



The **BACK RIVER** PROJECT

Final Environmental Impact Statement Volume 1: Main Volume



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Location

- Located in the western Kitikmeot Region of Nunavut at approximately 65° north latitude and 106° west longitude. About 400 km south of Cambridge Bay and 525 km northeast Yellowknife.
- Primary communities: Kugluktuk, Cambridge Bay, Gjoa Haven, Kugaaruk, and Taloyoak.
- The closest community areas to the Project are Kingaok, located approximately 160 km north of the Goose Property, and Omingmaktok, located approximately 250 km northeast of the Goose Property.

Reserves

- Four mining areas within the Goose Property: Umwelt, Llama, Goose Main, and Echo.

Mobilization and Construction Phase

- The project could commence as early as 2016 and take four years to mobilize and construct.
- Up to a \$695 M initial capital investment.

Operational Phase

- Open pit and underground mines at each of the four Goose deposits.

Production

- Ore production: 19.8 million tonnes of mill feed over the life of mine.
- Projected annual 350,000 ounces of gold for about up to 10 years.

Processing

- Processing plant throughput of 6,000 tonnes per day.
- Standard gravity separation and cyanide leaching circuit.
- Tailings storage facilities in Goose Potential Development Area but purpose-built TSF on Crown land.

Transport

- Gold doré bars shipped out by aircraft.

Access Roads

- All-weather roads within Goose and MLA properties.
- Winter ice road between Goose and MLA properties.
- Winter ice road connection to George Exploration Camp.

Re-supply

- Marine supply via open water seasonal shipping (approximately 3 to 5 vessels per year).
- Year-round by aircraft.
- Winter ice road to connect the Goose and MLA properties.

Environment

- Extensive baseline studies including terrestrial environment, wildlife (particularly caribou), marine environment, freshwater environment, air quality, human environment, and resource utilization.
- Traditional knowledge (TK) information collected and analyzed through an Inuit-owned major study – *Naonaiyaotit Traditional Knowledge Project*.
- Baseline and TK information will form the foundation of Environmental Impact Statement and provide information for development of mitigation and management plans.

Employment

- Fly-in/fly-out operation.
- Direct construction employment up to 1,500 person-years over a four year period.
- Direct operations employment up to 6,970 person-years over a 10 year period.

Social and Economic Benefits

- Inuit Impact Benefits Agreement to be finalized with the Kitikmeot Inuit Association.
- Employment opportunities at the site.
- Opportunities for local businesses.
- Royalties and taxes to governments.

Closure and Post-closure Phase

- Closure will ensure that the former operational footprint is both physically and chemically stable in the long term for protection of people and the natural environment.
- Post-closure environmental monitoring will continue until it has been verified that reclamation has successfully met closure and reclamation objectives.

BACK RIVER PROJECT

FINAL ENVIRONMENTAL IMPACT STATEMENT

Main Volume

November 2015
Project #0283709-0002

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Sabina. 2015. *Back River Project: Final Environmental Impact Statement: Main Volume*. Prepared by Sabina Gold & Silver Corp.

Prepared by:



Sabina Gold & Silver Corp.

Main Volume: Revisions Log

Chapter	Section	Subject	Description (Major Revisions Only)
Chapter 1	All sections	George Property	Remove George as a source of ore; defer development of the Property.
	1	DEIS Volume 11	Volume 11 Water Licence Application is not required for FEIS as Back River is no longer in the Coordinated Process.
	1	DEIS Volume 12	Volume 12 Other Approvals is not required as other approvals, incl. Site Preparation and Type B Water Licences, are not relevant for FEIS.
	1.5	Alternatives	Revise list of Tier 1 and Tier 2 alternatives.
	1.6	Economic impacts	Update socio-economic figures based on results from FEIS modelling.
	1.7.1	Site preparation	Remove Site Preparation as a phase in Project development.
	1.7.1	Project schedule	Update for estimated development schedule for the Project.
	1.7.3	Additional ore	Defer developing George Property for its resources and infrastructure.
	1.8.1	Exceptions from review	No plans to request additional exemptions, e.g. Site Preparation, other than those for ongoing exploration and camp operations.
Chapter 2	All sections	Various	Various minor clarifications, updates, and changes (e.g., spelling and grammar) made to ensure greater clarity and accuracy of the document.
	2.1	Public Consultation and Engagement	Consultation and engagement activities for the Project have been updated and made current as of July 2015.
	2.1	Public Consultation and Engagement	Key community issues and commitments have been revised to reflect recent public consultation and engagement activities and results (including issues identified during the November 2014 community roundtable).
	2.2	Government Engagement	Updates made to Sabina's government engagement goals and the government agencies that have been engaged about the Project.
Chapter 3	All sections	George Property	Remove George as a source of ore; defer development of the Property.
	3.1.2	Future development	Defer ore resources to future development.
	3.1.4	Site preparation	Remove Site Preparation as a phase in Project development.
	3.1.4	Project schedule	Update for estimated development schedule for the Project.
	3.2.4	Economic impacts	Update socio-economic figures based on results from FEIS modelling.
	3.3.1.2	Staging ports and shipping routes	Cargo will be transported by barges and ships originating on the East or West coasts.
	3.3.1.4	Winter ice road to BIPR	PDA includes winter ice road extension from George Exploration Camp to BIPR all-weather road.
	3.3.2	Operation of MLA	Last sealift will occur in Year 8; MLA and the Winter Ice Road will operate as required in Year 9 and 10.

