details of compensation for habitat loss and implications for fish.
	Elimination of the connecting channel between Vault and Wally lakes. Elimination of connection between Phaser Lake and Vault Lake, resulting in loss of fish during mine-life.	L	L	M*	I	NO	Improve access channel between Wally Lake and two small, isolated ponds to increase habitat available by fish from Wally Lake.	Loss of access by fish to Vault and Phaser lakes offset by access to lakes formerly unavailable to fish.	NO	High	Monitor access by fish between Wally Lake and small ponds. See NNL Habitat Report (2004).

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Vault Lake Dewatering	Entrainment of sediments during draw down and pumping into Wally Lake causing increase in TSS. Ecological effects may be reduced feeding efficiency, impairment of benthic, spawning habitat from sedimentation.	L	L	S	F	NO	Locate dewatering barge and pumps in deep areas of Vault Lake to minimize entrainment of suspended sediment.	Temporary increase in dissolved metals; increase in water column TSS, sedimentation and reduced light penetration resulting in impaired feeding by fish; temporary evacuation of fish from disturbed area. Mitigation will reduce magnitude and spatial extent of effects.	NO	Mod	Monitoring of water column TSS during dewatering of Vault Lake has been identified as a targeted study within the AEMP.
Pit Development	Pit development will result in loss of fish productivity within Vault Lake.	M	L	M*	F	YES	Loss of fish habitat from pit footprint will be compensated for by creating habitat along Vault dike exterior. See NNL Report (2004).	Temporary loss of fish habitat beneath pit footprint during operation. Net loss is only partially offset by the new habitat area and value created along Vault dike exterior.	YES	High	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish over mine life during operation.

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Vault Rock Storage Facility	Runoff from disturbed terrain and the waste rock pile (i.e., contact water) could introduce low pH water with elevated metals concentrations into Wally Lake, adversely affecting fish.	M	L	M*	F	YES	All contact water with Rock Storage facility will be directed to the Vault Lake attenuation pond to eliminate impacts to habitat from introduction of low pH, high metals surface water drainage. Discharge only during open water season.	Small increase in TSS, metals from discharge of attenuation pond water into Wally Lake during open water. Mitigation will reduce magnitude and extent of impact to fish from collection of contact water and redirection to attenuation ponds.	NO	High	Water quality monitoring adjacent to dikes and outfall. Targeted monitoring during construction will be implemented when necessary. See AEMP.
Roads and Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, road dust.	L	L	M*	F	NO	Construction activities in and around waterways will be avoided. No direct contact of vehicles in lakes. Dust suppressants applied to roads. Other dust control measures for aerial emissions. Perimeter ditches to direct runoff to attenuation pond.	Mitigation will eliminate exposure pathways and result in negligible ecological effects.	NO	High	Water quality monitoring adjacent to mine site will be conducted routinely at a variety of locations. Targeted monitoring during construction will be implemented when necessary. See AEMP.
Non-Contact Diversion Facility	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop / Office	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Turn Lake Road Crossing	Culverts installation will disturb fish movement between Turn and Drilltrail lakes.	L	L	S	R	NO	Construct during winter. Place coarse grain substrate in bottom of culverts to replace habitat loss. Culverts will be designed with maximum discharge velocity of 0.6 m/s to ensure fish passage. See Aquatic Environmental Management Plan and No Net Loss Report (2004).	Culverts will mitigate crossing impact. Crossing will be constructed in winter when there are no fish movements therefore resulting in negligible ecological effects.	NO	High	Hoop nets will be set at the upstream and downstream end of the culverts to capture fish for purposes of a mark-recapture study. Routine monitoring to confirm that movements of fish between Turn Lake and Drilltrail Lake is not impaired. (see AEMP).
OTHER FACILITIES											
Worker Fishing	Increase in direct mortality of fish in all project lakes due to influx of workers during construction phase.	M	L	M*	F	YES	A strict no-fishing policy will be implemented for all workers on-site.	First Nations may exercise their traditional right to fish for sport, domestic consumption or to provide fish to dogs, resulting in an unknown degree of impact.	NO	Mod	Despite a no fishing policy, impacts by worker fishing are potentially significant. The number and type of fish captured within each project lake will be monitored where possible and biological data collected opportunistically (see AMEP).

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Winter Road and Traffic	Potential temporary stream blockage in spring due to freeze-down and snow pack at stream crossing locations.	L	R	S	I	NO	Use existing winter road route; use lake areas as much as possible; Use of large tundra tires and ener/exit lakes and streams where there is snow cover protecting soils.	Negligible residual effect. Mitigation will further reduce magnitude and extent of impacts to fish movements.	NO	High	Routine, annual monitoring of the winter road will be conducted to determine if any adverse effects can be observed and corrected, if necessary (see AEMP).
Baker Lake Access Road and Traffic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baker Lake Marine Barge Landing Facility	Localized degradation of fish habitat along Baker Lake foreshore resulting in decreased fish biomass.	L	L	S	I	NO	Construct landing facility to minimize impacts to near-shore and shoreline of Baker Lake; avoid high quality habitat; use geotextile material during unloading to minimize erosion; see AEMP and No Net Loss Report (2004).	Negligible residual effect.	NO	High	Implement emergency spills response in event of an accidental spill (see AEMP). Routine, annual monitoring of the Barge Landing Facility will be conducted to determine if any adverse effects can be observed and corrected, if necessary (see AEMP).

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Marine Barge Traffic	Increase in marine barge traffic. Will cause small incremental rise of noise and hydrocarbon emissions along the transport route.	L	R	S	I	NO	Follow hazardous material handling guidelines; follow spill contingency guidelines; protocols and standards for barge operators	Negligible residual effect. Mitigation will reduce the magnitude and frequency of effects.	NO	High	No routine monitoring required.
Baker Lake Staging Facility	Construction of the staging facility will take place well away from fish-bearing waters and no adverse physical effects are anticipated	L	L	S	R	NO	Ensure compliance with policies for vehicle re-fueling, safe storage of explosives, fuels, etc.	Negligible residual effect.	NO	High	No monitoring required.
Explosives Magazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B13.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency & Timing						
Accidental Spills: Fuel Storage Site (Portage), Tank Farm, Roads, Marine Transport.	Potential spills can impact fish and their eggs through introduction of contaminants (toxicity), or physical effect (blockages of streams reducing movements).	L	L	M	R	NO	Tank farm built within berms for containment. Follow hazardous material handling guidelines; follow spill contingency guidelines; protocols and standards for barge operators. Follow standard marine shipping procedures during Hudson Bay open water season. Implement strategies contained in the Spill Contingency Report.	Mitigation will reduce the magnitude, duration and spatial extent of any spills that may occur and cause impacts.	NO	High	Implement emergency spills response in event of an accidental spill (AEMP).

Table B13.2: Fish Impact Matrix – Operation

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
MAIN FACILITIES											
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dikes											
Second Portage - East Dike	Leaching of dissolved metals from dike materials into surrounding water columns. Cause potential toxicity to fish eggs, reducing survival and development.	L	L	P	F	NO	A 2 m thick layer of IF rock material (lowest metal leaching potential) will be placed on external dike surface to provide optimal habitat for spawning by lake trout and round whitefish. Excavate Dogleg Lake stream channel to connect to Second Portage Lake, providing hydrologic connection and access by fish between these lakes, thereby increasing available habitat and fish biomass in Second Portage Lake.	Net reduction in fish biomass in Second Portage Lake that is partly offset by habitat and biomass gain from connection with Dogleg Lake; Incorporate optimal habitat for fish spawning and egg survival on dike exteriors to partly offset loss of habitat along shorelines. Dissolved metals may reduce fish egg survival and larval development during overwinter incubation. Use of low metal-leaching rock will reduce magnitude and frequency of habitat impairment.	NO	Mod	Monitoring of changes in fish biomass in Second Portage Lake will be assessed as described in the NNL Habitat Report. A targeted study has been proposed to monitor pore water and very near-field water quality along the dike to confirm/refute Golder (2004) predicted water quality modeling results of metal leaching (see AEMP).

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Second Portage Lake Tailings Dike	See Pit Development	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Third Portage – Bay Zone Dike	Potential for local impairment of Third Portage Lake dike pore water quality due to metals leaching into waters from dike material. Possible impairment of fish eggs laid on dikes. Short term as this will be eliminated after 5 years when Goose Island Pit is developed.	L	L	S	F	NO	Fish habitat will be replaced along dike exteriors during operations phase and will be effective until Goose Island installation in Year 5. Use IF material with lowest metal leaching potential to construct outer face of Bay Zone Dike. See No Net Loss Report (2004). Substrate, depth and slope of dike exterior designed to optimize spawning and rearing habitat for lake trout and round whitefish	Reduced fish biomass in Third Portage Lake, offset by habitat compensation. Possible impairment of spawning and nursery habitat on dike exteriors. Use of low metal-leaching rock will reduce magnitude and frequency of habitat impairment.	NO	High	The net difference in productive capacity of fish habitat is assessed within the NNL Report. There will be a net loss of habitat in the project area and off-site habitat compensation is being considered.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Third Portage – Goose Island Dike	Potential for local impairment of Third Portage Lake dike pore water quality due to metals leaching from dike material Possible reduction of habitat suitability for fish egg survival.	L	L	L	F	NO	Fish habitat will be replaced along dike exteriors during operations phase and post-closure to enhance fish biomass. Use IF material with lowest metal leaching potential to construct outer face of Goose Island Dike. See No Net Loss Report (2004). Substrate, depth and slope of dike exterior designed to optimize spawning and rearing habitat for lake trout and round whitefish.	Reduced fish biomass in Third Portage Lake, offset by habitat compensation. Possible impairment of fish egg survival. Use of low metal-leaching rock will reduce magnitude and frequency of habitat impairment.	NO	High	The net difference in productive capacity of fish biomass is assessed within the NNL Report. A targeted study has been proposed to monitor pore water and very near-field water quality along the dike to confirm/refute Golder (2004) predicted water quality modeling results of metal leaching (see AEMP).
Blasting											
Pit Development	Blasting of rock during pit development may cause mortality of fish and fish eggs on or near dike habitat. Degree of impact depends upon setback from dike and stage of pit development which dictates distance between blast and fish-bearing water.	L	L	L	F	NO	Use smaller charges and blast holes, stagger detonations. Implement Blast Design Plan (Golder 2004).	Possible residual mortality of fish depending on blast frequency and peak particle velocity. Mitigation proposed, Blast Design Report will reduce magnitude and spatial extent of effects.	NO	High	Monitoring of blasting effects on fish has been identified as a Targetted Study (see AEMP).
Pit Dewatering	NA – occurs during Construction, not Operation phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Pit Operation - Portage Pit and Goose Island	Pit operation will result in loss of fish biomass within pit area in Second Portage Lake. Net loss of fish biomass proportional to pit surface area.	M	L	M	F	YES	Loss of fish biomass in Second Portage Lake from pit footprint will be compensated for by creating habitat along dike during operations phase and during post-closure. Fishway to Dogleg Lake to be connected to system, and further offsite habitat compensation will be required (to be resolved with DFO) at Baker Lake. See NNL Report (2004) for full details.	Loss of fish biomass proportional to pit footprint. Net loss is partially offset (reduced magnitude) by habitat area and value created along dike exterior (operation) and interior (post-closure), as well as Dogleg L. and offsite at Baker L., but not enough to become insignificant.	YES	Mod	The NNL Habitat Report addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.
Pit Operation – Goose Island/ Bay Zone pits	Pit operation will result in loss of fish biomass within pit area in Third Portage Lake. Net loss of fish biomass proportional to pit surface area.	L	L	M	F	NO	Loss of fish biomass in Second Portage Lake from pit footprint will be compensated for by creating habitat along dike during operations phase and during post-closure. Fishway to Dogleg Lake to be connected to system, and further offsite habitat compensation will be required (to be resolved with DFO) at Baker Lake. See NNL Report (2004) for full details.	Loss of fish biomass proportional to pit footprint. Net loss is partially offset (reduced magnitude) by habitat area and value created along dike exterior (operation) and interior (post-closure).	NO	Mod	The NNL Habitat Report addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries				Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Second Portage Tailings Facility	Permanent loss of fish biomass due to development of tailings disposal and attenuation ponds.	H	L	P	F	YES	Loss of fish biomass in Second Portage Lake due to tailings pond and attenuation pond footprint will be partially compensated for by creating habitat along dike exteriors during post-closure; added habitat at Dogleg Lake, connecting channel, and offsite habitat at Baker Lake. See NNL Report (2004) for full details.	Permanent loss of fish biomass proportional to tailings and attenuation pond footprint. Net loss in fish biomass is partially offset (reduced magnitude) by habitat area and value created along dike exterior (operation) and interior (post-closure), as well as Dogleg L. and at Baker L., but not enough to become insignificant.	YES	High	The NNL Habitat Report addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Portage – Goose Rock Storage Facility	The Portage – Goose Rock storage facility lies directly over Lake NP-2 (fish bearing) and adjacent to one small non-fish bearing pond. Lake NP-2 does not have an hydraulic connection to Second Portage Lake and is isolated. Runoff from the waste rock pile (i.e., contact water) during operation could introduce low pH water with elevated metals concentrations into Second Portage Lake and Third Portage lakes, resulting in toxicity to fish and eggs.	L	L	P	F	NO	Construct a reliable hydraulic connection between Second Portage Lake and Dogleg Lake (NP-1). Dogleg contains fish but, like NP-2 does not have an hydraulic connection. Excavating a stream channel will allow fish to move back and forth between the lakes and will increase available fish habitat within the Second Portage Lake drainage system. All contact water with Rock Storage facility will be directed to the Second Portage Lake attenuation pond to eliminate impacts to habitat from introduction of low pH, high metals surface water drainage.	Access by fish to Dogleg Lake will result in a net increase in fish biomass in Second Portage Lake despite elimination of NP-2 pond. Use of collection ditches and attenuation ponds will eliminate pathway to receiving environment, reducing magnitude, duration and frequency of impacts.	NO	High	Access to Dogleg Lake by fish from Second Portage Lake will increase available habitat and increase productive capacity. See NNL Habitat Report (2004).
Borrow Pit/Quarry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Roads and Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, introduction of dust from runoff from roads. Potential adverse physiological effects to fish (leading to stress) and potential for increased egg mortality.	L	L	M	F	NO	Avoid operating heavy equipment in and around waterways. No direct contact of vehicles in lakes. Dust suppressants applied to roads. Other dust control measures for aerial emissions. Perimeter ditches to direct contact runoff with roads, waste piles, airstrip, etc. to tailings facility (see Golder 2004?).	Negligible ecological effects on fish. Mitigation will eliminate pathways of contamination, reducing magnitude, extent and duration of impacts.	NO	High	Water quality monitoring adjacent to mine site will be conducted routinely at a variety of locations. See AEMP.
Airstrip and Air Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, introcution of dust from runoff from airstrip. Potential increase in sedimentation and impairment of benthic habitat.	L	L	M	F	NO	Dust suppressants applied to airstrip. Perimeter ditches to direct contact runoff with roads, waste piles, airstrip, etc. to tailings facility (see Golder 2004?).	Negligible ecological effects on fish. Mitigation will eliminate pathways of contamination, reducing magnitude, extent and duration of impacts.	NO	High	Water quality monitoring of Portage lakes will be conducted routinely. See AEMP.
Mine Plant and Facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	Operation of a water intake pipe in Third Portage Lake. Average intake volume is estimated to be 0.021 m³/s. Entrainment of fish larvae during open water is possible.	L	L	L	F	NO	Install intake at deep depth near bottom to minimize entrainment of fish larvae. Intake facility will be sized to reduce intake flow velocity below minimum speed to minimize entrainment of trout and whitefish.	Mitigation will reduce the magnitude of any residual effects. Minimal entrainment of fish.	NO	High	No monitoring required.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Effluent Discharge and Pipeline – Third Portage Lake	Effluent discharge to Third Portage Lake North Basin during construction and years 1 – 5 of operation will consist of water discharged from the Second Portage attenuation pond. In years 1 – 5 this pond will receive direct precipitation, contact and non-contact water, and treated sewage. Potential for particulates and dissolved metals to result in sublethal toxicity to fish.	(Year 1-5) L	L	M	F	NO	Install a diffuser at the outfall to increase dilution potential. Effluent will only be discharged during the open-water season and will not be discharged under ice to avoid sensitive periods for fish spawning and egg incubation.	Years 1-5 does not involve discharge of tailings effluents. Discharge below MMER standards and only during open water. Effect will be to reduce magnitude and extent of impact.	NO	Mod	Metal Mining Effluent Regulations are very specific with regards to monitoring requirements of effluents. A draft monitoring program (EEM 2004) has been designed for this project to address all EEM requirements.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
	After year 5, metals contaminated water from the tailings pond will be combined with the attenuation pond and discharged to Third Portage Lake. Given the low dilution potential and turnover in Third Portage Lake, there is potential for dissolved metals to exceed CCME criteria for the protection of aquatic life. Inputs of particulate bound contaminants may affect fish (metal toxicity leading to stress, avoidance, behavioural changes).	(> 5 Yr) M	R	M	F	YES	Delay discharge to Third Portage for as long as possible and contain wastes within Second Portage attenuation pond. A water treatment plant will be installed in Year 5 to reduce metals and TSS loading. Install a diffuser at the outfall to increase dilution potential. Effluent will only be discharged during the open-water season and will not be discharged under ice to avoid sensitive periods for fish spawning and egg incubation.	Despite water treatment and given the low buffering capacity of the project lakes, there is the potential for dissolved metals to exceed CCME criteria for the protection of aquatic life. Uncertain effects to phytoplankton and zooplankton. Magnitude will depend on spatial and temporal extent of exceedences, pending results of more detailed Water Quality Monitoring. This is the worst case scenario. Mitigation (adaptive water treatment) will reduce magnitude and extent of impacts to local and regional lakes.	YES	Mod	Metal Mining Effluent Regulations are very specific with regards to monitoring requirements of effluents. A draft monitoring program (MMER 2004) has been designed for this project to address all MMER requirements. A plume delineation study will be conducted in accordance with guidance. In addition, the AEMP will monitor impacts of the effluent from a wider spatial scale and place impacts in context with non-effluent impacts. Targeted studies will be implemented if necessary in accordance with adaptive management principals to assess habitat impacts.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
	Increase in nutrient levels in Third Portage Lake as a result of discharge of treated sewage. Possible increase in fish biomass due to higher rates of primary and secondary productivity.	L	L	M	F	NO	Primary treatment is proposed to reduce nutrient inputs. Wastes will be discharged only during the open water season after holding in attenuation pond. Install a diffuser at the outfall to increase dilution potential.	Increase in nutrient concentrations may cause an increase in primary productivity (i.e., phytoplankton) that may be reflected as an increase in secondary productivity and ultimately, fish.	NO	Mod	Routine monitoring of near-field and far-field stations as part of the AEMP for water column nutrient concentration chlorophyll a and phytoplankton biomass to quantify change. Depending on perspective, this may be viewed as a positive impact.
	Input of suspended sediment may result in fish avoidance, reduced feeding and gill functions, and increased egg mortality.	L	L	M	F	NO	Installation of a water treatment facility to control TSS introductions. Discharge only during the open water season to increase dispersion of suspended solids. Conform to MMER standards.	Possible degradation of fish habitats, smothering of fish eggs, and negative effects to fish. Mitigation will reduce the magnitude and extent and minimize adverse ecological effects.	NO	High	Implement MMER program. See AEMP for routine monitoring of TSS.
Non-Contact Diversion Facility	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage	NA – No pathway to aquatic ecosystem (see Spills).	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage / Explosives Magazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camp (North and South)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
VAULT FACILITIES											
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vault Dike	Potential for local impairment of water quality along Vault dike due to leaching of dissolved metals.	L	L	M	F	NO	Two m thick layer of IF rock material will be placed on external surface of Vault Dike to provide optimal nursery and shelter habitat for lake trout and round whitefish. See No Net Habitat Loss repot (2004) for details of habitat compensation.	Connections to two small lakes to provide new habitat will offset losses to fish biomass. Low metal-leaching rock will reduce magnitude and extent of dissolved metals.	NO	High	A targeted study has been proposed to monitor pore water and very near-field water quality along the Vault dike to confirm/refute Golder (2004) predicted water quality modeling (see AEMP).
Vault L. Dewatering	NA – refer to Construction phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit Operation	Pit operation will result in loss of habitat of Vault Lake. Net loss of fish productivity equivalent to lake area.	M	L	M	F	YES	Loss of fish habitat will be compensated for by creating habitat along dike exteriors during operations phase, as well as new habitat (two small lakes) connected to Wally Lake. See NNL Report (2004) for full details.	Loss of fish habitat (Vault Lake) during operation, to be regained post-closure (re-flooding lakes area over several years; lowered quality). Net loss is only partially reduced by habitat area and value created along dike exterior (operation).	YES	Mod	The NNL Habitat Report addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Vault Rock Storage Facility	Runoff from disturbed terrain and the waste rock pile (i.e., contact water) could introduce low pH water with elevated metals concentrations into Wally Lake, adversely affecting fish.	M	L	P	F	YES	All contact water with Rock Storage facility will be directed to the Vault Lake attenuation pond to eliminate impacts to fish from introduction of low pH, high metals surface water. Discharge only during open water season.	Small increase in TSS, metals from discharge of attenuation pond water into Wally Lake during open water. Mitigation will reduce magnitude and extent of adverse effects.	NO	High	Water quality monitoring adjacent to dikes and outfall. Targeted monitoring during construction will be implemented when necessary. See Section x.x of the AEMP.
Roads and Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, road dust. Possible impacts to fish from sedimentation and dissolved metals.	L	L	M	F	NO	Operation of heavy equipment in and around waterways will be avoided. No direct contact of vehicles in lakes. Dust suppressants applied to roads. Other dust control measures for aerial emissions. Perimeter ditches to direct runoff to Vault attenuation pond.	Negligible ecological effects on fish habitat. Use of collection channels will eliminate pathway and reduce magnitude and extent of adverse effects.	NO	High	Water quality monitoring in Wally Lake will be conducted routinely at a variety of locations. See AEMP.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Effluent Discharge – Wally Lake	Effluent discharge to Wally Lake is scheduled to in Year 5 of operation. No input of mine water or other contaminants will be directed to the attenuation ponds and water treatment plant will be required. Effluent will be discharged during open water and will consist of pit inflow water, precipitation and non-contact water (Golder 2004). Possible adverse effects to fish and eggs from exposure to metals and TSS.	L	L	M	F	NO	Install a diffuser at the outfall to increase dilution potential. Effluent will only be discharged during the open-water season and will not be discharged under ice to avoid sensitive periods for fish spawning and egg incubation. Effluent will be monitored, and will be treated if necessary (MMER).	Minor potential for direct impacts to fish from dissolved metals and TSS. Reduced feeding efficiency by trout. Possible settling of particulates on fish spawning habitat. Mitigation will reduce the magnitude and extent of residual effects.	NO	Mod	Effluent from the Vault attenuation ponds will be monitored under MMER in the same fashion as mine water discharge. See the MMER Report. A plume delineation study will be conducted to determine the spatial extent of the plume and determine whether a fish survey is required.
Non-Contact Diversion Facility	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop / Office	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turn Lake Road Crossing	Potential for impaired fish passage because of high water velocity during spring freshet; visual barrier to fish movement because of long culvert length.	L	L	M	I	NO	Install rip rap along shorelines and approaches to road crossing and within dike to encourage movement by fish. Install culvert to maintain discharge velocity <0.6 m/s to ensure fish passage.	Possible reduced movement by fish into or out of Turn Lake. Adequate culvert sizing will ensure that fish passage is not compromised.	NO	High	Hoop nets will be set at the upstream and downstream end of the culverts to capture fish for purposes of a mark-recapture study to determine movement of fish through the culvert into Turn Lake. See AEMP Targeted study.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
OTHER FACILITIES											
Worker Fishing – Project Lakes	Increase in direct mortality of fish in all project lakes due to presence of mine workers during life of mine.	M	L	M	F	YES	Implement a strict no-fishing policy at all project lakes.	First Nations may exercise their traditional right to fish for sport, domestic consumption or to provide fish to dogs, resulting in an unknown degree of impact. Implementation of the policy will reduce the frequency of fishing and magnitude of fish harvest.	NO	Mod	The AEMP describes a program to gather biological data (standard meristics, tissue samples for metals) for fish captured by workers, where possible.
Winter Road Operation and Traffic	Compaction of stream beds; erosion of entry/exit points of lakes causing erosion, permafrost exposure. Potential impacts to fish movements if streams are blocked.	L	R	M	I	NO	Use existing winter road route; use lake areas as much as possible; Use of large tundra tires, and enter/exit lakes and streams where there is snow cover protecting soils. Select alternate route if a problem is identified during routine monitoring (see AEMP). Follow hazardous material handling guidelines; follow spill contingency guidelines.	Mitigation will reduce magnitude and frequency of impacts. Negligible residual impact on fish and their movements within streams and channels.	NO	High	Routine, annual monitoring of the winter road to determine if any adverse effects can be observed and corrected (see AEMP). Implement emergency spills response in event of an accidental spill.