Chapter	Section	Subject	Description (Major Revisions Only)
Chapter 3 (cont'd)	3.3.2, 3.3.5	Sewage management	Direct incineration of sewage.
	3.3.3	Big Lake pump station	Source supplemental freshwater from Big Lake instead of Propeller Lake.
	3.3.4	Tailings Storage Facility	Relocate facility to Crown land and expand on design basis and operating criteria.
	3.3.4.2	TSF design basis	Location has changed so the geotechnical and constructability requirements have changed to suit.
	3.4.1, 3.4.3	Mineral resources and reserves	Provide revised data for resources and reserve including basis for calculating the latter.
	3.4.1, 3.4.3	Mineral resources and reserves	George Property resources are deferred for future development but the equivalent reserves quantities are added to those of Goose Property.
	3.4.4	Waste rock: ML and ARD	Provide details on testing methods and results on metal leaching and acid rock drainage.
	3.4.4	Waste rock management	Define WRSA locations and their design and construction basis including capping for freezeback.
	3.4.7	Tailings management	Provide details on deposition plan incl. use of mined out open pits (Umwelt and Goose Main).
	3.4.8	Goose Property is not zero discharge	Contact, non-contact, and groundwater will be managed separately; not all will report to the TSF per DEIS.
	3.4.8	Water management	Revise water use, sourcing, and treatment statistics.
	3.4.9	Progressive reclamation	Provide details on approach and opportunities for progressive reclamation.
Chapter 4	N/A	Traditional Knowledge	Various minor clarifications, updates, and changes (e.g., spelling and grammar) made to ensure greater clarity and accuracy of the document.
	N/A	Traditional Knowledge	Mention of new TK source (i.e., TK study on the Bernard Harbour Arctic char fishery) added. This report was not previously available for integration into the DEIS.
	N/A	Traditional Knowledge	Public consultation and engagement activities for the Project have been updated and made current as of July 2015.
Chapter 5	All sections	Existing Environment and Baseline Information	Inclusion of baseline data collected post DEIS
	5.1.3	Climate change	Added climate change predictions
Chapter 6	All sections	George	Remove George Potential Development Area and any associated potential effects.
	6.1	Traditional Knowledge	Added references to KIA 2014 and specific comments from 2014 report.
	6.2.1, Table 6.8-1	Air Quality	Potential project effects edited to reflect updated effects assessment.
	6.4.2, 6.4.3, Table 6.8-1	Freshwater Water Quality and Sediment Quality	Potential project effects edited to reflect updated effects assessment.
	6.5.1, 6.5.2, Table 6.8-1	Marine Water Quality and Sediment Quality	Potential project effects edited to reflect updated effects assessment.
	6.4.4, 6.4.5, Table 6.8-1	Freshwater Fish/Aquatic Habitat and Community	Potential project effects edited to reflect updated effects assessment.

Chapter	Section	Subject	Description (Major Revisions Only)
Chapter 6 (cont'd)	6.5.3, 6.5.4, Table 6.8-1	Marine Fish/Aquatic Habitat and Community	Potential project effects edited to reflect updated effects assessment.
Chapter 7	All sections	Existing Environment and Baseline Information	Inclusion of baseline data collected post-DEIS.
Chapter 8	All sections	George Property	Cumulative effects assessments add George Property as a future mine development.
	8.1	Interactive projects	Update past, existing, and reasonably foreseeable future Projects.
	8.3.6	Migratory birds	Potential cumulative effects assessment conducted: residual effects are predicted for habitat loss and disturbance.
	8.3.6	Raptors	Potential cumulative effects assessment was not conducted for raptors.
Chapter 9	9.1	Project schedule	Update for the phases and estimated development schedule for the Project.
	9.4	Tailings deposition	Provide details on deposition plan incl. use of mined out open pits (Umwelt and Goose Main).
	9.4, 9.7	Tailings facilities	Revise approach to close TSF, incl. meromixis and add for mine-out open pits, i.e., TFs.
	9.5	UG mines	Saline water will be pumped into UG workings.
	9.6	Waste rock management	Update details for disposal plan using WRSAs.
	9.12.1	Goose Property is not zero discharge	Contact, non-contact, and groundwater will be managed separately; not all will report to the TSF per DEIS.
	9.12.1	Water management	Update for details of water management for closure incl. treatment and monitoring.
Chapter 10	9.15.2	Progressive reclamation	Update various details.
	10.1	Environmental Management System	Updated section and figure to reference ISO 14001:2015.
	10.4	Table 10.4-1	Updated names of management plans for FEIS.
Chapter 11	10.4	Table 10.4-1	Updated names of Project phases.
		Summary of Commitments	No significant revisions but corresponding Appendix V1-6 updated fully for FEIS.
Chapter 12		Conclusions	No significant revisions.

Plain Language Summary

Plain Language Summary

Sabina Gold & Silver Corp. (Sabina) has prepared a Final Environmental Impact Statement (Final EIS) for the proposed development of the Back River Project (the Project). The Final EIS will be submitted to the Nunavut Impact Review Board (NIRB), Nunavut Water Board, government review agencies and community stakeholders for review and comment.

This popular summary presents the findings of the Final EIS, focusing on the topics that were identified during consultation and engagement as being most important to the potentially affected communities and government review agencies. The Final EIS provides a detailed assessment of the Project's baselines environment, anticipated environmental and socio-economic effects, residual effects, transboundary considerations and associated mitigation and monitoring plans.

About Sabina

Sabina is a Canadian junior resource company headquartered in Vancouver, BC focused on the advancement of the Back River Project. The Back River Project is Sabina's 100%-owned, proposed gold mine located in the western Kitikmeot Region of western Nunavut (see Figures 1 and 2). The project is comprised of two areas interconnected by winter ice roads: the Goose Property (mineral deposits - Umwelt, Llama, Echo, and Goose Main) and the Marine Laydown Area located along the western shore of southern Bathurst Inlet. Sabina's management team has a wealth of project development experience and is focused on advancing the Project in a sustainable and financially responsible manner.

Mine Plan

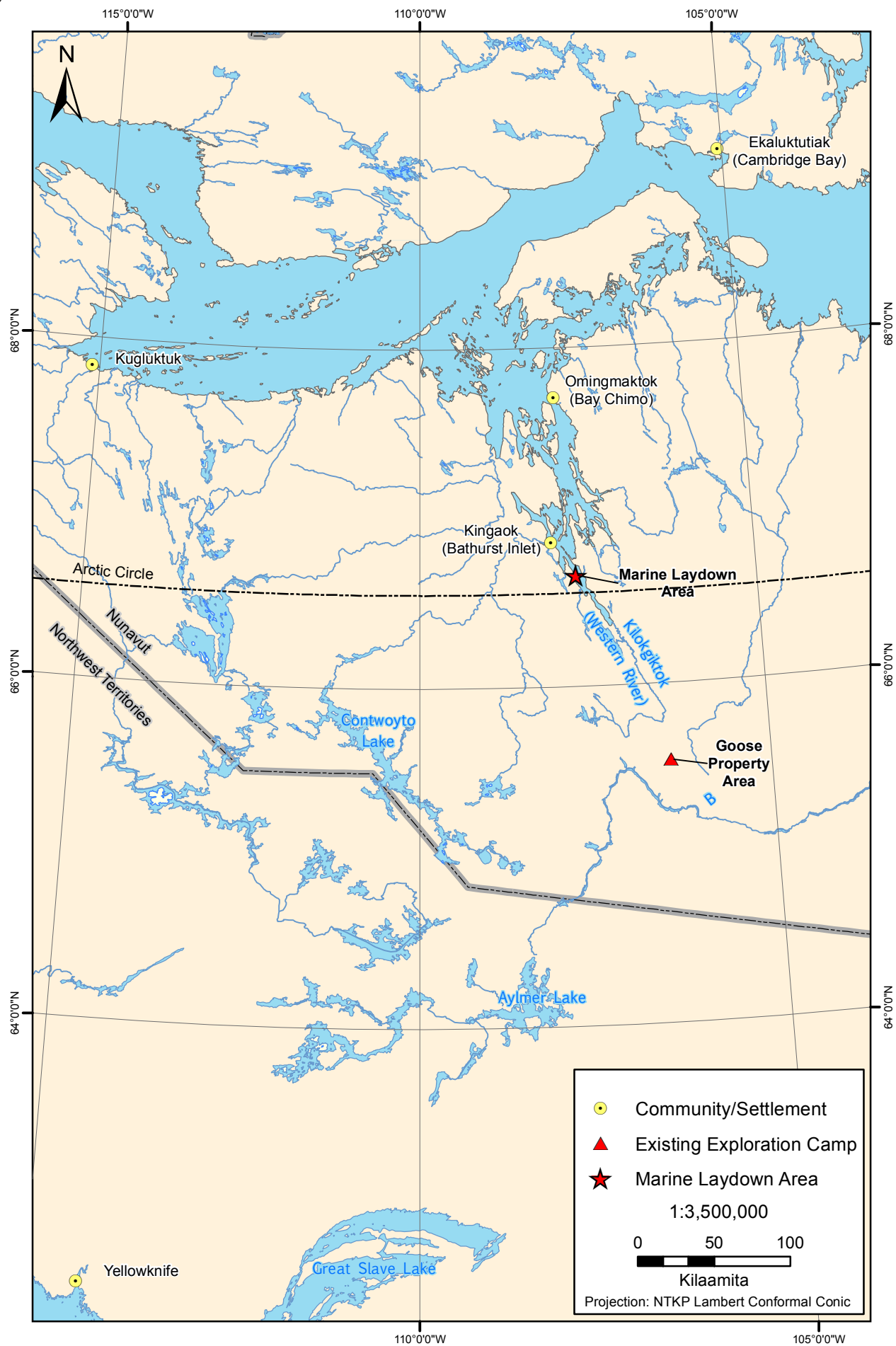
The mine plan for the Project reflects a ten year operating life based on current reserves with a total ore feed of 19.8 million tonnes. Continued exploration may extend the mine's life. Any significant increases to the Project may trigger subsequent Environmental Assessment processes.

Ore will be mined using conventional open pit and underground methods and will be trucked to the process plant for processing. Waste rock will be stored in several designated waste rock storage areas on the surface or backfilled in mined out workings. Initially, tailings from the process plant will be stored in the Tailings Storage Facility (TSF) located near the process plant and followed by backfilling mined out open pits.

Project Phases

The life of the Back River Project, from mobilization to post closure, is 27 years. It is expected that mobilization and construction activities could begin as early as 2016 (Table 1). The Operations Phase is expected to continue for 10 years based on the proposed plan.

When the Project's mineral reserves become exhausted, the mine will enter the closure and reclamation phase. During this phase, which is expected to last approximately eight years, the mine, equipment, and infrastructure will be decommissioned and the site will be returned to a stable condition leaving no significant effect on the environment. Post closure monitoring will be conducted for a period of approximately five years to ensure the area remains both chemically and physically stable.