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Baker Lake Marine Barge Landing Facility	Localized disturbance to fish along Baker Lake foreshore due noise, barge activity, and introduction of TSS.	L	L	M	I	NO	Construct landing facility away from sensitive areas to fish avoid high quality habitat; use geotextile material during unloading to minimize erosion and habitat disturbance; see AEMP and No Net Loss Report (2004).	Negligible residual impact to fish. Mitigation will reduce the magnitude of impacts to shoreline habitat.	NO	High	Routine, annual monitoring of the barge landing facility will be conducted to determine if any adverse effects can be observed and corrected, if necessary (see AEMP).
Marine Barge Traffic	Increase in marine barge traffic. Will cause small incremental rise of noise and hydrocarbon emissions along the transport route.	L	R	S	I	NO	Follow standard marine shipping procedures during Hudson Bay open water season.	Negligible residual impact to fish. Mitigation will reduce the magnitude of impacts to shoreline habitat.	NO	High	No monitoring required.
Baker Lake Staging Facility	Construction of the staging facility will take place well away from fish-bearing waters and no adverse physical effects are anticipated.	L	L	S	R	NO	Ensure compliance with policies for vehicle re-fueling, safe storage of explosives, fuels, etc.	Negligible residual impact to fish. Mitigation will reduce the magnitude of impacts to shoreline habitat.	NO	High	No monitoring required.
Explosives Magazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B13.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects					Proposed Mitigation	Assessment of Residual Effects			Aquatic Environment Management Program (AEMP) Description
		Spatial Boundaries		Temporal Boundaries		Significance of Unmitigated Effects		Residual Effect / Influence of Mitigation	Significance of Residual Effects	Certainty of Prediction	
		Magnitude	Spatial Extent	Duration	Frequency and Timing						
Accidental Spills: Fuel Storage Site (Portage), Tank Farm, Roads, Marine Transport.	Potential spills can impact fish and their eggs through introduction of contaminants (toxicity), or physical effect (blockages of streams reducing movements).	L	L	M	R	NO	Tank farm built within berms for containment. Follow hazardous material handling guidelines; follow spill contingency guidelines; protocols and standards for barge operators. Follow standard marine shipping procedures during Hudson Bay open water season. Implement strategies contained in the Spill Contingency Report.	Mitigation will reduce the magnitude, duration and spatial extent of any spills that may occur and cause impacts.	NO	High	Implement emergency spills response in event of an accidental spill.

Table B13.3: Fish Impact Matrix – Closure & Post-Closure

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Assessment of Residual Effects		
		Spatial Boundaries		Temporal Boundaries		Influence of Activity/ Residual Effect	Significance of Residual Effects	Certainty of Prediction
		Magnitude	Spatial Extent	Duration	Frequency and Timing			
MAIN FACILITIES								
Dikes								
Second Portage - East Dike	Create habitat on dike interior in Third Portage Lake. Leaching of dissolved metals from dike materials into surrounding water column. Loss of habitat suitable for fish egg development. Cause potential toxicity to fish eggs, reducing survival and development. Fish avoidance of local area. Effect diminishes over time.	L	L	S	F	New dike habitat represents an increase in structural complexity and area of fish habitat compared to pre-mining condition; benefit is partially offset by localized leaching of dissolved metals through capped dike wall into water. Net effect is neutral or positive to fish productivity. Significant increase in habitat for fish spawning. Dissolved metals may reduce fish egg survival and larval development during overwinter incubation. Effect decreases over time.	NO	High
Second Portage Lake Tailings Dike	Create habitat on tailings dike exterior (now part of Third Portage Lake). Leaching of metals from dike porewaters into immediate water columns, affecting fish egg survival on dikes facing old pit area. Cause potential toxicity, resulting in reduced egg survival, fish avoidance of area, thereby reducing fish habitat of Third Portage Lake. Effect diminishes over time.	L	L	S	F	New dike habitat represents an increase in structural complexity and area of fish habitat compared to pre-mining condition; benefit is partially offset by localized leaching of dissolved metals through capped dike wall into water. Net effect is neutral to fish productivity. Moderate increase in habitat for fish spawning. Dissolved metals may reduce fish egg survival and larval development during overwinter incubation. Effect decreases over time.	NO	High

Table B13.3 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Assessment of Residual Effects		
		Spatial Boundaries		Temporal Boundaries		Influence of Activity/ Residual Effect	Significance of Residual Effects	Certainty of Prediction
		Magnitude	Spatial Extent	Duration	Frequency and Timing			
Third Portage – Goose Island Dike	Create habitat on breached dike exterior and interior (Third Portage Lake). Leaching of metals from dike materials into surrounding water column. Loss of suitable habitat for fish egg development. Cause potential toxicity, resulting in reduced egg survival, fish avoidance of area, thereby reducing fish habitat of Third Portage Lake. Effect diminishes over time.	L	L	S	F	New dike habitat represents an increase in structural complexity and area of fish habitat compared to pre-mining condition; benefit is partially offset by localized leaching of dissolved metals through capped dike wall into water. Net effect is neutral or positive to fish productivity. Significant increase in habitat for fish spawning. Dissolved metals may reduce fish egg survival and larval development during overwinter incubation. Effect decreases over time.	NO	High
Pits								
Pit Operation - Portage Pit and Goose Island	Adjoining Third Portage Lake to new habitat (part of which was previously Second Portage Lake) within Portage/ Goose Island pit areas. Deep pit footprint (Portage) will remain following closure, representing new habitat of lower quality to fish (altered conditions at bottom, less food available).	M	L	P	F	Habitat area in Second Portage Lake now part of Third Portage Lake; habitat of lowered quality (very deep), proportional to flooded pit area. Reduced fish productivity. Insignificant increase in fish productivity in Third Portage Lake.	YES (SPL) NO (TPL)	High
	Connection of Portage and Goose Island pit areas to Third Portage Lake. Residual metals from pit walls will move into water column. Potential toxicity to fish and fish eggs in local area (along dikes encircling pits). Fish avoidance and reduced fish biomass in pit area relative to pre-mine condition.	L	L	S	F	New habitat within pit area may cause toxicity to fish and eggs. Net loss in productivity may be offset by increase in habitat area. See NNL 2004.	NO	High
Second Portage Tailings Facility	Permanent capping and storage of tailings at Second Portage Tailings Facility. North arm of Second Portage Lake is lost fish habitat. Reduced fish productivity in this lake.	H	L	P	F	Permanent loss of fish habitat resulting in reduced fish productivity (See NNL 2004).	YES	High
	Capping tailings material. Leaching of dissolved metals from tailings materials into surface waters.	L	L	P	I	Metals leaching will be minimal due to capping and gradual permafrost formation. Toxicity reducing fish productivity limited to open water season, diminished over time as tailings freeze.	NO	Mod

Table B13.3 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Assessment of Residual Effects		
		Spatial Boundaries		Temporal Boundaries		Influence of Activity/ Residual Effect	Significance of Residual Effects	Certainty of Prediction
		Magnitude	Spatial Extent	Duration	Frequency and Timing			
Portage – Goose Rock Storage Facility	Permanent storage of waste rock material. Runoff from the waste rock pile (i.e., contact water) could introduce low pH water with elevated metals concentrations into Second Portage Lake and Third Portage lakes, resulting in localized toxicity to fish and eggs.	L	L	P	I	During open-water season, some runoff from surface waters/ leachate from capped rock storage materials may lead to decreased fish productivity. Permafrost formation over several years will reduce exposure to fish.	NO	Mod
Borrow Pit/Quarry	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Roads will be decommissioned; land will be restored.	NA	NA	NA	NA	NA	NA	NA
Airstrip and Air Traffic	Airstrip will be decommissioned; land will be restored.	NA	NA	NA	NA	NA	NA	NA
Mine Plant and Facilities	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	Pipeline will be removed during closure. No residual effect.	NA	NA	NA	NA	NA	NA	NA
Effluent Discharge and Pipeline – Third Portage Lake	No effluent discharge will occur following mine closure. Removal of discharge pipeline during closure. No residual effects.	NA	NA	NA	NA	NA	NA	NA
Non-Contact Diversion Facility	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Fuel Storage	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage / Explosives Magazine	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Camp (North and South)	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES								

Table B13.3 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Assessment of Residual Effects		
		Spatial Boundaries		Temporal Boundaries		Influence of Activity/ Residual Effect	Significance of Residual Effects	Certainty of Prediction
		Magnitude	Spatial Extent	Duration	Frequency and Timing			
Vault Pit	Connecting re-flooded Vault pit with Wally Lake (Vault dike removed at closure). Vault Lake has reduced quality of fish habitat (deep pit). Pit area will show a loss of fish productivity from original Vault Lake.	L	L	P	F	Fish habitat in Vault Lake will be of lowered quality, proportional to pit area. Fish productivity will be reduced post-closure.	YES	High
	Connection of Vault pit area to Wally Lake. Residual metals from pit walls will move into water column. Potential toxicity to fish and fish eggs in local area (lake littoral habitat encircling pits). Fish avoidance and reduced fish biomass in Vault Lake. Effects decrease over time.	L	L	S	F	Restored Vault Lake will contain residual metals from pit walls. Potential toxic effects to fish and eggs. Possible fish avoidance of these lakes. Effects decrease over time.	NO	High
Vault Rock Storage Facility	Permanent storage of waste rock materials. Runoff from the waste rock pile (i.e., contact water) could introduce low pH water with elevated metals concentrations into Wally and Vault lakes, causing localized impacts on fish productivity.	M	L	P	I	During open-water season, some runoff from surface waters/ leachate from capped rock storage materials may lead to decreased fish productivity. Permafrost formation over several years will reduce metals leaching and diminish exposure to fish.	NO	Mod
Roads and Traffic	Roads will be decommissioned; land will be restored.	NA	NA	NA	NA	NA	NA	NA
Effluent Discharge – Wally Lake	No effluent discharge will occur following mine closure. Removal of discharge pipeline during closure. No residual effects.	NA	NA	NA	NA	NA	NA	NA
Non-Contact Diversion Facility	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Mine Shop / Office	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Turn Lake Road Crossing	Removal in winter when natural stream channel is frozen. Minor disturbance to localized fish during closure; no residual effects following restoration.	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES								
Worker Fishing – Project Lakes	Fish harvest reduced to historic, traditional use, depending on community of Baker Lake.	NA	NA	NA	NA	NA	NA	NA
Winter Road Operation and Traffic	No further use of road.	NA	NA	NA	NA	NA	NA	NA