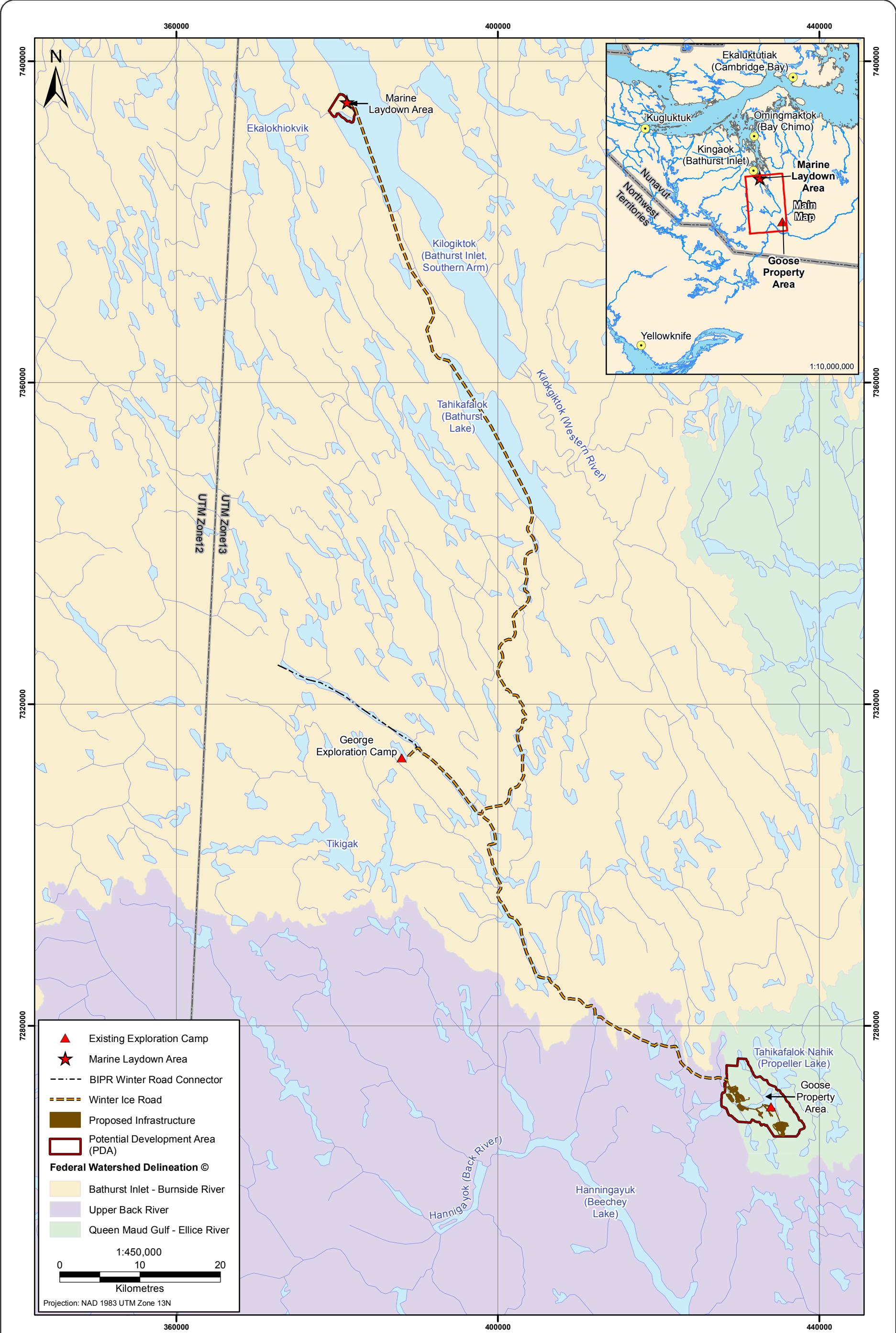


Figure 2

Table 1. Project Phases

Phase Name	Activities	Duration	Project Year
Mobilization and Construction	Mobilization, earthworks, facilities, equipment, mine development	4 years	-4 to -1
Operation	Mining, processing, progressive reclamation	10 years	1 to 10
Reclamation and Closure	Deconstruction, decommissioning, reclamation, WRSA closure, water treatment	8 years*	10 to 18
Post-Closure Monitoring	Monitoring of water quality, geotechnical, terrestrial and aquatic effects	5 years*	18 to 23

Alternatives

Project alternatives have been evaluated as follows: technical feasibility; costs; potential impacts to the environment; and amenability to reclamation. Engagement, consultation and traditional knowledge have been considered as part of the alternatives assessment. As the Project advances, alternatives will be further refined and evaluated.

Economic and Operating Environment

The Project will create significant socio-economic benefits:

- During construction, the Project will contribute as much as \$44 million in GDP to Nunavut;
- Construction is estimated to result in about 4,300 person-years of direct, indirect, and induced employment across Canada;
- Over the proposed 10 year production phase, total Canadian GDP impacts of the Project are predicted to exceed 2 billion dollars and total tax revenue is estimated at \$400 million;
- Nunavut mining royalties will reach approximately \$97 million over the life of the mine;
- The total direct, indirect and induced employment for Canada will be approximately 21,000 person-years over the operations phase of the Project; and
- The Project (from construction to post closure) will contribute as much as \$380 million in GDP to Nunavut.

Throughout the Project life, Sabina will seek to recruit a stable workforce capable of operating the mine efficiently and safely while giving first opportunity to northern residents.

Logistics

The sites will be accessed through year-round air transportation, two open water marine shipping routes to Bathurst Inlet, and winter ice roads between the Goose Property and the MLA. There is an existing all-weather airstrip at the Goose Property that will be extended for continued use. The MLA will be serviced by an ice strip in the winter and float plane in the summer.

Freight will be brought in by sea during summer from two ports: Bécancour, Quebec in the east (barges and ships) or Vancouver, BC in the west (barges). International ports may also be used if necessary. The ships and barges will be self-sufficient for offloading cargo. Lightering barges will be used to transfer cargo from the vessel to the MLA.

Fuel will be transported in tanker ships and/or barges and then will be transferred using floating hose to storage tanks on land at the MLA. Incoming and outgoing cargo and incoming fuel will be staged at

the MLA while awaiting transfer to the project sites by winter ice road or awaiting the appropriate vessel for back-haul.

Project Infrastructure

Both Project locations will have self-sufficient operating infrastructure. The Goose Property is the hub of the Project with the process plant, all-weather air strip, four open pits, four underground mines, and a camp capable of housing all employees for that site (see Figure 3).

The Bathurst Inlet MLA is located approximately 130 km north-northwest of the Goose Property. It is the primary staging area for equipment, material, fuel, and other supplies required for the construction and operation of the Project. This site will also have a camp capable of housing employees (see Figure 3).

Mineralogy and Mining

Gold is hosted in iron formations that are found in Archaean-age rock types common in the Canadian Shield. The minable mineral reserves for the Back River Project total 19,792 kt at 5.70 g/t for a quantity of contained gold of 3,628 koz. The ore at all open pits (Umwelt, Llama, Echo, and Goose Main) will be recovered using conventional truck and shovel open pit mining methods. Each of these deposits will also have underground mining operations which will be carried out using post pillar cut-and-fill, drift and fill, and longitudinal open stoping mining techniques.

Waste Rock and Tailings Management

The Tailings Storage Facility (TSF) is south-southeast of the Goose Main open pit. The TSF, together with the mined-out open pits, will store all of the tailings produced. The Goose Property will utilize three waste rock storage areas designed to properly manage potentially acid-generating (PAG) and non-potentially acid-generating (NPAG) mining waste.

Borrow Pits and Quarry Sites

Initial open pit mining will provide the bulk of crushed rock and aggregate to build local all-weather roads, laydown areas, airstrip extension, and support other such construction and maintenance activities. Sabina will establish borrow pits and/or quarries as supplemental sources of crushed rock and aggregate. At the MLA, small borrow pits and/or quarries are planned for building the required infrastructure.