Table B13.3 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Assessment of Residual Effects		
		Spatial Boundaries		Temporal Boundaries		Influence of Activity/ Residual Effect	Significance of Residual Effects	Certainty of Prediction
		Magnitude	Spatial Extent	Duration	Frequency and Timing			
Baker Lake Marine Barge Landing Facility	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Marine Barge Traffic	NA (no traffic in this phase).	NA	NA	NA	NA	NA	NA	NA
Baker Lake Staging Facility	Removal of the staging facility is not expected to cause any adverse effects during operation; no residual effects post-closure.	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Accidental Spills	Facilities (fuel storage (Portage), tank farm, roads, marine transport) will be removed at mine closure; no residual effects post-closure.	NA	NA	NA	NA	NA	NA	NA

Table B14.1: Fish Habitat Impact Matrix – Construction

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
MAIN FACILITIES											
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dike Construction											
Second Portage Lake East Dike	Disturbance of fine sediments beneath dike footprint causing increase in TSS. Compression of sediments releasing dissolved metals in pore water. Elimination of fish habitat beneath dike footprint.	M	L	S	F	NO	Use silt curtains to contain sediments during dike construction.	Possible escape of sediment beneath or around silt curtain causing local increase in TSS and smothering of fish habitat. Decreased magnitude of ecological effect.	NO	High	AEMP will monitor water quality in dike near-field. Targeted study to address productivity of fish habitat on dike exterior. See>NNL Habitat Report for habitat compensation assessment.
	Dike placement will eliminate one connecting channel between Second and Third Portage Lake.	M	L	M*	I	NO	Enhance (widen, deepen) one stream channel, improving opportunity for fish movement in the two remaining channels.	Decreased magnitude of ecological effect, improving passage, and extending period for fish movement into Third Portage Lake.	NO	High	Monitor stream channel integrity.
	Local impairment of Second Portage Lake from introduction of nitrates from blasted rock used to construct dike. Increase in phytoplankton and zooplankton abundance.	L	L	M	I	NO	Use silt curtains to minimize sediment dispersion.	Leaching of nitrates from blasted rock. Small increase in lake productivity in near-field from nutrients.	NO	Mod	A targeted study has been proposed to monitor near-field water quality and assess changes in productivity (see AEMP).
Second Portage Lake Tailings Dike	NA (See Post-Closure phase)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Third Portage Lake Portage Dike	Disturbance of fine sediments beneath dike footprint causing increase in TSS. Compression of sediments releasing dissolved metals in pore water. Elimination of fish habitat beneath dike footprint.	L	L	S	F	NO	Use silt curtains to contain sediment during dike construction.	Possible escape of sediment beneath or around silt curtain causing local increase in TSS and smothering of fish habitat. Evacuation of fish from disturbed area	NO	High	AEMP will monitor water quality in dike near-field and assess impacts of TSS and metals in Third Portage Lake See NNL Habitat Report for habitat compensation assessment.
	Local impairment of Third Portage Lake from introduction of nitrates from blasted rock used to construct dike. Increase in phytoplankton and zooplankton abundance.	L	L	M	I	NO	No mitigation possible to protect fish habitat during construction.	Leaching of nitrates from blasted rock. Small increase in lake productivity in near-field from nutrients.	NO	Mod	A targeted study has been proposed to monitor near-field water quality and assess changes in productivity (see AEMP).

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Third Portage Lake Goose Island	Disturbance of fine sediments beneath dike footprint causing increase in TSS. Compression of sediments releasing dissolved metals in pore water. Elimination of fish habitat beneath dike footprint.	L	L	S	F	NO	Use silt curtains to contain sediment during dike construction.	Possible escape of sediment beneath or around silt curtain causing local increase in TSS and smothering of fish habitat. Leaching of nitrates from newly placed dike material. Evacuation of fish from disturbed area	NO	High	AEMP will monitor water quality in dike near-field and assess impacts of TSS and metals in Third Portage Lake See>NNL Habitat Report for habitat compensation assessment.
	Local impairment of Third Portage Lake from introduction of nitrates from blasted rock used to construct dike. Increase in phytoplankton and zooplankton abundance.	L	L	M	I	NO	No mitigation possible to protect fish habitat during construction.	Leaching of nitrates from blasted rock. Small increase in lake productivity in near-field from nutrients.	NO	Mod	A targeted study has been proposed to monitor near-field water quality and assess changes in productivity (see AEMP).
Pit Dewatering											
Dewatering of Second Portage North Arm into Third Portage Lake	Second Portage Lake behind the East Dike will be drawn down by 28 m. Water will be discharged to Third Portage Lake North Basin. During drawdown, there is the potential for entrainment of sediment and pore water metals discharged to Third Portage Lake. Potential for smothering and toxicity to aquatic invertebrates.	M	L	S	F	NO	Locate dewatering barge and pumps in an area of Second Portage Lake such that withdrawal of suspended sediments from water column is minimized.	Temporary increase in TSS causing reduced light penetration and productivity, smothering of fish habitat in depositional areas of North Basin Third Portage Lake. Mitigation will reduce magnitude and duration of effects.	NO	Mod	Monitoring of water column TSS during dewatering of impoundment has been identified as a targeted study within the AEMP.

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Dewatering of Portage Pit into Third Portage Lake	Entrainment of sediments during draw down and pumping into Third Portage Lake. Decreased water quality, sedimentation of benthic habitats.	L	L	S	F	NO	Locate dewatering barge and pumps within deepest portion of impounded area such that withdrawal of suspended sediments is minimized as much as possible.	Increase in TSS causing reduced light penetration and productivity, smothering of fish habitat in depositional areas of Third Portage Lake. Mitigation reduces magnitude and duration of effects.	NO	Mod	Monitoring of water column TSS and effects on fish during dewatering of Portage Pit impoundment has been identified as a targeted study within the AEMP.
Dewatering of Bay Zone Pit into Third Portage Lake	Entrainment of sediments during draw down and pumping into Third Portage Lake. Decreased water quality, sedimentation of benthic habitats.	L	L	S	F	NO	Locate dewatering barge and pumps within deepest portion of impounded area such that withdrawal of suspended sediments is minimized as much as possible.	Increase in TSS causing reduced light penetration and productivity, smothering of fish habitat in depositional areas of Third Portage Lake. Mitigation reduces magnitude and duration of effects.	NO	Mod	Monitoring of water column TSS and effects on fish during dewatering of Portage Pit impoundment has been identified as a targeted study within the AEMP.
Dewatering of Goose Island Pit into Third Portage Lake	Entrainment of sediments during draw down and pumping into Third Portage Lake. Decreased water quality, sedimentation of benthic habitats.	L	L	S	F	NO	Locate dewatering barge and pumps within deepest portion of impounded area such that withdrawal of suspended sediments is minimized as much as possible.	Increase in TSS causing reduced light penetration and productivity, smothering of fish habitat in depositional areas of Third Portage Lake. Mitigation reduces magnitude and duration of effects.	NO	Mod	Monitoring of water column TSS during dewatering of impoundment has been identified as a targeted study within the AEMP.

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Pit Development											
Portage Pit	Pit development will result in medium-term loss of habitat behind dike in Second Portage Lake. Net loss of habitat and productivity in Second Portage Lake equivalent to pit surface area.	M	L	M*	F	YES	Loss of fish habitat in Second Portage Lake from pit footprint will be compensated for by creating habitat along dike exteriors during operations phase and during post-closure. Further offsite habitat compensation will be required (to be resolved with DFO) at Baker Lake. See No Net Loss Report (2004) for full details.	Loss of fish habitat during mine life; alteration of habitat at post-closure. Net loss is offset by habitat area and value created along dike exterior (operation) and interior (post-closure), as well as additional habitat at Baker Lake.	YES	High	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.
Bay Zone Pit	During Year 0-5, pit development will result in medium-term loss of habitat behind dike in Second Portage Lake. Net loss of habitat and productivity in Second Portage Lake equivalent to pit surface area. This pit will be incorporated within Goose Island Pit after Year 5.	L	L	M*	F	NO	Loss of fish habitat in Third Portage Lake from pit footprint will be compensated for by creating habitat along dike exteriors during operations phase and during post-closure. Further offsite habitat compensation will be required at Baker Lake.	Loss of fish habitat within pit footprint. Net loss is offset by value created along dike exterior (operation) and interior (post-closure).	NO	High	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Goose Island Pit	Pit development will result in medium-term loss of habitat behind dike in Third Portage Lake. Net loss of habitat and productivity in Third Portage Lake equivalent to pit surface area.	L	L	M*	F	NO	Loss of fish habitat in Third Portage Lake from pit footprint will be compensated for by creating habitat along dike exterior during operations phase and during post-closure. Further offsite habitat compensation will be required at Baker Lake.	Loss of fish habitat within pit footprint. Net loss is offset by value created along dike exterior (operation) and interior (post-closure).	NO	High	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.
Second Portage Tailings Facility	Permanent loss of fish habitat due to tailings disposal.	H	L	M	F	YES	Replace habitat by connecting a channel to Dogleg Lake. Offsite compensation at Baker Lake.	Reduce aerial proportion of fish habitat loss by connecting Dogleg Lake by a connecting channel and habitat at Baker L.; mitigation reduces magnitude of habitat loss.	YES	High	Habitat lost as a result of installation of a tailings disposal facility will be partially compensated for by a combination of on-site and off-site activities. See NNL Program for details.

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Portage – Goose Island Rock Storage Facility	The Portage – Goose Rock storage facility lies directly over Lake NP-2 (fish bearing) and adjacent to one small non-fish bearing pond. Lake NP-2 does not have an hydraulic connection to Second Portage Lake and is isolated. The rock storage facility will eliminate all fish habitat in Lake NP-2. Contact water runoff from disturbed terrain and the waste rock pile could introduce low pH water with elevated metals concentrations into Third Portage Lake.	L	L	M*	F	NO	Construct a reliable hydraulic connection between Second Portage Lake and Dogleg Lake (NP-1). All contact water with Rock Storage facility will be directed to the Second Portage Lake attenuation pond to eliminate impacts to habitat from introduction of low pH, high metals surface water drainage.	Access by fish to Dogleg Lake will result in a net increase in available habitat despite elimination of NP-2 pond. Directing all contact water to attenuation pond will reduce magnitude and frequency of effects.	NO	High	Access to Dogleg Lake by fish from Second Portage Lake will increase available habitat and increase productive capacity. The NNL Habitat Report (2004) describes effectiveness of habitat compensation.
Borrow Pit/Quarry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, road dust. Smothering of benthos and fish spawning habitat, impaired feeding efficiency by fish; toxicity due to metals introductions.	L	L	S	F	NO	Construction activities in and around waterways will be avoided. No direct contact of vehicles in lakes. Dust suppressants applied to roads. Other dust control measures for aerial emissions. Perimeter ditches for all contact water directed to runoff to tailings facility in Second Portage Lake.	Collection of contact water and diversion by ditches to attenuation pond to eliminate exposure pathway. Mitigation will reduce magnitude, extent and duration of effects. Negligible residual ecological effects.	NO	High	Targeted monitoring during road construction will be implemented if necessary. See AEMP (2004). Because all contact water is captured and routed to the attenuation pond, there is no direct runoff to the receiving environment and no routine monitoring is required.

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Airstrip and Air Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, dust during aircraft take-off and landing. Smothering of benthos and fish spawning habitat, impaired feeding efficiency by fish; toxicity due to metals introductions.	L	L	S	F	NO	Dust suppressants applied to airstrip. Other dust control measures for aerial emissions. Perimeter ditches for all contact water to direct runoff to attenuation pond.	Collection of contact water and diversion by ditches to attenuation pond to eliminate exposure pathway. Mitigation will reduce magnitude, extent and duration of effects. Negligible residual ecological effects.	NO	High	Targeted monitoring during airstrip construction will be implemented if necessary. See AEMP (2004).
Mine Plant and Associated Facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	Construction of water intake pipe in Third Portage Lake altering the directly underlying fish habitat.	L	L	S	R	NO	Minimize disturbance of bottom, time installation during open water.	Negligible ecological effect.	NO	High	No monitoring required.
Discharge Facility and Pipeline	Installation of a pipeline and floating barge in Third Portage Lake, altering the directly underlying fish habitat.	L	L	S	R	NO	Minimize disturbance of bottom, time installation during open water.	Negligible ecological effect.	NO	High	No monitoring required.
Non-Contact Diversion Facility	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage at Site	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage / Explosives Magazines	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Camps (North and South)	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES											
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Dike Construction – Vault Lake	Minor disturbance to nearshore area of Wally Lake/Vault Lake beneath dike footprint with potential for minor increase in TSS. Elimination of fish habitat beneath dike footprint.	L	L	S	I	NO	Use silt curtains to contain sediments during dike construction.	Low potential for escape of sediment beneath or around silt curtain because of boulder substrate. Low possibility of increase in TSS and smothering of fish habitat. Nearshore area impacted is very small and potential for residual effects in Wally Lake is negligible.	NO	High	AEMP will monitor water quality in dike near-field during construction and assess impacts on fish habitat in Wally Lake. See NNL Habitat Report for habitat compensation assessment.
	Introduction of nitrates from blasted rock used to construct dike. Increase in primary and secondary productivity.	L	L	S	I	NO	Use silt curtains to contain disturbance during dike construction.	Small increase in lake productivity in near-field from nutrients.	NO	High	A targeted study has been proposed to monitor near-field water quality and assess changes in productivity (see AEMP).
Vault Lake Dewatering	Entrainment of sediments during draw down and pumping into Wally Lake causing increase in TSS and local impairment of benthic habitat.	M	L	S	F	NO	Locate dewatering barge and pumps in profundal area of Vault Lake to minimize entrainment of suspended sediments.	Increase in TSS causing reduced light penetration and productivity, smothering of fish habitat in depositional areas of Wally Lake. Mitigation will reduce magnitude and extent of effects.	NO	Mod	Monitoring of water column TSS during dewatering of impoundment has been identified as a targeted study within the AEMP.

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Pit Development	Pit development will result in loss of habitat within Vault Lake. Net loss of habitat and productivity equivalent to lake surface area.	M	L	M*	F	YES	Loss of fish habitat from pit footprint will be compensated for by creating habitat along dike exterior. See NNL Report (2004).	Temporary loss of fish habitat beneath dike footprint during operation. Net loss is offset by habitat area and value created along dike exterior.	YES	High	The NNL Habitat Report addresses net impacts to fish habitat and implications on fish over mine life during operation.
Vault Rock Storage Facility	Runoff from disturbed terrain and the waste rock pile (i.e., contact water) could introduce low pH water with elevated metals concentrations into Wally Lake, adversely affecting fish habitat.	M	L	M*	F	YES	All contact water with Rock Storage facility will be directed to the Vault Lake attenuation pond to eliminate impacts to habitat from introduction of low pH, high metals surface water drainage. Discharge only during open water season.	Small increase in TSS, metals from discharge of attenuation pond water into Wally Lake during open water. Mitigation will reduce magnitude and frequency of effects by directing all contact water to Vault attenuation pond.	NO	High	Water quality monitoring adjacent to dikes and outfall. Targeted monitoring during construction will be implemented when necessary. See Section x.x of the AEMP.

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Roads and Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, road dust. Localized reductions in habitat productivity due to reduced water clarity and smothering of benthos.	L	L	M*	F	NO	Construction activities in and around waterways will be avoided. No direct contact of vehicles in lakes. Dust suppressants applied to roads. Other dust control measures for aerial emissions. Perimeter ditches to direct runoff to attenuation ponds.	Negligible residual effect. Mitigation will reduce the frequency and duration of effects and eliminate the exposure pathway and ecological effects.	NO	High	Water quality monitoring adjacent to mine site will be conducted routinely at a variety of locations. Targeted monitoring during construction will be implemented when necessary. See AEMP.
Non-Contact Diversion Facility	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop / Office	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Turn Lake Road Crossing	Culverts will be installed in the dry season during winter when natural stream channel is frozen. Elimination of fish habitat beneath culvert footprint	L	L	S	R	NO	Construct during winter. Place coarse grain substrate in bottom of culverts to replace habitat loss. see Aquatic Environmental Management Plan and No Net Loss Report (2004).	Negligible residual effect.	NO	High	Annual monitoring to confirm that rep rap habitat at entry and exit points to culvert is stable and functioning as designed (see AEMP).

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
OTHER FACILITIES											
Winter Road and Traffic	Potential damage to lake and stream habitat quality at winter road crossings via compaction and erosion (i.e., destabilization of entry/ exit points). Potential temporary stream blockage in spring due to freeze-down and snow pack at stream crossing points of lakes causing erosion, permafrost exposure.	L	R	M	I	NO	Avoid use of winter road at the beginning and end of the season; install protective devices or maintain winter road to minimize potential effects; cross at established entry points; use appropriate vehicles and tires; Select alternate route if a problem is identified during routine monitoring (see AEMP).	Negligible residual effect. Mitigation will reduce magnitude, duration and frequency of effects.	NO	High	Routine, annual monitoring of the winter road will be conducted to determine if any adverse effects to fish habitat at key crossing areas can be detected and corrected, if necessary (see AEMP).
Baker Lake Access Road and Traffic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Baker Lake Marine Barge Landing Facility	Localized alteration of fish habitat along Baker Lake foreshore.	L	L	M*	I	NO	Construct landing facility to minimize impacts to near-shore and shoreline of Baker Lake; avoid high quality habitat; use geotextile material during unloading to minimize erosion and habitat disturbance; see AEMP and No Net Loss Report .	No residual effects anticipated. Mitigation will reduce magnitude, duration and frequency of effects.	NO	High	Implement emergency spills response in event of an accidental spill (see AEMP). Routine, annual monitoring of the Barge Landing Facility will be conducted to determine if any adverse effects to fish habitat can be detected and corrected, if necessary (see AEMP).

Table B14.1 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Program (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect / Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Marine Barge Traffic during Construction	Increase in marine barge traffic. Will cause small incremental rise of noise and hydrocarbon emissions along the transport route.	L	R	S	I	NO	Follow hazardous material handling guidelines; follow spill contingency guidelines; protocols and standards for barge operators	Mitigation will reduce the magnitude and frequency of effects (negligible residual effect).	NO	High	No monitoring required.
Baker Lake Staging Facility	Construction of the staging facility will take place well away from fish-bearing waters and no adverse physical effects are anticipated	L	L	S	R	NO	Ensure compliance with policies for vehicle re-fueling, safe storage of explosives, fuels, etc.	Negligible residual effect.	NO	High	No monitoring required.
Explosives Magazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Accidental Spills: Fuel Storage Site (Portage), Tank Farm, Roads, Marine Transport.	Potential spills can impact fish habitat through introduction of contaminants (toxicity), or physical effect (smothering, compaction, erosion).	L	L	M	R	NO	Tank farm built within berms for containment. Follow hazardous material handling guidelines; follow spill contingency guidelines; protocols and standards for barge operators. Follow standard marine shipping procedures during Hudson Bay open water season. Implement strategies contained in the Spill Contingency Report.	Mitigation will reduce the magnitude, duration and spatial extent of any spills that may occur and cause impacts.	NO	High	Implement emergency spills response in event of an accidental spill (see AEMP).

Table B14.2: Fish Habitat Impact Matrix – Operation

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
MAIN FACILITIES											
Noise and Traffic	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dikes											
Second Portage - East Dike	Leaching of metals from dike materials into water columns, affecting constructed fish habitat quality on dikes. Loss of habitat under dike footprint. Cause potential toxicity, limiting periphyton growth, and colonization by benthos, thereby reducing fish habitat.	L	L	P	F	NO	Fish habitat will be replaced along dike exteriors during operations phase and during post-closure. Use IF material with lowest metal leaching potential to construct outer face of East Dike. Substrate, depth and slope of dike exterior designed to optimize spawning and rearing habitat for fish and colonization by periphyton and benthos.	Reduced productive capacity of fish habitat in Second Portage Lake. Mitigation will further reduce magnitude and provide productive habitat. Possible impairment of periphyton growth and benthic colonization. Use of low metal leaching rock will reduce magnitude and frequency of habitat impairment.	NO	Mod	The net difference in productive capacity of fish habitat is assessed within the NNL Report (2004). There will be a net loss of habitat in the project area and off-site habitat compensation is being considered.
	Potential for local impairment of Second Portage Lake water quality due to metals leaching from dike material pore waters. Reduction in periphyton and benthic communities (fish habitat) away from dike.	L	L	L	F	NO	Use IF material with lowest metal leaching potential to construct outer face of East Dike.	Possible toxicity to phytoplankton and benthos. Effect will be reduced over time. Use of low metal leaching rock will reduce magnitude and frequency of habitat impairment.	NO	Mod	A targeted study has been proposed to monitor pore water and very near-field water quality along the dike to confirm/refute Golder (2004) predicted water quality modeling results of metal leaching (see AEMP). Implications on productivity of fish habitat will be assessed.
Second Portage – Tailings Dike	See Pit Development	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Third Portage Lake – Bay Zone Dike	Elimination of fish habitat within Portage South Dike footprint will reduce productive capacity of fish habitat in Third Portage Lake (Years 0-5).	L	L	S	F	NO	Replace fish habitat along dike exteriors during operations and post-closure. Use IF material with lowest metal leaching potential to construct outer face of East Dike; See No Net Loss Report (2004). Substrate, depth and slope of dike exterior designed to optimize spawning and rearing habitat for lake trout and round whitefish.	Reduced productive capacity of fish habitat in Third Portage Lake. Habitat loss offset by enhancement of habitat on dikes.	NO	Mod	The net difference in productive capacity of fish habitat is assessed within the NNL Report (2004). There will be a net loss of habitat in the project area and off-site habitat compensation is being proposed.
	Potential for local impairment of Third Portage Lake dike pore water quality due to metals leaching from dike material. Possible impairment of periphyton growth and benthos on dike exterior.	L	L	L	F	NO	Use IF material with low metal leaching potential to construct outer face of Portage South Dike.	Possible impairment of growth by periphyton and colonization by benthic invertebrates. Use of low metal leaching rock will reduce magnitude and frequency of habitat impairment.	NO	Mod	A targeted study has been proposed to monitor pore water and very near-field water quality along the dike to confirm/refute Golder (2004) predicted water quality modeling results of metal leaching (see AEMP).

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Third Portage Lake Goose Island	Elimination of 3% of lake area will reduce productive capacity of fish habitat in Third Portage Lake behind Goose Island dike.	L	L	P	F	NO	Fish habitat will be replaced along dike exteriors during operations phase and during post-closure. Use IF material with lowest metal leaching potential to construct outer face of East Dike. Substrate, depth and slope of dike exterior designed to optimize spawning and rearing habitat for lake trout and round whitefish.	Reduced productive capacity of fish habitat in Third Portage Lake within Goose Island dike.	NO	Mod	Enhancement of dike exterior is expected to offset habitat loss in Third Portage Lake and is addressed in the NNL Habitat Report (2004).
	Local impairment of Third Portage Lake water quality from leaching of metals from outside of dikes. Possible impairment of periphyton growth and benthos on dike exterior.	L	L	L	F	NO	Use IF material with lowest metal leaching potential to construct outer face of Goose Island Dike.	Possible impairment of growth by periphyton and colonization by benthic invertebrates. Use of low metal leaching rock will reduce magnitude and frequency of habitat impairment.	NO	Mod	A targeted study has been proposed to monitor pore water and very near-field water quality along the dike to confirm/refute Golder (2004) predicted water quality modeling results of metal leaching (see AEMP) to assess productivity of fish habitat compensation.
Pit Dewatering	NA – see Construction	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Pit Operation											
Pit Operation – Portage Pit and Goose Island Pit	Pit operation will result in loss of habitat beneath pit footprints in Second Portage Lake. Net loss of habitat and productivity equivalent to pit surface area.	M	L	L	F	YES	Loss of fish habitat in Second Portage Lake from pit footprint will be compensated for by creating habitat along dike during operations phase and during post-closure. Offsite habitat compensation will be required (to be resolved with DFO) at Baker Lake. See NNL Report (2004) for full details.	Loss of fish habitat beneath pit footprint. Net loss is partially offset (reduced magnitude) by habitat area and value created along dike exterior (operation) and interior (post-closure), and offsite at Baker L., but not enough to become insignificant.	YES	Mod	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.
Pit Operation – Bay Zone/ Goose Island pits	Pit operation will result in loss of habitat beneath pit footprints in Third Portage Lake. Net loss of habitat and productivity equivalent to pit surface area.	L	L	L	F	NO	Loss of fish habitat in Second Portage Lake from pit footprint will be compensated for by creating habitat along dike during operations phase and during post-closure. Offsite habitat compensation will be required (to be resolved with DFO) at Baker Lake. See NNL Report (2004) for full details.	Loss of fish habitat beneath pit footprint. Net loss is partially offset (reduced magnitude) by habitat area and value created along dike exterior (operation) and interior (post-closure).	NO	Mod	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Second Portage Tailings Facility	Permanent loss of habitat due to tailings disposal.	H	L	P	F	YES	Permanent loss of fish habitat in Second Portage Lake from pit footprint will be partially compensated for by creating habitat along dike exteriors during operations phase and during post-closure. See NNL Report (2004) for full details.	Permanent loss of fish habitat beneath post-closure pit footprint. Net loss is partially offset (reduced magnitude) by habitat area and value created along dike exterior (operation) and interior (post-closure), but not enough to become insignificant.	YES	High	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish over mine life during operation and post-closure.

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Portage – Goose Rock Storage Facility	The Portage – Goose Rock storage facility lies directly over Lake NP-2 (fish bearing) and adjacent to one small non-fish bearing pond. Lake NP-2 does not have an hydraulic connection to Second Portage Lake and is isolated. Runoff from the waste rock pile (i.e., contact water) during operation could introduce low pH water with elevated metals concentrations into Second Portage Lake and Third Portage lakes, reducing primary and secondary productivity.	L	L	P	F	NO	Construct a reliable hydraulic connection between Second Portage Lake and Dogleg Lake (NP-1). Dogleg contains fish but, like NP-2 does not have an hydraulic connection. Excavating a stream channel will allow fish to move back and forth between the lakes and will increase available fish habitat within the Second Portage Lake drainage system. All contact water with Rock Storage facility will be directed to the Second Portage Lake attenuation pond to eliminate impacts to habitat from introduction of low pH, high metals surface water drainage.	Access by fish to Dogleg Lake will result in a net increase in available habitat in Second Portage Lake despite elimination of NP-2 pond. Use of collection ditches and attenuation ponds will eliminate pathway to receiving environment, reducing magnitude, duration and frequency of impacts.	NO	High	Access to Dogleg Lake by fish from Second Portage Lake will increase available habitat and increase productive capacity. The NNL Habitat Report (2004) describes effectiveness of habitat compensation.
Borrow Pit/Quarry	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Roads and Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, road dust. Potential for reduction in primary and especially secondary productivity.	L	L	L	F	NO	Operation activities in and around waterways will be avoided. No direct contact of vehicles in lakes. Dust suppressants applied to roads. Other dust control measures for aerial emissions. Perimeter ditches will capture and direct all contact water to tailings facility.	Negligible ecological effect on fish. Mitigation will eliminate pathways of contamination, reducing magnitude, extent and duration of impacts.	NO	High	Water quality monitoring adjacent to mine site will be conducted routinely at a variety of locations. Targeted monitoring during construction will be implemented when necessary. See AEMP.
Airstrip and Air Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, road dust. Potential increase in sedimentation and impairment of benthic habitat.	L	L	L	F	NO	Operation activities in and around waterways will be avoided. No direct contact of vehicles in lakes. Dust suppressants applied to roads. Other dust control measures for aerial emissions. Perimeter ditches to direct runoff to tailings facility.	Negligible ecological effect on fish. Mitigation will eliminate pathways of contamination, reducing magnitude, extent and duration of impacts.	NO	High	Water quality monitoring adjacent to mine site will be conducted routinely at a variety of locations. Targeted monitoring during construction will be implemented when necessary. See AEMP.
Mine Plant and Associated Facilities	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Freshwater Intake and Pipeline	Operation of a water intake pipe in Third Portage Lake. Average intake rate is estimated to be 0.021 m ³ /s. Entrainment of plankton from the lake during open water.	L	L	L	F	NO	Install intake at deep depth near bottom to minimize entrainment of plankton.	Minimal entrainment of plankton, with negligible ecological effects.	NO	High	No monitoring required.

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Effluent Discharge and Pipeline – Third Portage Lake	Effluent discharge to Third Portage Lake North Basin during construction and years 1 – 5 of operation will consist of water discharged from the Second Portage attenuation pond. In years 1 – 5 this pond will receive direct precipitation, contact and non-contact water, and treated sewage. Potential for metals exposure to result in sublethal toxicity to aquatic life, and possible effects to fish habitat by deposition of particulates.	(Year 1-5) L	L	L	F	NO	Install a diffuser at the outfall to increase dilution potential. Effluent will only be discharged during the open-water season and will not be discharged under ice to avoid sensitive periods for fish spawning and egg incubation.	Years 1-5 does not involve discharge of tailings effluents. Discharge below MMER standards and only during open water. Effect will be to reduce magnitude and extent of impact.	NO	Mod	Metal Mining Effluent Regulations are very specific with regards to monitoring requirements of effluents. A draft monitoring program (EEM 2004) has been designed for this project to address all EEM requirements.

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
	After year 5, metals contaminated water from the tailings pond will be combined with the attenuation pond and discharged to Third Portage Lake. Given the low dilution potential and turnover in Third Portage Lake, there is potential for dissolved metals to exceed CCME criteria for the protection of aquatic life. Inputs of particulate bound contaminants will settle in depositional areas and may affect fish habitat.	(> 5 Yr) M	R	L	F	YES	Delay discharge to Third Portage for as long as possible and contain wastes within Second Portage attenuation pond. A water treatment plant will be installed in Year 5 to reduce metals and TSS loading. Install a diffuser at the outfall to increase dilution potential. Effluent will only be discharged during the open-water season and will not be discharged under ice to avoid sensitive periods for fish spawning and egg incubation.	Despite water treatment and given the low buffering capacity of the project lakes, there is the potential for dissolved metals to exceed CCME criteria for the protection of aquatic life. Uncertain effects on phytoplankton and zooplankton. Magnitude will depend on spatial and temporal extent of exceedences, pending results of more detailed Water Quality Monitoring. This is the worst case scenario. Mitigation (adaptive water treatment) will reduce the magnitude and extent of negative water quality impacts to local and regional lakes.	YES	Mod	Metal Mining Effluent Regulations are very specific with regards to monitoring requirements of effluents. A draft monitoring program (MMER 2004) has been designed for this project to address all MMER requirements. A plume delineation study will be conducted in accordance with guidance. In addition, the AEMP will monitor impacts of the effluent from a wider spatial scale and place impacts in context with non-effluent impacts. Targeted studies will be implemented (e.g., impacts of sediment on benthos) if necessary in accordance with adaptive management principals to assess habitat impacts.

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
	Increase in nutrient levels in Third Portage Lake as a result of discharge of treated sewage. Possible increase in primary and secondary productivity.	L	L	L	F	NO	Primary treatment is proposed to reduce nutrient inputs. Wastes will be discharged only during the open water season after holding in attenuation pond. Install a diffuser at the outfall to increase dilution potential.	Increase in nutrient concentrations may cause an increase in primary productivity (i.e., phytoplankton) that may be reflected as an increase in secondary productivity and ultimately, fish.	NO	Mod	Routine monitoring of near-field and far-field stations as part of the AEMP for water column nutrient concentration chlorophyll a and phytoplankton biomass to quantify change. Depending on perspective, this may be viewed as a positive impact.
	Input of suspended sediment that may settle in depositional areas and degrade aquatic habitat.	L	L	L	F	NO	Installation of a water treatment facility to control TSS introductions. Discharge only during the open water season to increase dispersion of suspended solids.	Possible degradation of benthic habitats by TSS causing smothering or decreased feeding). Mitigation will reduce the magnitude of these potential effects.	NO	High	Implement MMER program. See AEMP for routine monitoring of TSS.
Non-Contact Diversion Facility	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Fuel Storage	NA – No pathway to aquatic ecosystem (see Spills).	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage / Explosives Facility	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
North and South Camp	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES											
Noise and Activity	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Vault Dike	Metals leaching from dike face may impair colonization by periphyton and benthos.	L	L	L	F	NO	Two m thick layer of IF rock material will be placed on external surface of Vault Dike to provide optimal habitat for spawning by lake trout and round whitefish. See No Net Habitat Loss Report (2004) for details of habitat compensation.	Possible impairment of growth by periphyton and colonization by benthic invertebrates. Low metal-leaching rock will reduce magnitude and extent of dissolved metals.	NO	High	A targeted study has been proposed to monitor pore water and very near-field water quality along the Vault dike to confirm/refute Golder (2004) predicted water quality modeling (see AEMP).
Vault L. Dewatering	NA – see Construction phase	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Pit Operation	Pit operation will result in loss of habitat within Vault Lake. Net loss of habitat and productivity equivalent to lake surface area.	M	L	L	F	YES	Loss of fish habitat within Vault Lake will be compensated for by creating habitat along dike exteriors during operations phase and during post-closure. See NNL Report (2004). Establish a reliable hydraulic connection between the two small ponds north of the Vault Rock Storage facility and Wally Lake to permit access to fish habitat by fish.	Loss of fish habitat beneath post-closure pit footprint. Net loss is offset by habitat area and value created along dike exterior (operation) and interior (post-closure). Magnitude of habitat lost is only partially reduced at post-closure.	YES	Mod	The NNL Habitat Report (2004) addresses net impacts to fish habitat and implications on fish habitat over mine life during operation and post-closure.