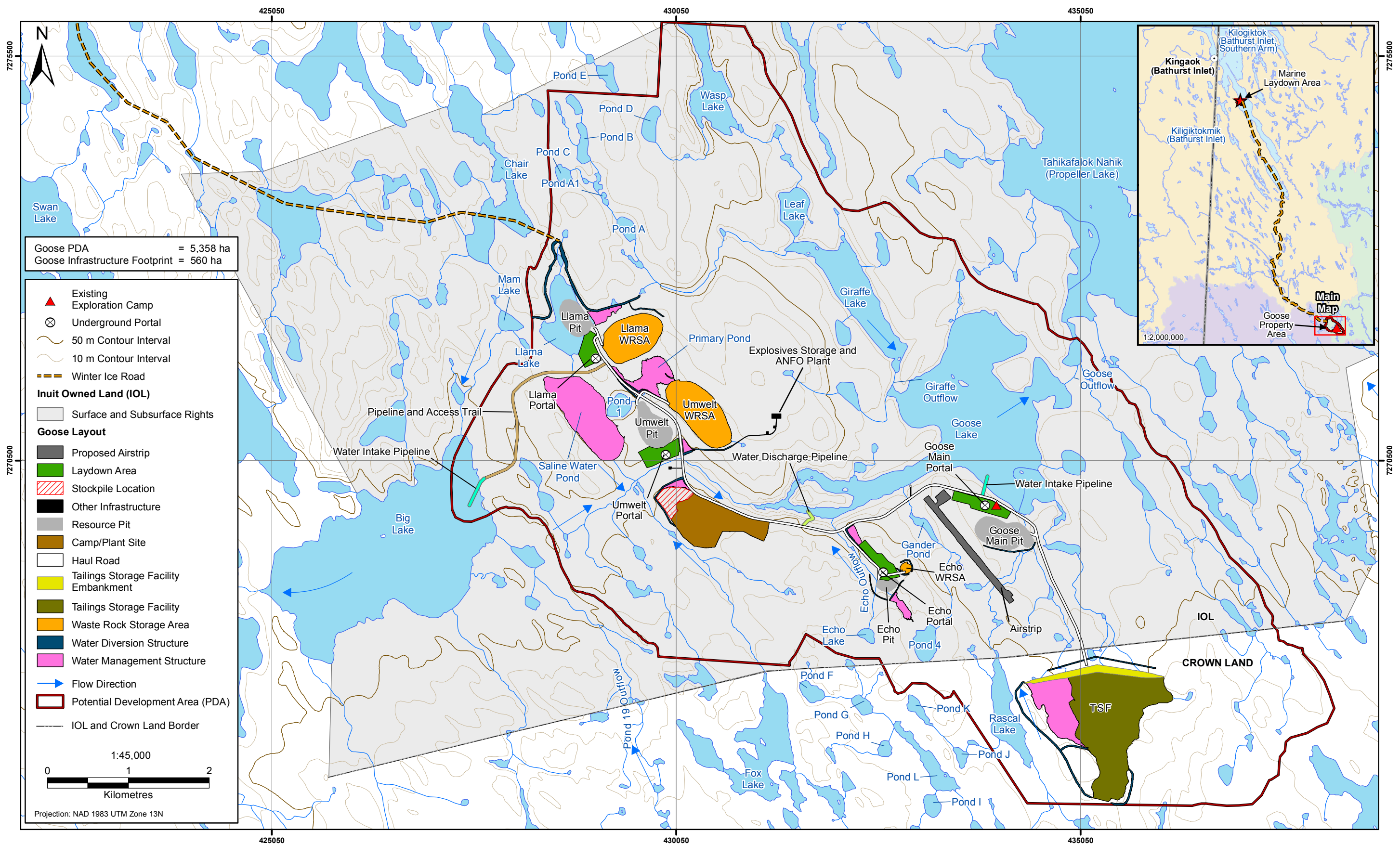
Mineral Processing

During operations, all ore will be processed using conventional gravity concentration and cyanidation techniques. The process plant's capacity is 6,000 tonnes of ore per day. Gold doré bars will be produced on site and then flown off-site for further refinement.

Water Management

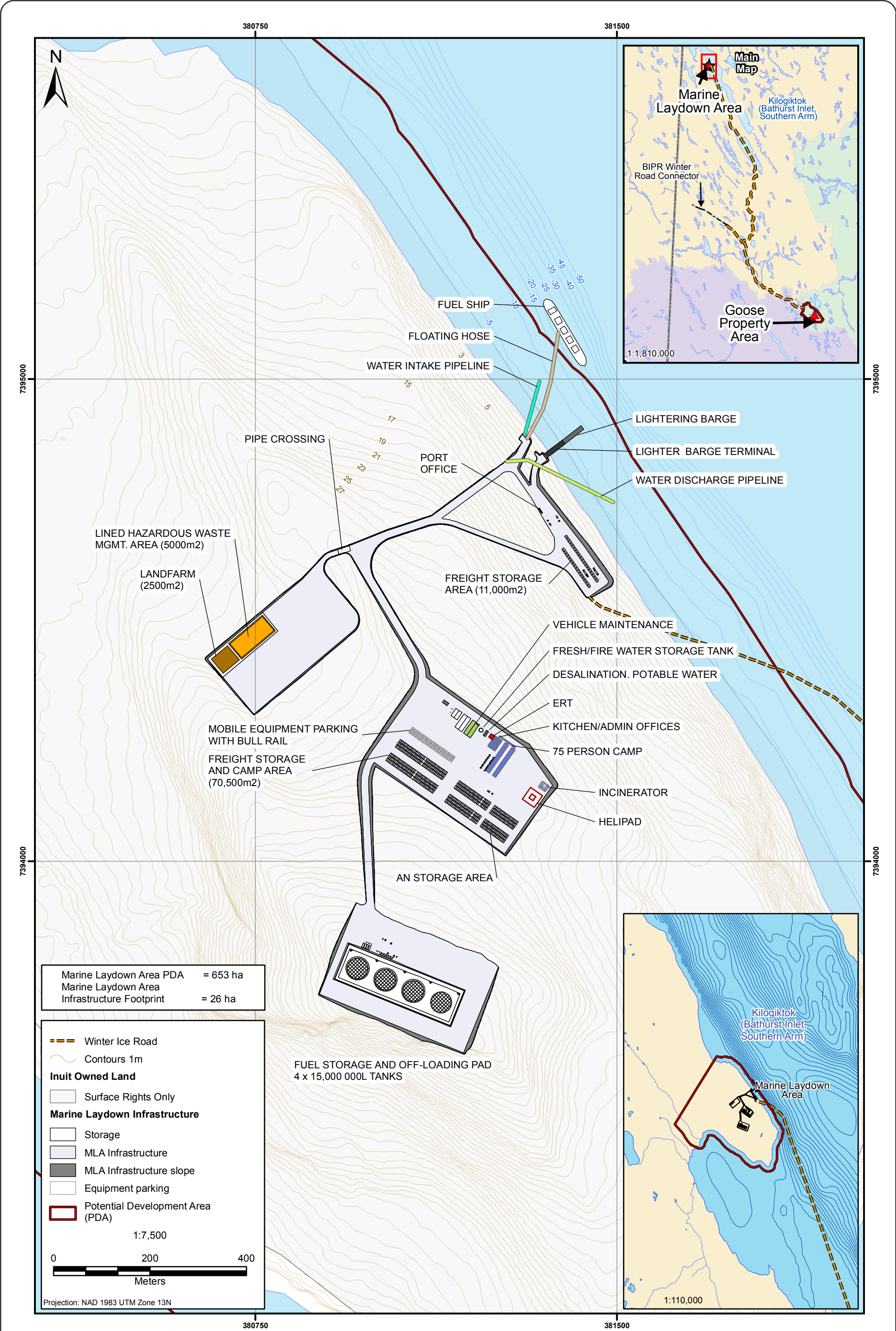
The base source of process water will be reclaimed water. Additional make-up water may be required from a nearby freshwater source during periods of insufficient reclaim.