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Vault Rock Storage Facility	Runoff from the waste rock pile (i.e., contact water) could introduce low pH water with elevated metals concentrations into Wally Lake, adversely affecting fish habitat.	M	L	P	F	YES	All contact water with Rock Storage facility will be directed to the Vault Lake attenuation pond to eliminate impacts to habitat from introduction of low pH, high metals surface water drainage.	TSS and metals discharged from attenuation pond to Wally Lake during open water only. Collection and attenuation will reduce magnitude and extent of impacts.	NO	High	Water quality monitoring adjacent to dikes and outfall. EEM Program for mine effluent will be implemented for discharges from Vault attenuation pond to Wally Lake. See AEMP.
Roads and Traffic	Terrain disturbance, introduction of particulates to lakes during rain events, aerial dispersion of particulates, local habitat disturbance, road dust. Possible impairment of aquatic habitats from sedimentation and dissolved metals.	L	L	L	F	NO	Operation of heavy equipment in and around waterways will be avoided. No direct contact of vehicles in lakes. Dust suppressants applied to roads. Other dust control measures for aerial emissions. Perimeter ditches to direct runoff to Vault attenuation pond.	Negligible ecological effects on fish habitat. Use of collection channels will eliminate pathway and mitigate adverse effects to fish habitat by reducing magnitude and extent.	NO	High	Water quality monitoring in Wally Lake will be conducted routinely at a variety of locations. See AEMP.
Effluent Discharge – Wally Lake	Effluent discharge to Wally Lake is scheduled to begin during Year 5 of operation. No input of mine water or other contaminants will be directed to the attenuation ponds, and a water treatment plant is not expected to be required. Effluent will be discharged during open water and effluent will consist of pit inflow water, precipitation and non-contact water. Possible adverse effects to fish habitat leading to decreased productivity from exposure to metals and TSS.	L	L	L	F	NO	Install a diffuser at the outfall to increase dilution potential. Effluent will only be discharged during the open-water season and will not be discharged under ice to avoid impacts to sessile biota. Treatment of effluent if necessary.	Settling of TSS and altered sediment chemistry may impact benthos. Mitigation will reduce the magnitude and extent of effects.	NO	Mod	Effluent from the Vault attenuation ponds will be monitored under MMER in the same fashion as mine water discharge. See EEM Report. A plume delineation study will be conducted to determine the spatial extent of the plume and determine whether fish and benthic invertebrate surveys are required.
Non-Contact Diversion Facility	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Mine Shop / Office	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Turn Lake Road Crossing	Reduced productivity because of shading by road crossing. Loss of benthic habitat.	L	L	L	F	NO	Install rip rap along shorelines and approaches to road crossing to replace low value, soft sediment habitat with higher value habitat.	Negligible residual impact. Mitigation will protect habitat and lessen effects.	NO	High	Annual monitoring of shoreline stability at Turn Lake crossing (see AEMP).
OTHER FACILITIES											
Winter Road and Traffic	Potential damage to lake and stream habitat quality at winter road crossings via compaction and erosion (i.e., destabilization of entry/ exit points). Potential temporary stream blockage in spring due to freeze-down and snow pack at stream crossing points of lakes causing erosion, permafrost exposure.	L	R	L	I	YES	Avoid use of winter road at the beginning and end of the season; maintain winter road to minimize potential effects; cross at established entry points; use appropriate vehicles and tires; Select alternate route if a problem is identified during routine monitoring (see AEMP). Follow hazardous material handling guidelines; follow spill contingency guidelines.	Negligible residual impact. Mitigation will significantly reduce magnitude and extent of effects to fish habitat.	NO	High	Routine, annual monitoring of the winter road will be conducted to determine if any adverse effects can be observed and corrected, if necessary (see AEMP). Implement emergency spills response in event of an accidental spill (AEMP).
Baker Lake Access Road and Traffic	NA	NA	NA	NA	NA	NA	NA	MA	NA	NA	NA

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Baker Lake Marine Barge Landing Facility	Localized degradation of fish habitat along Baker Lake foreshore due to compaction, disturbance, bank destabilization and introduction of TSS.	L	L	L	I	NO	Landing facility designed to minimize impacts to near-shore and shoreline fish habitats in Baker Lake; avoid high quality habitat; use geotextile material during unloading to minimize erosion and habitat disturbance;	Negligible residual impact. Mitigation will reduce the magnitude of impacts to shoreline habitat.	NO	High	Annual monitoring of shoreline stability and integrity will be conducted to avoid habitat impacts. See AEMP and NNL Habitat Report (2004).
Marine Barge Traffic	Increase in marine barge traffic will cause small incremental rise of noise and hydrocarbon emissions along the transport route.	L	R	S	I	NO	Follow standard marine shipping procedures during Hudson Bay open water season.	Negligible residual impact. Mitigation will reduce magnitude and spatial extent of ecological effects.	NO	High	No monitoring required.
Baker Lake Staging Facility	Construction of the staging facility will take place well away from fish-bearing waters and no adverse physical effects are anticipated.	L	L	S	R	NO	Ensure compliance with policies for vehicle re-fueling, safe storage of explosives, fuels, etc.	Negligible residual impact. Mitigation includes proper guidelines for reducing risk of impacts to fish habitat.	NO	High	No monitoring required.
Explosives Magazine	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Table B14.2 Continued

Project Component	Potential Physical and Ecological Effect	Assessment of Unmitigated Effects				Significance of Unmitigated Effects	Assessment of Residual Effects				Aquatic Environment Management Plan (AEMP) Description
		Magnitude	Spatial Extent	Duration	Frequency and Timing		Proposed Mitigation	Residual Effect /Influence of Mitigation	Significance of Residual Effect	Certainty of Prediction	
Accidental Spills: Fuel Storage Site (Portage), Tank Farm, Roads, Marine Transport.	Potential spills can impact fish habitat through introduction of contaminants (toxicity).	L	L	M	R	NO	Tank farm built within berms for containment. Follow hazardous material handling guidelines; follow spill contingency guidelines; protocols and standards for barge operators. Follow standard marine shipping procedures during Hudson Bay open water season. Implement strategies contained in the Spill Contingency Report.	Mitigation will reduce the magnitude, duration and spatial extent of any spills that may occur and cause impacts.	NO	High	Implement emergency spills response in event of an accidental spill (see AEMP).

Table B14.3: Fish Habitat Impact Matrix – Closure & Post-Closure

Project Component	Activity/ Ecological Effect	Assessment of Unmitigated Effects				Assessment of Residual Effects		
		Spatial Boundaries		Temporal Boundaries		Influence of Activity/ Residual Effect	Significance of Residual Effects	Certainty of Prediction
		Magnitude	Spatial Extent	Duration	Frequency and Timing			
MAIN FACILITIES								
Dikes								
Second Portage - East Dike	Create habitat on dike interior in Third Portage Lake. Leaching of dissolved metals from dike materials into surrounding water column. Cause potential toxicity to benthos and periphyton, reducing fish habitat productivity. Effects diminish over time.	L	L	M	F	New dike habitat represents an increase in structural complexity and area of fish habitat compared to pre-mining condition; benefit is partially offset by localized leaching of dissolved metals through capped dike wall into water. Increase in habitat area for benthos and periphyton. Dissolved metals may reduce primary and secondary productivity. Net effect is neutral or positive to benthic productivity.	NO	High
Second Portage Lake Tailings Dike	Create habitat on tailings dike exterior (now part of Third Portage Lake). Leaching of metals from dike porewaters into immediate water columns, affecting fish habitat on dikes facing old pit area. Cause potential toxicity to benthos and periphyton, reducing fish habitat productivity. Effects diminish over time.	L	L	M	F	New dike habitat represents an increase in structural complexity and area of fish habitat compared to pre-mining condition; benefit is partially offset by localized leaching of dissolved metals through capped dike wall into water. Moderate increase in fish habitat area. Dissolved metals may reduce primary and secondary productivity. Net effect is neutral to benthic productivity.	NO	High
Third Portage – Goose Island Dike	Create habitat on breached dike exterior and interior (Third Portage Lake). Leaching of metals from dike materials into surrounding water column. Loss of suitable habitat for benthos and periphyton. Cause potential toxicity to benthos and periphyton, reducing fish habitat productivity in Third Portage Lake. Diminished effects over time.	L	L	M	F	New dike habitat represents an increase in structural complexity and area of fish habitat compared to pre-mining condition; benefit is partially offset by localized leaching of dissolved metals through capped dike wall into water. Significant increase in habitat for benthos and periphyton. Dissolved metals may reduce primary and secondary productivity. Net effect is neutral or positive to benthic productivity.	NO	High

Table B14.3 Continued

Project Component	Activity/ Ecological Effect	Assessment of Unmitigated Effects				Assessment of Residual Effects		
		Spatial Boundaries		Temporal Boundaries		Influence of Activity/ Residual Effect	Significance of Residual Effects	Certainty of Prediction
		Magnitude	Spatial Extent	Duration	Frequency and Timing			
Pits								
Pit Operation - Portage Pit and Goose Island	Adjoining Third Portage Lake to new habitat (part of which was previously Second Portage Lake) within Portage/ Goose Island pit areas. Deep pit footprint (Portage) will remain following closure, representing new habitat of lower quality to benthos.	M	L	P	F	Habitat area in Second Portage Lake now part of Third Portage Lake; habitat of lowered quality (very deep), proportional to flooded pit area. Reduced primary and secondary productivity in former Second Portage Lake. Insignificant increase in fish habitat in Third Portage Lake.	YES (SPL) NO (TPL)	High
	Connection of Portage and Goose Island pit areas to Third Portage Lake. Residual metals from pit walls will move into water column. Potential toxicity to benthos in local area (along dikes encircling pits). Reduction in primary and secondary productivity in pit habitat relative to pre-mine conditions.	L	L	M	F	New habitat within pit area may cause toxicity to benthos and periphyton. Effect decreases over time. Net loss in productivity within Third Portage Lake from metals toxicity may be offset by increase in habitat area. See NNL 2004.	NO	High
Second Portage Tailings Facility	Permanent capping and storage of tailings at Second Portage Tailings Facility resulting in net loss of fish habitat equivalent to 572,900 m ² .	H	L	P	F	Permanent loss of fish habitat resulting in reduced primary and secondary productivity (See NNL 2004).	YES	High
	Capping tailings material. Leaching of dissolved metals from tailings materials into surface waters of Third Portage Lake.	L	L	P	I	Leaching will be minimal due to capping and gradual permafrost formation. Toxicity reducing benthic productivity limited to open water season, diminished as tailings freeze; negligible residual effect.	NO	Mod
Portage – Goose Rock Storage Facility	Permanent storage of waste rock material. Runoff from the waste rock pile (i.e., contact water) could introduce low pH water with elevated metals concentrations into Second Portage Lake and Third Portage lakes, resulting in localized toxicity to periphyton and benthos.	L	L	P	I	During open-water season, some runoff from surface waters/ leachate from capped rock storage materials may lead to decreased habitat productivity. Permafrost formation over several years will reduce metals leaching and diminish exposure to benthos and periphyton; negligible residual effect.	NO	Mod
Borrow Pit/Quarry	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Roads and Traffic	Roads will be decommissioned; land will be restored.	NA	NA	NA	NA	NA	NA	NA
Airstrip and Air Traffic	Airstrip will be decommissioned; land will be restored.	NA	NA	NA	NA	NA	NA	NA
Mine Plant and Facilities	Decommissioned.	NA	NA	NA	NA	NA	NA	NA

Table B14.3 Continued

Project Component	Activity/ Ecological Effect	Assessment of Unmitigated Effects				Assessment of Residual Effects		
		Spatial Boundaries		Temporal Boundaries		Influence of Activity/ Residual Effect	Significance of Residual Effects	Certainty of Prediction
		Magnitude	Spatial Extent	Duration	Frequency and Timing			
Freshwater Intake and Pipeline	Pipeline will be removed during closure. No residual effect.	NA	NA	NA	NA	NA	NA	NA
Effluent Discharge and Pipeline – Third Portage Lake	No effluent discharge will occur following mine closure. Removal of discharge pipeline during closure. No residual effects.	NA	NA	NA	NA	NA	NA	NA
Non-Contact Diversion Facility	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Fuel Storage	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Emulsion/AN Storage / Explosives Magazine	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Camp (North and South)	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Sewage and Solid Waste Disposal	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
VAULT FACILITIES								
Vault Pit	Connecting re-flooded Vault pit with Wally Lake (Vault dike removed at closure). Vault Lake has reduced quality of fish habitat (deep pit). Pit area will show a loss of benthic productivity from original levels in Vault Lake.	L	L	P	F	Fish habitat in Vault Lake will be of lowered quality, proportional to pit area. Habitat productivity will be reduced post-closure.	YES	High
	Connection of Vault pit area to Wally Lake. Residual metals from pit walls will move into water column. Potential toxicity to primary and secondary producers in local area (littoral habitat encircling pits). Reduced habitat productivity in Vault Lake. Effect diminishes over time.	L	L	M	F	Restored Vault Lake will contain residual metals from pit walls. Potential toxic effects to benthos and periphyton; negligible reduction in productivity. Effect will decrease over time.	NO	High
Vault Rock Storage Facility	Permanent storage of waste rock materials. Runoff from the waste rock pile (i.e., contact water) could introduce low pH water with elevated metals concentrations into Wally and Vault lakes, causing localized impacts on primary and secondary productivity.	M	L	P	I	During open-water season, some runoff from surface waters/ leachate from capped rock storage materials may lead to decreased habitat productivity. Permafrost formation over several years will reduce metals leaching and diminish exposure to primary and secondary producers.	NO	Mod
Roads and Traffic	Roads will be decommissioned; land will be restored.	NA	NA	NA	NA	NA	NA	NA

Table B14.3 Continued

Project Component	Activity/ Ecological Effect	Assessment of Unmitigated Effects				Assessment of Residual Effects		
		Spatial Boundaries		Temporal Boundaries		Influence of Activity/ Residual Effect	Significance of Residual Effects	Certainty of Prediction
		Magnitude	Spatial Extent	Duration	Frequency and Timing			
Effluent Discharge – Wally Lake	No effluent discharge will occur following mine closure. Removal of discharge pipeline during closure. No residual effects.	NA	NA	NA	NA	NA	NA	NA
Non-Contact Diversion Facility	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Mine Shop / Office	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Turn Lake Road Crossing	Removal in winter when natural stream channel is frozen. Minor disturbance to localized benthos and periphyton during closure; no residual effects following restoration.	NA	NA	NA	NA	NA	NA	NA
OTHER FACILITIES								
Winter Road Operation and Traffic	No further use of road.	NA	NA	NA	NA	NA	NA	NA
Baker Lake Marine Barge Landing Facility	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Marine Barge Traffic	NA (no traffic in this phase).	NA	NA	NA	NA	NA	NA	NA
Baker Lake Staging Facility	Removal of the staging facility is not expected to cause any adverse effects during operation; no residual effects post-closure.	NA	NA	NA	NA	NA	NA	NA
Explosives Magazine	Decommissioned.	NA	NA	NA	NA	NA	NA	NA
Accidental Spills	Facilities (fuel storage (Portage), tank farm, roads, marine transport) will be removed at mine closure; no residual effects post-closure.	NA	NA	NA	NA	NA	NA	NA

Table B15.1: Socioeconomic – Construction

Valued Socio-economic Component	Residual Impact	Geographic Extent	Duration	Prior to Mitigation		Proposed Mitigation	After Mitigation		Proposed Monitoring
				Direction	Significance		Direction	Significance	
Employment, training and business opportunities	Expenditure of \$76 M over 19 months	Regional	Short term	+	Low, as expenditures would be less without mitigation	Preferential employment and contracting	+	Moderate, relative to size of regional economy and investment levels	Employment and contracting reporting
	Employment of at least 85 workers	Individual, in the local area primarily, but also regional	Short term	+	Moderate, as employment might be somewhat less without mitigation	Preferential hiring	+	High, at the individual level and relative to size Baker Lake labour force	Employment reporting, by ethnicity, point of hire, gender, etc.
	Goods and service contracts for local businesses	Regional	Short term	+	Low, as contracting would be less without mitigation	Preferential procurement	+	High for individual businesses, but overall moderate, relative to the size of the regional market	Contract reporting, by type of good and location and status of business
	Overall increased economic activity, including indirect and induced effects	Regional	Short term	+	Low	No direct mitigation, preferential employment and contracting will produce additional effects	+	Moderate, given importance accorded developing and diversifying the economy of the region	Government economic indicators
	Increased capacity of local labour force to participate in project and in formal economy more generally	Individual and in the local area primarily, but also regional	Long term	+	Low	On the job training, employment and contracting experience build capacity in the formal wage economy	+	High at the individual level but overall low, because the construction period is comparatively short; capacity building contributes to life long success in formal wage economy	Government economic and social indicators
	Increased Individual and family wellness	Individual	Short term	+	High at the individual level	No direct mitigation, payment of good wages will increase income	+	Moderate, although income effects are significant at the individual level they will be short term	Government social indicators
Traditional ways of life	Access to traditional lands	Individual	Short term	-	Negligible, as project lands are rarely used for traditional activity	Allowing use of project winter road to traditional land users	+	Moderate, for any specific individual although overall number of users is likely to be limited	None required
	Reduction in traditional activity	Individual	Short term	-	Low, given construction jobs are generally short term	Income and workforce management practices that provide opportunity for and value traditional activity	- or +	Low negative, as less traditional activity is more likely to be choice rather than lack of opportunity and potentially high positive at least for some individuals	Consultation results
	Reduction in harvesting of country foods	Individual and local	Short term	-	Moderate, as foregone traditional activity is shared and can have negative effects on nutrition and economy	Workforce management initiatives in support of traditional activity	- or +	Negligible overall, given short term nature of construction jobs and opportunities to continue traditional activity	Consultation results