Freshwater will be required to support the domestic and industrial water requirements at the Goose Property and MLA. The Goose Property will draw fresh water from Goose Lake with supplemental water from Big Lake if required. A desalination unit will be installed at the MLA drawing seawater from Bathurst Inlet. Water treatment facilities will provide potable water at both properties.



Potential Development Area and Infrastructure Areas - Goose Property

Figure 3



Llama Lake will need to be dewatered to access the Llama deposit. In addition, Umwelt Lake will be dewatered to use as a temporary water reservoir for potential saline groundwater that could come from underground mining. A dewatering plan will be prepared and implemented upon regulatory approval prior to any dewatering.

Waste Management

Waste products will be sorted at waste management facilities located at each site after which the material will be reused or recycled wherever possible. The Goose Property will utilize landfills for approved nonhazardous solid waste. Other materials will then be safely stored pending transportation to approved offsite recycling or disposal facilities. MLA will not have a landfill; therefore, waste will be transported off site either to Goose Property or with the seasonal marine backhaul.

Both sites will have hazardous waste storage areas and incinerators for combustion of nonhazardous, combustible waste including sewage sludge. At the Goose Property, sewage and grey water will be treated in wastewater treatment plant. Treated sewage effluent will then be discharged to the tailings storage facilities or a designated/approved area in the terrestrial environment. Any discharge will be conveyed through structures designed to minimize erosion and degradation of the permafrost. At the MLA, sewage will be collected in Pacto systems and incinerated.

Closure and Reclamation

Sabina will undertake progressive reclamation activities throughout the mine life. Achieving chemical and physical stability will be a key focus of final mine closure. Mine closure is expected to take eight years and consist of two stages (active and passive) followed by five years of post closure monitoring.

Environmental Management

Sabina's Environmental Management System provides a framework for the environmental and socio-economic monitoring activities to be implemented through the life of the Project. The system provides enough flexibility to respond to the monitoring results in a timely fashion to reduce or eliminate potential adverse residual effects to the natural and socio-economic environments.

Public Consultation and Engagement

To date, there have been extensive consultation and engagement sessions with relevant communities and organizations that may have an interest in the Project. These include public meetings, meetings with key stakeholders and stakeholder groups (Hamlets, elders, HTOs, and youth), meetings with community advisory groups in Cambridge Bay and Kugluktuk, as well as the Kitikmeot Inuit Association. There has been a particular focus on the communities of Cambridge Bay, Kugluktuk, Kingaok, Omingmaktok, Gjoa Haven, Taloyoak, and Kugaaruk. Meetings with additional groups in the Northwest Territories have also been completed.

Information obtained through these consultation and engagement sessions has helped Sabina identify issues and concerns so that they may be properly addressed in the Final EIS.

Government Engagement

The purpose of Sabina's government engagement program is to provide government officials with clear and comprehensive information regarding the proposed Project, its various management and mitigation plans, and its timelines and milestones. Engagement involved officials in the Governments of Nunavut and Northwest Territories as well as all relevant Federal agencies.

Sabina has used a wide range of government engagement methods and has emphasized building trust and personal relationships to the greatest extent possible. Sabina recognizes there will be an on-going need for both formal and informal government engagement activities. Any significant Project-related correspondence will be provided directly to NIRB and will become part of the public record and as required by their process.

Traditional Knowledge

Sabina recognizes the inherent value of Traditional Knowledge (TK) and the importance local communities place on its use. TK is important as it complements existing scientific and socio-economic information; provides new or otherwise unrecorded information; and provides valued alternative views or interpretations.

To ensure relevant TK was properly considered, the Project entered into a partnership with the Kitikmeot Inuit Association to collect and analyse available data. In addition publically available information was used for groups within the Northwest Territories. TK played a major role in Project design and decisions.

Valued Components

Valued Ecosystem Components (VECs) and Valued Socio-economic Components (VSECs) are the highest priority aspects for a particular region, community or to society as a whole. The assessment of potential Project effects looked at the potential effects over time and considered potential effects near to the Project, referred to as the local study area (LSA); a larger area around the Project, referred to as the regional study area (RSA); and even larger area within the region including potentially all of Nunavut.

Through the review process, the interactions of the Project with the various VECs and VSECs were identified and key indicator species were identified and analysed. Scientific studies combined with TK were used to predict any potential effect. Where negative Project interactions could not be avoided, plans were developed to minimize or eliminate effects.

Valued Ecosystem Components (VECs)

Atmospheric Environment

Air Quality - Project activities may generate air emissions and may lead to dust and acid deposition. Emissions linked to the Project include: stack emissions, vehicle exhaust emissions, dust emissions from vehicles travelling on unpaved roads, emissions associated with blasting and aircraft emissions. Mitigation and management activities planned to reduce or eliminate potential effects on air quality include: energy efficiency measures, measures to reduce fuel use, the use of water or dust suppression fluids to reduce dust from unpaved roads, transported material and equipment in the crushing facility, and the use of emission control systems such as wet scrubbers, baghouses, and filters. The significance of residual effects for air quality is predicted to be not significant. There are no potential cumulative effects or transboundary effects on air quality.

Noise and Vibration - Construction and mine operation will introduce noise and vibration from construction equipment, haul vehicles, blasting and vehicle/aircraft traffic. Project effects on humans are: sleep disturbance; interference with speech communications, complaints, annoyance, rattling, hearing loss and building. Effects on wildlife include: loss of habitat and disturbance. Mitigation and management measures planned to reduce or eliminate potential effects from noise and vibration include: ensuring equipment is fitted with appropriate mufflers and silencers, limiting activities such as blasting and take-off and landing of aircraft to certain times of the day, and housing stationary sources in building

or using enclosures, berms, acoustic screening and shrouding. The residual effects are not significant. There are no anticipated cumulative effects or transboundary effects for noise and vibration.

Terrestrial Environment

Vegetation and Special Landscape Features - Project construction may result in the loss of vegetation and special landscape features. The mitigation and management measures designed to remove or reduce these effects include: minimizing the Project footprint, using winter ice roads, and reducing fugitive dust where possible. The vegetation/special landscape feature loss will be low as it will be confined to the final footprint of the Project. The residual vegetation loss is not significant and there are no cumulative or transboundary effects.

Caribou - There are three barren-ground caribou herds in the region: the Bathurst herd, found primarily during post-calving period, and the Beverly herd (considered together with the Ahik herd), found primarily during the late-summer and early-fall; and the Dolphin and Union herds, found only occasionally north of the MLA. Potential Project-related effects include: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures to eliminate or minimize the potential effects include: minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan. With the above measures, the residual effects are not significant. The potential transboundary effects are accounted for in the cumulative effects assessment and are indicated to be not significant.

Grizzly Bears - Grizzly bears are federally listed as species of special concern and are listed as sensitive in Nunavut. Potential Project-related effects include: habitat loss, disturbance due to noise (e.g. displacement from areas of habitat), disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures to eliminate or minimize the potential effects include: minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads, waste management and chemical handling measures to avoid attracting wildlife and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan. With the above measures, the residual effects are not significant. Potential transboundary effects are accounted for in the cumulative effects assessment and are not significant.

Muskox - Potential Project-related effects on muskox include: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures to eliminate or minimize the potential effects include minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan. With the above measures, the residual effects are not significant. Potential transboundary effects are accounted for in the cumulative effects assessment and are not significant.

Wolverine and Furbearers - Wolverine and grey wolves were selected as the representative furbearer species for the Final EIS. Project-related effects include: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures to eliminate or minimize the potential effects include: minimization of Project footprint, noise abatement

measures, speed control measures, the use of winter ice roads, waste management and chemical handling measures to avoid attracting wildlife, and the implementation of the Wildlife Mitigation and Monitoring Plan. With the above measures, the residual effects are not significant. Potential transboundary effects are accounted for in the cumulative effects assessment and are not significant.

Migratory Birds - Potential Project-related effects on migratory birds include: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management to eliminate or minimize the potential effects include: minimizing the Project footprint, noise abatement measures, speed control measures, the use of winter ice roads, waste and chemical handling measures to avoid attracting wildlife, and the implementation of the Wildlife Mitigation and Monitoring Plan. With the above measures, the residual effects are not significant. There are no anticipated cumulative effects or transboundary effects on migratory birds.

Raptors - Two raptor nest sites were found in the Project development area, while seven nests were found within a 12 km radius. Potential Project-related effects include: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include: minimizing the Project footprint, noise abatement measures, speed control measures, the use of winter ice roads, waste management and chemical handling measures to avoid attracting wildlife, and the implementation of the Wildlife Mitigation and Monitoring Plan. With the above measures, the residual effects on air quality are not significant. Potential transboundary effects are accounted for in the cumulative effects assessment and are not significant.

Freshwater Environment

Surface Hydrology - Potential Project effects include water use, site water management activities, and winter roads. Mitigation and management measures to eliminate or minimize the potential effects include: the design of maximum water use volumes for key waterbodies in order to protect critical fish habitat, following DFO protocols for winter water withdrawal, confinement of infrastructure to local watersheds, and following DFO's measures to avoid causing harm to fish and fish habitat. With the above measures, the residual effects are not significant. There are no anticipated cumulative effects or transboundary effects on hydrology.

Freshwater Water Quality - Potential Project-related effects include Project activities that could alter the following indicators for water quality via runoff, water withdrawals, treated discharge, and aerial deposition: pH, TSS, nutrients, metals, hydrocarbons, BOD, chlorine, and cyanide. Mitigation and management measures to eliminate or minimize the potential effects include: Project design features such as using geochemically suitable material for roads and pads, and the implementation of mitigation measures outlined in the Site Water Monitoring and Management Plan. With the above measures, the residual effects are not significant. There are no anticipated cumulative effects or transboundary effects on freshwater water quality.

Freshwater Sediment Quality - Potential Project-related effects include Project activities that could alter the following indicators via runoff, water withdrawals, treated discharge, and aerial deposition: particle size, nutrients and organic carbon, metals, and hydrocarbons. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include: mitigation measures to avoid erosion, and the implementation of mitigation measures outlined in the Site Water Monitoring and Management Plan. With the above measures, the residual effects are not significant. There are no anticipated cumulative effects or transboundary effects on freshwater sediment quality.

Freshwater Fish and Aquatic Habitat - Project activities that have the potential to directly affect freshwater fish and aquatic habitat include: the loss of lake habitat due to dewatering, development of open pits, water withdrawal for domestic and process use, and winter ice road construction. The primary mitigation measure to avoid potential effects on freshwater fish and aquatic habitat is building infrastructure in a way that avoids freshwater fish habitat wherever feasible; for example, placing the ore stockpile and waste rock areas away from fish-bearing waters. Another key mitigation measure is the establishment of maximum water volume usage. With these measures, no residual, cumulative or transboundary effects are anticipated on the freshwater fish and aquatic habitat.

Freshwater Fish Communities - This assessment focused on the two abundant freshwater or anadromous fish species, Lake Trout and Arctic Grayling. The main potential Project-related effect to freshwater fish communities is mortality and population decreases due to lake dewatering, building of winter ice roads, construction of the Project footprint, water withdrawal for domestic and process use or winter ice road construction, and blasting with explosives. The primary mitigation measure to avoid potential effects on freshwater fish communities is building infrastructure in a way that avoids freshwater fish habitat wherever feasible. Another key mitigation measure is the establishment of maximum water volume usage. With these measures, no residual, cumulative or transboundary effects are anticipated.