Table B15.1 Continued

Valued Socio-economic Component	Residual Impact	Geographic Extent	Duration	Prior to Mitigation		Proposed Mitigation	After Mitigation		Proposed Monitoring
				Direction	Significance		Direction	Significance	
	Undervaluing traditional ways of life through cross cultural contact	Individual and local	Long term	-	Low, as shifts in cultural values are rarely the product of a short term occurrence although construction phase could be a contributory factor	Workforce management initiatives in support of traditional ways of life	- or +	Negligible overall, given short term nature of construction jobs and support to traditional activity and knowledge	Government social indicators, consultation results
	Loss of traditional knowledge, including language	Individual	Long term	-	Low, as shifts in cultural values are rarely the product of a short term occurrence although construction phase could be a contributory factor	Workforce management initiatives in support of traditional ways of life	- or +	Negligible overall, given short term nature of construction jobs and support to traditional activity and knowledge	Government social indicators, consultation results
	Community effects of effects on traditional ways of life	Local	Long term	-	Low, as low participation over the short term in the project is unlikely to shift community culture	Workforce management initiatives in support of traditional ways of life	- or +	Negligible overall, despite preferential employment and contracting, given short term nature of construction jobs and support to traditional activity and knowledge	Government social indicators, consultation results
Individual and community wellness	Poor choices made in relation to how individual income is spent	Individual	Short term	-	High, for any specific individual so affected	Assistance to individuals experiencing problems and their families, zero tolerance policies	- or +	Low to high negative or positive at the individual level depending on program effectiveness, although overall it is expected that comparatively few will make consistently poor choices; some poor choices can have longer term effects	Government social indicators, consultation results
	Widening of distribution of income in community	Local	Short term	-	Low, with low participation over the short term in the project	None specifically, as this potential impact is an indirect effect of overall increases in economic property at the individual and community levels	-	Low, despite higher participation in the project the employment is short term	Government economic indicators, consultation results
	Public health and safety affects of poor behaviours of either those employed or unemployed	Local	Short to medium term	-	Low, with low participation over the short term in the project	Assistance to individuals experiencing problems and their families, zero tolerance policies,	+	Low as public health and safety is a function of many things out of a single project's control but project effects should produce an overall positive impact on individual behaviour	Government social indicators
	Stress on families from rotational employment	Individual	Short term	-	High	Short rotations, assistance to individuals experiencing problems and their families	-	Low	Government social indicators
	Return of family members to find employment	Individual	Short term	+	Low, given construction jobs are generally short term although construction implies operations	None required	+	Low	Consultation results

Table B15.1 Continued

Valued Socio-economic Component	Residual Impact	Geographic Extent	Duration	Prior to Mitigation		Proposed Mitigation	After Mitigation		Proposed Monitoring
				Direction	Significance		Direction	Significance	
	Public health and safety affects of poor behaviours of out of area workers	Local	Short term	-	Low	Workforce management best practice, including codes of conduct, rotation to point of hire, etc.	-	Negligible as out of area workers will not spend much time in Baker Lake or other regional communities	Government social indicators, consultation results
	Traffic accidents	Individual	Short to long term	-	Low to high, depending on the seriousness of the accident; the period over which accidents can incur is short term although the impact of a single serious accident can be long term	Rule enforcement, driver training, public education	-	Low to high at the individual level, depending on the seriousness of the accident however mitigation is expected to keep accidents to a minimum	Project health and safety reporting
	Emergencies	Individual and local	Short to long term	-	Low to high, depending on the nature of the emergency	Operations best practice to minimize emergencies, emergency response planning in the event of an emergency	-	Low to high however mitigation is expected to keep serious emergencies to none or very few.	Project health and safety reporting
	Disturbance by project activities	Individual	Short term	-	Moderate	Construction best practice	-	Low, as very little of the project construction will take place in Baker Lake	Consultation results
Infrastructure and social services	Increasing shortage of housing	Individual	Short term	-	Low, immigration is not expected specifically in response to construction, although construction implies operations and migrants may be attracted on that account	None	-	Low	Government social indicators
	Availability of other physical infrastructure	Local	Short term	-	Low	Project largely supplies its own infrastructure (roads, power, telecommunications, water)	+	Low, but positive as project some project infrastructure work (docks, road improvements) will be of use to Baker Lake people and businesses	Government social indicators
	Changes in demand for social services	Local	Short term	- or +	Low	Employment at good wages, assistance to individuals experiencing problems and their families, zero tolerance policies	+	Low but positive overall given existing pressures on social service delivery on assumption that increased income will be of net benefit to local population, additional RCMP officer may be required	Government social indicators and consultation results
	Changes in dependence on government support	Local	Short term	+	Negligible as numbers would be small without mitigation	Employment at good wages	+	Low but positive on assumption that increased income will decrease need for government transfers for some individuals	Government social indicators

Table B15.1 Continued

Valued Socio-economic Component	Residual Impact	Geographic Extent	Duration	Prior to Mitigation		Proposed Mitigation	After Mitigation		Proposed Monitoring
				Direction	Significance		Direction	Significance	
Site of heritage significance	Impacts on sites of heritage significance	Local	Short term	-	Low	Avoidance of identified sites of heritage significance, protocol in place in event that new sites are identified	-	Negligible, project as designed avoids all sites and archaeology and traditional knowledge studies indicate little potential for encountering as yet unknown sites	Consultation results

Table B15.2: Socioeconomic – Operations

Valued Socio-economic Component	Residual Impact	Geographic Extent	Duration	Prior to Mitigation		Proposed Mitigation	After Mitigation		Proposed Monitoring
				Direction	Significance		Direction	Significance	
Employment, training and business opportunities	Expenditure of \$23 million annually over 10 years	Regional	Medium term	+	Low, as total expenditures would be less without mitigation	Preferential employment and contracting	+	Moderate, relative to size of regional economy	Employment and contracting reporting
	Employment of at least 60 workers	Individual and in the local area primarily, but also regional	Medium term	+	Moderate, as employment might be somewhat less without mitigation	Preferential hiring	+	High, at the individual level and relative to size Baker Lake labour force	Employment reporting, by ethnicity, point of hire, gender etc.
	Goods and service contracts for local businesses	Regional	Medium term	+	Low, as contracting would be less without mitigation	Preferential procurement	+	High for individual businesses, but overall moderate relative to the size of the regional market	Contract reporting, by type of good and location and status of business
	Overall increased economic activity, including indirect and induced effects	Regional	Medium term	+	Low	No direct mitigation, preferential employment and contracting will produce additional effects	+	Moderate, given importance accorded to developing and diversifying the economy of the region	Government economic indicators
	Increased capacity of local labour force to participate in project and in formal economy more generally	Individual and in the local area primarily, but also regional	Long term	+	Low	Education and training initiatives, employment and contracting experience also builds capacity in the formal wage economy	+	High, particularly at the individual level and because capacity building contributes to life long success in formal wage economy	Training and human resource reporting, government economic indicators, possibly special purpose studies
	Some increase in interest in school on part of youth	Local	Long term	+	Negligible	Education initiatives directed at specific concern around youth and their future in a mixed economy	+	Moderate, as project initiatives alone will not suffice but will only contribute to other ongoing efforts although for any specific individual the significance could be high	Government social indicators, consultation results, possibly special purpose studies
	Increased Individual and family wellness	Individual	Medium to long term	+	High at the individual level although numbers would be limited without mitigation	No direct mitigation, payment of good wages will increase income	+	High, on the assumption that, overall, increased income is correlated with increased wellness	Government social indicators
	Increased community wellness	Local	Medium term	+	Low, as participation in the project economic benefits would be limited without mitigation	No direct mitigation, employment, contracting and indirect economic effects will increase community welfare	+	Moderate, on the assumption that, overall, growth in the formal wage economy is correlated with increased community wellness	Government social indicators, possibly special purpose studies
Traditional ways of life	Access to traditional lands	Individual	Medium term	-	Negligible, as project lands are rarely used for traditional activity	Allowing use of project winter road to traditional land users	+	Moderate, for any specific individual although overall number of users is likely to be limited	Consultation results

Table B15.2 Continued

Valued Socio-economic Component	Residual Impact	Geographic Extent	Duration	Prior to Mitigation		Proposed Mitigation	After Mitigation		Proposed Monitoring
				Direction	Significance		Direction	Significance	
	Reduction in traditional activity	Individual	Medium term	-	High, where reduced use is not due to choice although few individuals would be affected	Income and workforce management practices that value and provide opportunity for traditional activity	- or +	Low negative, as less traditional activity is more likely to be choice rather than lack of opportunity and potentially positive at least for some individuals	Government social indicators, consultation results, possibly special purpose studies
	Reduction in harvesting of country foods	Individual and local	Medium term	-	High, as foregone traditional activity can have negative effects on family nutrition and economy	Workforce management and community initiatives in support of traditional activity	- or +	Low negative, as less traditional activity is more likely to be choice rather than lack of opportunity and potentially positive at least for some individuals	Government social indicators, consultation results, possibly special purpose studies
	Undervaluing traditional ways of life through cross cultural contact	Individual and local	Long term	-	High	Workforce management and community initiatives in support of traditional ways of life	- or +	Low, as project initiatives alone will not suffice but will only contribute to other ongoing efforts in support of traditional ways of life	Government social indicators, consultation results
	Loss of traditional knowledge, including language	Individual	Long term	-	High	Workforce management and community initiatives in support of traditional ways of life	- or +	Low, as project initiatives alone will not suffice but will only contribute to other ongoing efforts in support of traditional ways of life	Government social indicators, consultation results
	Community effects of effects on traditional ways of life	Local	Long term	-	High	Workforce management and community initiatives in support of traditional ways of life	- or +	Low, as project initiatives alone will not suffice but will only contribute to other ongoing efforts in support of traditional ways of life	Government social indicators, consultation results, possibly special purpose studies
Individual and community wellness	Poor choices made in relation to how individual income is spent	Individual	Long term	-	High, for any specific individual so affected	Assistance to individuals experiencing problems and their families, zero tolerance policies,	- or +	Low to high negative or positive at the individual level depending on assistance program effectiveness, although overall it is expected that comparatively few will make consistently poor choices	Government social indicators, consultation results, possibly special purpose studies
	Widening of distribution of income in community	Local	Long term	-	Low, due to low participation in the economic benefits of the project	None specifically, as this potential impact is an indirect effect of overall increases in economic property at the individual and community levels; support for community initiatives	-	Moderate, although community initiatives may help to mitigate impact	, possibly special purpose studies
	Public health and safety affects of poor behaviours of either those employed or unemployed	Local	Medium to long term	-	Low, due to low participation in the economic benefits of the project	Assistance to individuals experiencing problems and their families, zero tolerance policies	+	Low as public health and safety is a function of many things out of a single project's control but project effects on community prosperity should produce an overall positive impact on individual behaviour	Government social indicators, consultation results

Table B15.2 Continued

Valued Socio-economic Component	Residual Impact	Geographic Extent	Duration	Prior to Mitigation		Proposed Mitigation	After Mitigation		Proposed Monitoring
				Direction	Significance		Direction	Significance	
	Stress on families from rotational employment	Individual	Medium term	-	High	Short rotations, assistance to individuals experiencing problems and their families	-	Low particularly over time as families learn to manage rotations, and benefit from the positive effects of participation in the mixed economy	Government social indicators, consultation results
	Return of family members to find employment	Individual	Medium term	+	Moderate	None required	+	Moderate overall as numbers are not expected to be large, but potentially of high benefit to individual families	Government social indicators, consultation results
	Public health and safety affects of poor behaviours of out of area workers	Local	Medium term	-	Moderate	Workforce management best practice, including codes of conduct, rotation to point of hire, etc.	-	Negligible as out of area workers will not spend much time in Baker Lake or other regional communities	Consultation results
	Traffic accidents	Individual	Medium term	-	Low to high, depending on the seriousness of the accident	Driver training, public education,	-	Low to high at the individual level, depending on the seriousness of the accident however mitigation is expected to keep accidents to a minimum	Project health and safety reporting
	Emergencies	Individual and local	Medium term	-	Low to high, depending on the nature of the emergency	Operations best practice to minimize emergencies, emergency response planning in the event of an emergency	-	Low to high however mitigation is expected to keep emergencies to none or very few.	Project health and safety reporting
	Disturbance by project activities	Individual	Medium term but of short duration	-	Low	Operations best practice	-	Negligible, as very little of the project physical activity will take place in Baker Lake	Consultation results
	Increased number of community wellness initiatives	Local	Long term	n/a	n/a	Support for community initiatives	+	Moderate	Government social indicators, consultation results
Infrastructure and social services	Increasing shortage of housing	Individual	Medium term	-	Low	None	-	Low as numbers of in migrants are expected to be low	Consultation results
	Availability of other physical infrastructure	Local	Medium term	-	Low	Project largely supplies its own infrastructure (roads, power, telecommunications, water)	+	Low, but positive as project some project infrastructure work (docks, road improvements) will be of use to Baker Lake people and businesses	Consultation results
	Changes in demand for social services	Local	Medium to long term	-	Low	Employment at good wages, assistance to employees experiencing problems and their families, zero tolerance policies	+	Low but positive given existing pressures on social service delivery on assumption that increased income will be of net benefit to local population, additional RCMP officer may be required	Government social indicators, consultation results

Table B15.2 Continued

Valued Socio-economic Component	Residual Impact	Geographic Extent	Duration	Prior to Mitigation		Proposed Mitigation	After Mitigation		Proposed Monitoring
				Direction	Significance		Direction	Significance	
	Changes in dependence on government support	Local	Medium to long term	+	Negligible as numbers would be small without mitigation	Employment at good wages	+	Low but positive on assumption that increased income will decrease need for government transfers for some individuals; potential long term affects would result from capacity building	Government social indicators
Site of heritage significance	Impacts on sites of heritage significance	Local	Medium term	-	Low	Avoidance of sites of heritage significance, protocol in place in event that new sites are identified	-	Negligible, project as designed avoids sites and archaeology and traditional knowledge studies indicate little potential for encountering as yet unknown sites	Consultation results

Table B15.3: Socioeconomic – Closure & Post Closure

Valued Socio-economic Component	Residual Impact	Geographic Extent	Duration	Prior to Mitigation		Proposed Mitigation	After Mitigation		Proposed Monitoring
				Direction	Significance		Direction	Significance	
Employment, training and business opportunities	Reduction in expenditures to \$13 M over two years	Regional	Long term	-	High	None	-	High	Government economic indicators
	Reduction in employment and contracting	Individual, local and regional	Long term	-	High	Education and training initiatives, employment and contracting experience to build capacity in the formal wage economy, initiatives to assist with re-employment, counseling on re-employment	-	High at the individual level, but moderate overall in the expectation that capacity building and economic growth will facilitate re-employment	Government economic indicators, consultation results
	Reduction in economic activity	Regional	Long term	-	High	None	-	High	Government economic indicators, consultation results
Individual and community wellness	Loss of income	Individual	Long term	-	High	None additional to those above	-	High at the individual level, but moderate overall in the expectation that capacity building and economic growth will facilitate re-employment	Government economic and social indicators
	Public health and safety effects of loss of income	Local	Long term	-	Low as economic participation in the project would be low without mitigation	None additional to those above	-	Moderate	Government social indicators
Infrastructure and social services	Changes in demand for social services	Local	Short term	-	Low	None additional to those above	-	Moderate	Government social indicators
	Changes in dependence on government support	Local	Short term	-	Low	None additional to those above	-	Moderate	Government social indicators

APPENDIX C

Socioeconomic Statistical Data

Table C.1: Selected Demographic, Education & Income Data

	Nunavut	Kivalliq Region	Baker Lake	
	2001	2001	1996	2001
Population (no.)	26,745	7,557	1,385	1,507
Five year population growth (%)	18.1	10.0	16.8	8.8
Projected population growth 2005-10 (%)	12.1	11.8	n/a	9.4
Ratio of males to females	1.07	1.03	1.13	1.11
Aboriginal population (%)	85.2	90.7	92.1	93.7
Population 15 and under (%)	37.1	40.3	40.2	39.0
Mobility status 1 year at same address (%)	79	83	n/a	85
Mobility status 5 year at same address (%)	44	47	n/a	46
Education (%)				
Less than high school*	41	46	60	50
male	39	44	55	47
female	41	48	65	47
20-34	43	48	n/a	59
35-44	34	40	n/a	43
45-64	44	46	n/a	43
Participation rate (%)	68	67	55	65
male	71	69	59	66
female	65	65	50	64
Unemployment rate (%)	17	19	17	26
male	18	20	16	26
female	16	17	15	26
Traditional activity (%)***				
hunted or fished	42	n/a	50	n/a
trapped	18	n/a	20	n/a
arts and crafts	7	n/a	4	n/a
Worked full year, full time (%)	n/a	41	n/a	35
Average earnings (\$)	28,215	25,116	18,688	20,289
Average full time earnings	48,078	42,926	n/a	39,621
Median income of age 15 and over (\$)	17,270	15,110	n/a	12,851
Family income, couples (\$)**	48,805	42,272	45,466	35,776
Family income, lone parent (\$)**	20,250	19,925	20,697	17,632
Occupation (%)				
Primary	6	5	0	5
Secondary	8	10	9	10
Tertiary	86	85	91	86
Lone parent families (%)	26	27	26	47
of which (%) female headed	73	78	n/a	81

Sources, Baseline Socioeconomic Study of the Kivalliq Region and the Community of Baker Lake 2003, some data recalculated.

Note: * Data are for the population age 15 and over for 1996, and for ages 20-64 for 2001; ** Figures are average for 1996 and median for 2001; *** Data are for 1993.

Table C.2: Selected School Data

Location	Grades Taught	Student Teacher Ratio	Capacity	Capacity Utilization (%)	Students		High School Graduates 1999/2000-2002/2003
					Number 2002/03	Growth (%) 2000/01-2002/03	
Arviat	7-12	15	187	171	320	39	42
Baker Lake	6-12	15	209	106	221	40	2
Chesterfield Inlet	K-12	13	157	75	117	11	6
Coral Harbour	K-12	14	335	80	269	4	20
Rankin Inlet	9-12	14	176	93	163	18	63
Repulse Bay	K-12	15	263	92	241	20	4
Whale Cove	K-12	17	123	124	153	80	0
Total		16	2,941	93	2,744	18	137

Source: Baseline Socioeconomic Study of the Kivalliq Region and the Community of Baker Lake 2003, some data recalculated.

Table C.3: Selected Crime Data

	2001	2000	1999	1998	1997	1996
<i>Kivalliq Region</i>						
Crimes of violence	408	376	226	291	275	250
Property crimes	400	276	237	174	257	224
Sexual assaults	53	59	37	57	50	68
Drugs	22	21	29	32	16	40
Other	680	368	318	335	375	173
Total	1,563	1,100	847	889	973	755
Youth as % of charges	18.9	11.5	17.6	9.5	11.5	6.9
<i>Baker Lake</i>						
Crimes of violence	48	96	32	73	58	65
Property crimes	44	38	47	27	38	25
Sexual assaults	10	31	7	14	11	19
Drugs	3	5	6	8	5	17
Other	102	83	44	57	51	48
Total	207	253	136	179	163	174
Youth as % of charges	22.9	10.3	3.7	1.6	9.4	0.0

Sources: Baseline Socioeconomic Study of the Kivalliq Region and the Community of Baker Lake 2003, some data recalculated.

Archaeology Data

Table C.4: Potentially Affected Heritage Resource Sites

Site Number	Location	Site Type or Feature	Mitigation Recommendation
A-1	Portage pit	Thought to be a Cumberland field crew camp	None
A-10	Adjacent to rock storage facility	Campsite	Test excavation
A-11	Adjacent to Goose Island rock storage facility	Hearth	Avoidance
A-12	Goose Island rock storage facility	Campsite	Test excavation
A-13	Adjacent to Goose Island rock storage facility	Campsite	Test excavation
A-16	ROM stockpile	Possible tent ring	Ground visit

Source: Baseline Archaeological Report 2004.

APPENDIX D

Wildlife Habitat Loss in the Local Study Area (LSA)

Table D.1 Ungulate High, Moderate & Low Suitability Habitat Lost during Growing Season & Winter at Main & Vault Sites based on LSA Analysis

Ungulates	Area Lost in LSA (ha) Growing Season			Ungulates	Area Lost in LSA (ha) Winter		
	Main Site	Vault Site	Total		Main Site	Vault Site	Total
Avens community (L)	2.7	3.2	5.9	Avens community (M)	2.7	3.2	5.9
Birch seep (H)	48.5	2.1	50.6	Birch seep (M)	48.5	2.1	50.6
Disturbed features (L)	6.1	-	6.1	Disturbed features (L)	6.1	-	6.1
Heath tundra (M)	132.3	138.1	270.4	Heath tundra (H)	132.3	138.1	270.4
Lakes or ponds (L)	233.9	106.2	340.0	Lakes or ponds (L)	233.9	106.2	340.0
Lichen rock on outcrops (M)	11.9	17.7	29.5	Lichen rock on outcrops (H)	11.9	17.7	29.5
Lichen rock with boulders (M)	22.3	69.2	91.5	Lichen rock with boulders (H)	22.3	69.2	91.5
Moss community (M)	0.0	-	0.0	Moss community (M)	0.0	-	0.0
Riparian shrub (H)	7.1	1.0	8.1	Riparian shrub (M)	7.1	1.0	8.1
Sedge community (H)	28.3	24.7	53.0	Sedge community (M)	28.3	24.7	53.0
Snowbank community (M)	3.8	2.1	5.9	Snowbank community (L)	3.8	2.1	5.9
Unclassified (L)	-	1.5	1.5	Unclassified (L)	-	1.5	1.5
	MainSite	VaultSite	Total		MainSite	VaultSite	Total
High	83.87	27.82	111.70	High	166.52	224.97	391.49
Moderate	170.33	227.08	397.41	Moderate	86.61	31.02	117.63
Low	242.66	110.87	353.53	Low	243.74	109.78	353.52
Total Hectares	496.87	365.77	862.64	Total Hectares	496.87	365.77	862.64

Table D.2: Ungulates – Total High Suitability Habitat Lost in the LSA

	Main Site High Suitability Habitat Lost in LSA (ha)	Vault Site High Suitability Habitat Lost in LSA (ha)	Total of LSA Lost (ha)	Total High Suitability Habitat Available (ha) in LSA	% High Suitability Habitat Lost in LSA	Total LSA (ha)	% Total LSA Lost
Growing	84	28	112	1,375	8.2%	9,385	1.19%
Winter	167	225	392	4,098	9.6	9,385	4.18
Total (H, M, L)	497	366	863	-	-	9,385	9.19%

Note: The bottom row is for the entire LSA and does not represent the sum of the cells above it. It is presented for comparison purposes.

Table D.3: Predatory Mammal High, Moderate & Low Suitability Habitat Loss During the Growing & Winter Seasons in Main & Vault Site Based on LSA Analysis

Predatory Mammals	Area Lost in LSA (ha) Growing Season			Predatory Mammals	Area Lost in LSA (ha) Winter		
	Main Site	Vault Site	Totals		Main Site	Vault Site	Totals
Avens community (H)	2.7	3.2	5.9	Avens community (H)	2.7	3.2	5.9
Birch seep (M)	48.5	2.1	50.6	Birch seep (M)	48.5	2.1	50.6
<i>Disturbed features (L)</i>	6.1	-	6.1	<i>Disturbed features (L)</i>	6.1	-	6.1
Heath tundra (M)	132.3	138.1	270.4	Heath tundra (H)	132.3	138.1	270.4
<i>Lakes or ponds (L)</i>	233.9	106.2	340.0	<i>Lakes or ponds (L)</i>	233.9	106.2	340.0
Lichen rock on outcrops (M)	11.9	17.7	29.5	Lichen rock on outcrops (M)	11.9	17.7	29.5
Lichen rock with boulders (M)	22.3	69.2	91.5	Lichen rock with boulders (M)	22.3	69.2	91.5
Moss community (M)	0.0	-	0.0	Moss community (M)	0.0	-	0.0
Riparian shrub (M)	7.1	1.0	8.1	Riparian shrub (M)	7.1	1.0	8.1
Sedge community (H)	28.3	24.7	53.0	Sedge community (M)	28.3	24.7	53.0
Snowbank community (M)	3.8	2.1	5.9	<i>Snowbank community (L)</i>	3.8	2.1	5.9
<i>Unclassified (L)</i>	-	1.5	1.5	<i>Unclassified (L)</i>	-	1.5	1.5
	Main Site	Vault Site	Totals		Main Site	Vault Site	Totals
High	30.99	27.94	58.93	High	135.04	141.27	276.30
Moderate	225.93	230.16	456.08	Moderate	118.09	114.72	232.82
Low	239.95	107.67	347.63	Low	243.74	109.78	353.52
Total Hectares	496.87	365.77	862.64	Total Hectares	496.87	365.77	862.64

Table D.4: Predatory Mammals – Total High Suitability Habitat Lost in the LSA

	Main Site High Suitability Habitat Lost in LSA (ha)	Vault Site High Suitability Habitat Lost in LSA (ha)	Total of LSA Lost (ha)	Total High Suitability Habitat Available (ha) in LSA	% High Suitability Habitat Lost in LSA	Total LSA (ha)	% Total LSA Lost
Growing	31	28	59	657	9.0%	9,385	0.63%
Winter	135	141	276	3,232	8.5%	9,385	2.94%
Total (H, M, L)	497	366	863	-	-	9,385	9.19%

Note: The bottom row is for the entire LSA and does not represent the sum of the cells above it. It is presented for comparison purposes.

Table D.5: Raptor High, Moderate & Low Suitability Habitat Loss During Growing & Winter Seasons in Main & Vault Sites Based on LSA Analysis

Raptors	Area Lost in LSA (ha) Growing Season			Raptors	Area Lost in LSA (ha) Winter		
	Main Site	Vault Site	Totals		Main Site	Vault Site	Totals
Avens community (M)	2.7	3.2	5.9	Avens community (M)	2.7	3.2	5.9
Birch seep (M)	48.5	2.1	50.6	Birch seep (L)	48.5	2.1	50.6
Disturbed features (L)	6.1	-	6.1	Disturbed features (L)	6.1	-	6.1
Heath tundra (H)	132.3	138.1	270.4	Heath tundra (H)	132.3	138.1	270.4
Lakes or ponds (M)	233.9	106.2	340.0	Lakes or ponds (L)	233.9	106.2	340.0
Lichen rock on outcrops (H)	11.9	17.7	29.5	Lichen rock on outcrops (H)	11.9	17.7	29.5
Lichen rock with boulders (H)	22.3	69.2	91.5	Lichen rock with boulders (H)	22.3	69.2	91.5
Moss community (M)	0.0	-	0.0	Moss community (L)	0.0	-	0.0
Riparian shrub (M)	7.1	1.0	8.1	Riparian shrub (L)	7.1	1.0	8.1
Sedge community (M)	28.3	24.7	53.0	Sedge community (L)	28.3	24.7	53.0
Snowbank community (L)	3.8	2.1	5.9	Snowbank community (L)	3.8	2.1	5.9
Unclassified (L)	-	1.5	1.5	Unclassified (L)	-	1.5	1.5
	MainSite	VaultSite	Totals		MainSite	VaultSite	Totals
High	166.52	224.97	391.49	High	166.52	224.97	391.49
Moderate	320.46	137.19	457.66	Moderate	2.71	3.20	5.90
Low	9.89	3.61	13.49	Low	327.64	137.61	465.25
Total Hectares	496.87	365.77	862.64	Total Hectares	496.87	365.77	862.64

Table D.6: Raptors – Total High Suitability Habitat Lost in the LSA

	Main Site High Suitability Habitat Lost in LSA (ha)	Vault Site High Suitability Habitat Lost in LSA (ha)	Total of LSA Lost (ha)	Total High Suitability Habitat Available (ha) in LSA	% High Suitability Habitat Lost in LSA	Total LSA (ha)	% Total LSA Lost
Growing	167	225	391	4,098	9.54%	9,385	4.17
Winter	167	225	391	4,098	9.54%	9,385	4.17
Total (H, M, L)	497	366	863	-	-	9,385	9.19%

Note: The bottom row is for the entire LSA and does not represent the sum of the cells above it. It is presented for comparison purposes.

Table D.7: Waterfowl High, Moderate & Low Suitability Habitat Loss at Main & Vault Site

Waterfowl	Area Lost (ha) Growing Season		
	Main Site	Vault Site	Total
Avens community (M)	2.71	3.20	5.90
Birch seep (M)	48.48	2.07	50.55
<i>Disturbed features (L)</i>	6.10	-	6.10
Heath tundra (M)	132.33	138.07	270.40
Lakes or ponds (H)	233.85	106.18	340.03
<i>Lichen rock on outcrops (L)</i>	11.87	17.67	29.54
<i>Lichen rock with boulders (L)</i>	22.32	69.23	91.55
Moss community (M)	0.03	-	0.03
Riparian shrub (M)	7.11	1.01	8.12
Sedge community (H)	28.28	24.75	53.03
<i>Snowbank community (L)</i>	3.79	2.11	5.89
<i>Unclassified (L)</i>	-	1.50	1.50
	Main Site	Vault Site	Total
High	262.13	130.92	393.05
Moderate	190.66	144.34	335.00
Low	44.08	90.51	134.59
Total Hectares	496.87	365.77	862.64

Table D.8: Waterfowl – Total High Suitability Habitat Lost in the LSA

	Main Site High Suitability Habitat Lost in LSA (ha)	Vault Site High Suitability Habitat Lost in LSA (ha)	Total of LSA Lost (ha)	Total High Suitability Habitat Available (ha) in LSA	% High Suitability Habitat Lost in LSA	Total LSA (ha)	% Total LSA Lost
Growing	262	131	393	4,318	9.1%	9,385	4.19%
Total (H, M, L)	497	366	863	-	-	9,385	9.19%

Note: The bottom row is for the entire LSA and does not represent the sum of the cells above it. It is presented for comparison purposes.

Table D.9: Other Breeding Birds High, Moderate & Low Suitability Habitat Loss at Main & Vault Site

A total of 4,535 ha of high suitability breeding bird habitat (i.e., 48.3% of total LSA area) is present

Other Breeding Birds	Area Lost in LSA (ha)		
	Main Site	Vault Site	Total
Avens community (M)	2.71	3.20	5.90
Birch seep (H)	48.48	2.07	50.55
Disturbed features (L)	6.10	-	6.10
Heath tundra (H)	132.33	138.07	270.40
Lakes or ponds (L)	233.85	106.18	340.03
Lichen rock on outcrops (M)	11.87	17.67	29.54
Lichen rock with boulders (L)	22.32	69.23	91.55
Moss community (M)	0.03	-	0.03
Riparian shrub (H)	7.11	1.01	8.12
Sedge community (H)	28.28	24.75	53.03
Snowbank community (L)	3.79	2.11	5.89
Unclassified (L)	-	1.50	1.50
	Main Site	Vault Site	Totals
High	216.20	165.90	382.10
Moderate	36.93	90.10	127.02
Low	243.74	109.78	353.52
Hectares	496.87	365.77	862.64

Table D.10: Other Breeding Birds – Total High Suitability Habitat Loss in the LSA

	Main Site High Suitability Habitat Lost in LSA (ha)	Vault Site High Suitability Habitat Lost in LSA (ha)	Total of LSA Lost (ha)	Total High Suitability Habitat Available (ha) in LSA	% High Suitability Habitat Lost in LSA	Total LSA (ha)	% Total LSA Lost
Growing	216	166	382	4,535	8.4%	9,385	4.07%
Total (H, M, L)	497	366	863	-	-	9,385	9.19%

Note: The bottom row is for the entire LSA and does not represent the sum of the cells above it. It is presented for comparison purposes.

APPENDIX E

Maximum Prediction Water Quality Concentration

Table E.1: Maximum Predicted Concentrations for Portage & Vault Attenuation Pond Effluents

	CWQG (FAL)	MMER	Portage Attenuation Pond				Vault Attenuation Pond	
			Stormwater Pond		Mixed Pond Untreated		Year 5	Year 10
			Year 1	Year 3	Year 6	Year 10		
pH	6.5 - 9.0	6.0 - 9.5	5.5	5.5	5.5	5.5	7.5	7.5
Alkalinity			7	19	62	69	16	21
Sulphate			11	29	2100	1700	3.7	4.2
Cyanide		1.0	0	0	0.18	0.17	0	0
Fluoride ²	0.12		0.1	0.11	0.63	1.1	0.03	0.03
Nitrate-N ³			0.7	1.3	1	1	1.6	0.9
Unionized AmmoniaNH3-N	0.019		0.00003	0.00005	0.00002	0.00002	0.0031	0.0011
Total Phosphorous			0.017	0.034	0.28	0.38	0.017	0.023
Metals	0.1		0.038	0.087	0.090	0.090	0.07	0.08
Aluminum ⁴	0.1		0.038	0.087	0.090	0.090	0.07	0.08
Arsenic	0.005	0.5	0.0051	0.010	0.033	0.072	0.08	0.11
Barium			0.021	0.023	0.003	0.003	0.015	0.018
Calcium			5.2	11	120	140	5.6	6.8
Cadmium	0.00010 - 0.00017		0.00007	0.00010	0.0028	0.0055	0.0014	0.0013
Cobalt			0.0032	0.0065	0.25	0.38	0.00017	0.00018
Chromium ⁵	0.001 / 0.0089		0.00083	0.00065	0.029	0.12	0.0005	0.0006
Copper ⁶	0.002 - 0.004	0.3	0.0036	0.0060	5.0	14.3	0.0005	0.0007
Iron	0.3		0.040	0.040	0.001	0.001	0.003	0.003
Mercury	0.0001		0.00003	0.00004	0.00008	0.00016	0.00004	0.00005
Potassium			1.9	2.1	84	55	1.0	1.1
Magnesium			2.4	5.9	21	31	1.3	1.5
Manganese			0.19	0.35	3.3	79	0.16	0.24
Molybdenum	0.073		0.002	0.004	0.07	0.066	0.015	0.021
Sodium			2.3	3.6	560	350	1.5	1.3
Nickel ⁶	0.025 - 0.15	0.5	0.024	0.46	1.14	2.4	0.0005	0.0006
Lead ⁶	0.001 - 0.007	0.2	0.001	0.0015	0.0084	0.016	0.0006	0.0006
Antimony			0.0014	0.0023	0.018	0.020	0.0054	0.0078
Selenium	0.001		0.0009	0.0006	0.009	0.01	0.0008	0.0010
Zinc	0.03	0.5	0.11	0.18	0.67	1.4	0.004	0.006

Note: 1: CWQG Freshwater Guidelines are based on total metal concentrations, except for aluminum (dissolved aluminum criteria); cadmium guideline shown is US EPA. **2:** Freshwater Aquatic Life Guideline listed for inorganic fluorides. **3:** Freshwater Aquatic Life Guideline stipulates that concentrations that stimulate weed growth should be avoided. **4:** Freshwater Aquatic Life Guideline is pH dependent. Based on the baseline pH values of each of the lakes (6.8 for Third Portage Lake, 7.5 for Second Portage Lake, and 7.3 for Wally Lake), only post-construction Vault IV porewater aluminum concentrations are in exceedance of the Freshwater Aquatic Life Guideline. However, long-term kinetic testing suggests that lake pH values could drop to 6.0, in which case porewater aluminum concentrations for all rock types would be in exceedance of the Freshwater Aquatic Life Guideline. **5:** Freshwater Aquatic Life Guideline for chromium depends on valence of chromium ion (Cr(III) = 0.0089 mg/L, Cr(VI) = 0.001 mg/L). **6:** Freshwater Aquatic Life Guideline is hardness dependent.

Table E.2: Predicted Maximum Concentrations of Selected Parameters in Portage Effluent, MMER Limits & Estimated Treatment Levels

Parameter	Units	Predicted Maximum Concentration in Untreated Effluent ¹	MMER Limits ²	Estimated Achievable Treatment Level ³
Total Suspended Solids	mg/L		15	
Total Cyanide	mg/L	0.263	1.0	
Arsenic	mg/L	0.1	0.50	0.02
Copper	mg/L	20.3	0.30	0.08
Nickel	mg/L	3.42	0.50	0.01
Cadmium	mg/L	0.008		0.001
Chromium	mg/L	0.2		0.01
Lead	mg/L	0.021	0.2	0.001
Selenium	mg/L	0.014		0.005
Manganese	mg/L	10.8		0.1
Zinc	mg/L	1.7	0.50	0.01

Notes: 1: Based on results of site water quality predictions using the GoldSim model (Table A.1; Appendix A). 2: Metal Mining Effluent Regulations (DFO, 2002). Values shown are maximum monthly averages. 3: Based on initial evaluation of achievable treatment levels using predicted Year 10 Portage effluent quality data (AMEC, 2004). (Golder 2004i)

Table E.3: Predicted Maximum Whole Lake Water Quality, Third Portage Lake

Parameter	Simulated Maximum Lake Concentration (mg/L) ³										Water Quality Guideline Concentrations (mg/L) ¹	
	Expected Loadings (kg/yr)			Average Baseline Conc. (mg/L) ²		Lower mixing estimate (40 Mm ³)		Mid-range mixing estimate (92 Mm ³)		Upper Mixing Estimate (169 Mm ³)		
												Without Dike Leaching
	Water Releases ⁴	Dike Leaching										
Conventional Parameters												
Hardness	468730	0	5.3	59	63	39	43	27	30			
pH	n/a	n/a	6.8	n/a	n/a	n/a	n/a	n/a	n/a	6.5-8.5		
Dissolved Anions												
Total Alkalinity	91552	5765	4.0	14	14	10	11	8.0	8.3			
Chloride	53216	2913	0.5	6.2	6.4	4.2	4.4	2.9	3.1	230	250	
Fluoride	1033	198	0.07	0.19	0.21	0.14	0.16	0.11	0.12		1.5	
Sulphate	2475771	501	1.3	290	290	185	185	121	121		500.0	
Nutrients												
Ammonia Nitrogen	1031	0	0.010	0.11	0.11	0.077	0.077	0.056	0.056	7.2		
Total Kjeldahl Nitrogen	n/a	n/a	0.09	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	
Nitrate Nitrogen	1793	43	0.0040	0.17	0.18	0.12	0.12	0.085	0.087	2.9	10.0	
Nitrite Nitrogen	n/a	n/a	0.0010	n/a	n/a	n/a	n/a	n/a	n/a		3.2	
Total Phosphate-P	140	0.0	0.0020	0.016	0.016	0.010	0.010	0.0067	0.0067			
Total Phosphorus	422	10.2	n/a	0.052	0.053	0.032	0.033	0.021	0.021			
Organic Parameters												
Dissolved Organic Carbon	n/a	n/a	1.4	n/a	n/a	n/a	n/a	n/a	n/a			
Cyanides												
Total Cyanide	102	0	0.0000	0.013	0.013	0.0080	0.0080	0.0051	0.0051	0.005	0.2	
Cyanate (CNO)	169769	n/a	0.5000	19	19	13	13	8.5	8.5			
Thiocyanate (SCN)	243468	n/a	0.5000	27	28	18	18	12	12			
Total Metals												
Aluminum	154	50	0.006	0.021	0.025	0.016	0.019	0.013	0.015	0.1		
Antimony	26	0.95	0.0005	0.0035	0.0035	0.0023	0.0024	0.0017	0.0017			
Arsenic	31.2	0.0	0.0005	0.0038	0.0038	0.0027	0.0027	0.0019	0.0019	0.005		
Barium	14	53	0.02	0.02	0.02	0.02	0.02	0.02	0.02			
Beryllium	29	0.00	0.0010	0.0047	0.0047	0.0032	0.0032	0.0024	0.0024			
Boron	648	0.0	0.100	0.16	0.160	0.136	0.136	0.12	0.12			
Bismuth	3.7	0.00	0	0.0004	0.0004	0.0003	0.0003	0.0002	0.0002			

Parameter	Simulated Maximum Lake Concentration (mg/L) ³										Water Quality Guideline Concentrations (mg/L) ¹	
	Expected Loadings (kg/yr)		Average Baseline Conc. (mg/L) ²	Lower mixing estimate (40 Mm ³)		Mid-range mixing estimate (92 Mm ³)		Upper Mixing Estimate (169 Mm ³)				
				Without Dike Leaching	With Dike Leaching			Without Dike Leaching	With Dike Leaching			
	Water Releases ⁴	Dike Leaching									Aquatic Life	Drinking Water Supply
Cadmium	1.5	0.00	0.0001	0.00021	0.00021	0.00015	0.00015	0.00012	0.00012	0.00010 – 0.00017	0.005	
Calcium	182772	9662	1.2	23	24.2	14.9	15.6	10	11			
Chromium	14	0.01	0.0010	0.0025	0.0025	0.0019	0.0019	0.0016	0.0016	0.001/0.0089	0.05	
Cobalt	416	39	0.0003	0.057	0.0597	0.0334	0.0361	0.021	0.023			
Copper	116	0.0	0.001	0.014	0.014	0.009	0.009	0.006	0.006	0.002	1	
Iron	22	10.0	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.3	0.3	
Lead	1.9	0.1	0.0006	0.0007	0.0007	0.0006	0.0007	0.0006	0.0006	0.001	0.01	
Lithium	39	0.0	0.0050	0.0083	0.0083	0.0071	0.0071	0.0064	0.0064			
Magnesium	37084	5703	0.5	5.1	5.5	3.3	3.7	2.3	2.6			
Manganese	190	1389	0.001	0.019	0.132	0.014	0.108	0.010	0.080		0.05	
Mercury	0.156	0.056	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001	
Molybdenum	104.3	0.1	0.001	0.013	0.013	0.009	0.009	0.006	0.006	0.073		
Nickel	19.0	3.0	0.001	0.003	0.003	0.002	0.002	0.002	0.002	0.025		
Potassium	88335	3567	2.0	11.4	11.7	8.1	8.4	6.0	6.2			
Selenium	7.43	0.01	0.0010	0.0017	0.0017	0.0014	0.0014	0.0013	0.0013	0.001	0.01	
Silver	0.385	0.016	0.00002	0.00006	0.00006	0.00005	0.00005	0.00004	0.00004	0.0001		
Silicon	5530	6459		0.67	1.19	0.42	0.85	0.27	0.59			
Sodium	575149	2252	2.0	65.0	65.2	43.3	43.4	29.1	29.2			
Strontium	1046	97		0.12	0.13	0.08	0.08	0.05	0.06			
Thallium	2.02	0.00	0.0002	0.0004	0.0004	0.0003	0.0003	0.0003	0.0003	0.0008		
Tin	n/a	n/a	0.0006	n/a	n/a	n/a	n/a	n/a	n/a			
Titanium	n/a	n/a	0.01	n/a	n/a	n/a	n/a	n/a	n/a			
Uranium	20.61	0.91	0.0002	0.0028	0.0028	0.0018	0.0018	0.0012	0.0012		0.02	
Vanadium	24.5	1.1	0.03	0.03	0.03	0.03	0.03	0.03	0.03			
Zinc	19	2	0.005	0.006	0.006	0.006	0.006	0.005	0.006	0.03	5	

Notes: 1. Canadian Water Quality Guidelines are used, except for aquatic life guidelines for chloride and cadmium, which are US EPA. 2. Total metals. 3. Dissolved metals. 4. Average loadings per year based on predicted data for the 10 years of operations. Concentrations of As, Cd, Cu, CN, Fe, Pb, Ni, Zn were set to achievable treatment levels (Table 3) where maximum concentrations exceeded treatment levels. Maximum predicted arsenic concentrations are predicted to vary from 0.003 to 0.029 mg/L, which ranges from less than the guideline to six times the guideline of 0.005 mg/L. Maximum predicted nickel concentrations are predicted to vary from 0.005 to 0.035 mg/L, which ranges from less than the guideline to 1.6 times the guideline of 0.025 mg/L. (modified from Golder 2004i).

Table E.4: Predicted Maximum Whole Lake Water Quality, Second Portage Lake

Parameter	Expected Loadings (kg/yr)	Average Baseline Conc. (mg/L) ²	Simulated Maximum Lake Concentration (mg/L)				Water Quality Guideline Concentrations (mg/L) ¹	
			Lower mixing estimate (40 Mm ³)		Upper Mixing Estimate (169 Mm ³)		Aquatic Life	Drinking Water Supply
			Without DiLe Leaching	With DiLe Leaching	Without DiLe Leaching	With DiLe Leaching		
Conventional Parameters								
Hardness	0	8.9	27.2	27.3	15.7	15.9		
pH	n/a	7.5	n/a	n/a	n/a	n/a	6.5-8.5	
Dissolved Anions								
Total Alkalinity	408	7.00	9.43	9.45	7.36	7.38		
Chloride	206	0.6	2.6	2.6	1.5	1.5	230	250
Fluoride	14	0.070	0.11	0.115	0.087	0.087		1.5
Sulphate	35	2.8	107.4	107.4	46.4	46.4		500.0
Nutrients								
Ammonia Nitrogen	0	0.020	0.051	0.051	0.033	0.033	7.2	
Total Kjeldahl Nitrogen	n/a	0.08	n/a	n/a	n/a	n/a	n/a	n/a
Nitrate Nitrogen	3	0.007	0.067	0.067	0.036	0.036	2.9	10.0
Nitrite Nitrogen		0.0010						3.2
Total Phosphate-P	0.0	0.0030	0.0058	0.0058	0.0025	0.0025		
Total Phosphorus	0.7		0.019	0.019	0.0076	0.0077		
Organic Parameters								
Dissolved Organic Carbon	n/a	1.7	n/a	n/a	n/a	n/a		
Cyanides								
Total Cyanide	0	0.000	0.005	0.005	0.002	0.002	0.005	0.2
Cyanate (CNO)	0	0.50	7.35	7.35	3.47	3.47		
Thiocyanate (SCN)	0	0.50	10.11	10.11	4.75	4.75		
Total Metals								
Aluminum	4	0.007	0.012	0.012	0.009	0.009	0.1	
Antimony	0.07	0.0005	0.0016	0.0016	0.0009	0.0009		
Arsenic	0.0	0.0005	0.0017	0.0017	0.0010	0.0010	0.005	0.0250
Barium	3.7	0.02	0.02	0.02	0.02	0.02		
Beryllium	0.00	0.0010	0.0023	0.0023	0.0015	0.0015		
Boron	0.0	0.1	0.1	0.1	0.1	0.1		
Bismuth	0.00	0	0.0001	0.0001	0.0001	0.0001		
							0.00006	
Cadmium	0.00	0.00005	0.00011	0.00011	0.00007	0.00007	0.000097	0.005
Calcium	684	2.3	9.9	10.0	5.2	5.2		
Chromium	0.00	0.0010	0.0015	0.0015	0.0012	0.0012	0.001	0.05
Cobalt	2.79	0.0003	0.0206	0.0207	0.0080	0.0081		
Copper	0.0	0.0010	0.0058	0.0058	0.0030	0.0030	0.002	1
Iron	0.7	0.03	0.03	0.03	0.03	0.03	0.3	0.3
Lead	0.0	0.001	0.001	0.001	0.0010	0.0010	0.001	0.01
Lithium	0.0	0.0050	0.0062	0.0062	0.0055	0.0055		
Magnesium	404	0.8	2.3	2.4	1.3	1.4		

Parameter	Expected Loadings (kg/yr)	Average Baseline Conc. (mg/L) ²	Simulated Maximum Lake Concentration (mg/L)				Water Quality Guideline Concentrations (mg/L) ¹	
			Lower mixing estimate (40 Mm ³)		Upper Mixing Estimate (169 Mm ³)			
			Without Dike Leaching	With Dike Leaching	Without Dike Leaching	With Dike Leaching	Aquatic Life	Drinking Water Supply
	Dike Leaching							
Manganese	98	0.0016	0.0079	0.0117	0.0047	0.0084		0.05
Mercury	0.004	0.0001	0.0001	0.0001	0.0001	0.0001	0.0001	0.001
Molybdenum	0.0	0.0010	0.0053	0.0053	0.0028	0.0028	0.073	
Nickel	0.2	0.001	0.002	0.002	0.001	0.001	0.025	
Potassium	253	2.0	5.4	5.4	3.5	3.5		
Selenium	0.00	0.001	0.001	0.001	0.001	0.001	0.001	0.01
Silver	0.001		0.00002	0.00002	0.00001	0.00001	0.0001	
Silicon	458	0	0.24	0.26	0.10	0.12		
Strontium	160		23.8	23.8	10.8	10.8		
Sodium	7	2.00	2.00	2.00	2.00	2.00		
Thallium	0.00	0.0002	0.0003	0.0003	0.0002	0.0002	0.0008	
Tin	n/a	0.0005	n/a	n/a	n/a	n/a		
Titanium	n/a	0.01	n/a	n/a	n/a	n/a		
Uranium	0.06	0.0002	0.0011	0.0011	0.0006	0.0006		0.02
Vanadium	0.1	0.03	0.03	0.03	0.03	0.03		
Zinc	0	0.005	0.005	0.005	0.005	0.005	0.03	5

Note: 1. Canadian Water Quality Guidelines are used, except for aquatic life guidelines for chloride and cadmium, which are US EPA. 2. (modified from Golder 2004i)..

Table E.5: Predicted Maximum Whole Lake Water Quality, Wally Lake

Parameter	Expected Loadings (kg/yr)		Average Baseline Conc. (mg/L) ²	Simulated Maximum Lake Concentration (mg/L)		Water Quality Guideline Concentrations (mg/L) ¹	
	Water Releases	Dike Leaching		Without Dike Leaching	With Dike Leaching	Aquatic Life	Drinking Water Supply
Conventional Parameters							
Hardness	6423	0	17.2	17.2	17.2		
pH	n/a	n/a	7.3	n/a	n/a	6.5-8.5	
Dissolved Anions							
Total Alkalinity	11394	1550	13.00	13.24	13.34		
Chloride	436	17	0.7	0.7	0.7	230	250
Fluoride	30	1	0.05	0.05	0.05		1.5
Sulphate	2408	1	5.3	5.3	5.3		500.0
Nutrients							
Ammonia Nitrogen	776	0	0.0200	0.0890	0.0890	7	
Total Kjeldahl Nitrogen	n/a	n/a	0.11	n/a	n/a	n/a	n/a
Nitrate Nitrogen	879	1	0.0240	0.1020	0.1020	2.9	10.0
Nitrite Nitrogen			0.0010				3.2
Total Phosphate-P	1.8	0.00	0.0030	0.0030	0.0030		
Total Phosphorus	9.0	2.2	0.0030	0.0039	0.0040		
Organic Parameters							
Dissolved Organic Carbon	n/a	n/a	2.2	n/a	n/a		
Cyanides							
Total Cyanide	0	0	0.000	0.000	0.000	0.005	0.2
Total Metals							
Aluminum	45	4	0.008	0.012	0.013	0.1	
Antimony	3.32	0.21	0.0005	0.0009	0.0009		
Arsenic	15.1	0.03	0.0005	0.005	0.006	0.005	
Barium	9.7	0.3	0.02	0.02	0.02		
Beryllium	0.23	0.00	0.0010	0.0010	0.0010		
Boron	22.9	0.0	0.100	0.100	0.100		
Bismuth	0.00	0.00	0	0.0000	0.0000		
Cadmium	0.73	0.00	0.00005	0.00018	0.00019	0.00007	0.005
Calcium	3782	497	4.6	4.7	4.7		
Chromium	0.40	0.00	0.0010	0.0010	0.0010	0.001/0.0089	0.05
Cobalt	0.10	0.00	0.0003	0.0003	0.0003		
Copper	0.4	0.0	0.002	0.002	0.002	0.002	1
Iron	2.4	0.0	0.03	0.03	0.03	0.3	0.3
Lead	0.7	0.0	0.0007	0.0007	0.0007	0.001	0.01
Lithium	1.1	0.0	0.0050	0.0050	0.0050		
Magnesium	851	84	1.3	1.3	1.3		
Manganese	10	1	0.001	0.002	0.002		0.05

Parameter	Expected Loadings (kg/yr)		Average Baseline Conc. (mg/L) ²	Simulated Maximum Lake Concentration (mg/L)		Water Quality Guideline Concentrations (mg/L) ¹	
	Water Releases	Dike Leaching		Without Dike Leaching	With Dike Leaching	Aquatic Life	Drinking Water Supply
Mercury	0.028	0.001	0.0001	0.0001	0.0001	0.0001	0.001
Molybdenum	9.1	0.6	0.001	0.002	0.002	0.073	
Nickel	0.4	0.0	0.0010	0.0010	0.0010		
Potassium	637	43	2.0	2.0	2.0	0.025	
Selenium	0.57	0.00	0.0010	0.0010	0.0010		
Silver	0.008	0.0002	0.00002	0.00002	0.00002	0.001	0.01
Silicon	298	73	0	0.04	0.04	0.0001	
Sodium	908	38	2.0	2.0	2.0		
Strontium	38	2	0	0.00	0.00		
Thallium	0.05	0.00	0.0002	0.0002	0.0002		
Tin	n/a	n/a	0.0005	n/a	n/a	0.0008	
Titanium	n/a	n/a	0.01	n/a	n/a		
Uranium	4.01	0.25	0.0002	0.0007	0.0007		
Vanadium	7.2	0.0	0.03	0.03	0.03		0.02
Zinc	3	0	0.013	0.013	0.013		

Note: 1. Canadian Water Quality Guidelines are used, except for aquatic life guidelines for chloride and cadmium, which are US EPA. (modified from Golder 2004i).