Marine Environment

Marine Water Quality - The following Project-related activities will have an effect on marine water quality include shipping activities; sediment introduction to water as a result of site preparation, construction, and reclamation; site contact water; winter ice roads; explosives; fuels, oils, and polycyclic aromatic hydrocarbons (PAHs); treated discharges; and dust deposition. Mitigation and management measures to eliminate or minimize the potential effects include: minimizing vessel speeds and restricting vessels to deeper waters, using geochemically suitable material for roads and pads, adhering to regulatory guidelines for treated discharges, and using best management practices for the storage, transport, and use of fuels, explosives, and hazardous materials as well as for dust suppression and incineration. With the above measures, the residual effects are not significant. There are no anticipated cumulative effects or transboundary effects on freshwater water quality.

Marine Sediment Quality - The following Project-related activities could have an effect on marine sediment quality: shipping activities; sediment introduction to water as a result of site preparation, construction, and reclamation; site contact water; fuels, oils, and polycyclic aromatic hydrocarbons (PAHs); treated discharges; and dust deposition. Mitigation and management measures to eliminate or minimize the potential effects include: adhering to regulatory guidelines for treated discharges and using best management practices for the storage, transport, and use of fuels, explosives, and hazardous materials as well as for dust suppression and incineration. With the above measures, the residual effects are not significant. There are no anticipated cumulative effects or transboundary effects on freshwater water quality.

Marine Fish and Aquatic Habitat - The in-water construction of MLA infrastructure (in-water construction of a seasonal floating dock) could have a direct impact on aquatic habitat. Residual effects are not significant, No cumulative or transboundary effects are anticipated.

Marine Fish Community - Potential Project effects focused on Arctic Char and include: potential direct mortality from in-water construction, population effects from introduced species carried by ballast water, and underwater noise from shipping activities. Mitigation measures to eliminate or reduce potential effects include: limiting the amount of in-water construction, eliminating ballast water exchange, and enforcing speed limits for ships navigating through the regional study area. With the above measures, the residual and cumulative effects are not significant. There are not any transboundary effects.

Seabirds and Seaducks - Seabirds and seaducks include migratory bird species that may use marine areas during any time of year and encompass a diverse group of avian species including eiders, scoters, geese and swans, dabbling ducks, diving ducks, loons, and gulls. Common eider, glaucous gull, and long-tailed duck are considered sensitive species. Potential Project effects include: disturbance (e.g., noise) and reduced reproductive productivity. Mitigation measures include: identification and avoidance of seabird and seaduck staging areas, avoidance of disturbing sensitive areas, and establishing appropriate flight altitude plans above known staging areas. With the above measures, the residual and cumulative effects are not significant. No transboundary effects are anticipated.

Ringed Seals - Potential Project effects include: alteration of habitat, disturbance (e.g., noise), direct mortality and injury, indirect mortality, exposure to contaminants, and reduced reproductive productivity. Mitigation measures to eliminate or reduce potential effects include: identification and avoidance of seal lairs. Effects are not significant and cumulative or transboundary effects are not anticipated.

Valued Socio-economic Components (VSECs)

Human Environment

Archaeological Sites - The construction of the Project has the potential to impact archaeological sites. The main mitigation measure will be the avoidance of archaeological site by Project design. Any archaeological sites discovered during construction, operations, and closure will be inspected by the Project archaeologist, documented, and reported to the Government of Nunavut, Department of Culture and Heritage. With avoidance and/or mitigation implemented potential effects are not significant and no cumulative or transboundary effects are anticipated.

Socio-economics

Economic Development - Increases to economic diversity are anticipated as a result of the Project and are characterized by: increased local employment, increased incomes, and spending; Project-related expenditures (locally, regionally) with existing businesses located in the Kitikmeot and across Nunavut, increasing the financial resources available to existing businesses; the addition of new businesses or expansion of existing businesses within the Kitikmeot Region that provide goods or services previously unavailable; and/or the development of or additional investment in Inuit-owned businesses. Increased economic growth, diversity, and performance are expected to have a positive residual effect on economic development.

Business Opportunities - Project activities are anticipated to promote growth and diversity among Inuit and northern businesses and include: provision of contract and sub-contract opportunities, specifically the procurement of goods and services from local suppliers; and contribution to personal incomes thereby increasing the purchasing power of local residents. The expected increase in local business activity is expected to bring about an increase in capital investment (investment in the expansion of businesses or the creation of new businesses) in anticipation of the Project. Local businesses will be presented with opportunities to bid on Project work, facilitated by the Project through mitigation and management measures established to maximize the benefits of contracting opportunities, and the local sourcing of goods and services. Changes to the growth and diversity of Inuit and northern business are anticipated to have a positive residual effect.

Employment - The Project is expected to affect employment in three ways: changes to employment and income levels; changes to the capacity of the labour force; and changes to competition for local labour. Mitigation and management measures that focus on training, recruitment, and retention were developed to enhance the participation of local Inuit in Project employment and are detailed in the Human Resources Plan. Direct Project employment and procurement may cause negative changes to

local competition for labour. The Project creates the potential for individuals currently employed in the Kitikmeot Region to leave their current employment for mine-related positions. Potential effects are not significant and there are no anticipated Project residual, cumulative or transboundary effects.

Education and Training - The potential effects of the Project on education and training include changes to the demand for education and training and changes to youth's attitudes and behaviours toward education and training. Sabina expects to partner with local governments, educational institutions, Inuit organizations, and other mine proponents to contribute to the creation of a regional training facility or additional mine employment training programs. Changes to the demand for education and training, as well as changes in youth attitudes toward education and training, are predicted to have positive residual effects.

Health and Community Well-being - Both positive and negative residual effects are predicted for health and community well-being due to changes to individual and family spending. Should local residents that obtain employment with the Project choose to spend their increased incomes unproductively (e.g., on gambling, drugs, and alcohol) and engage in negative social behaviours, this will have a negative effect on the community. However, income used to improve standards of living (e.g., improvements to housing and food security) coupled with the other numerous positive effects associated with Project employment have the potential to result in substantial improvements. Overall, the residual, cumulative and transboundary effects of negative changes to individual and family spending and negative changes to family and household structure are determined to be not significant.

Land Use

Non-traditional Land and Resource Use - Commercial land use consists primarily of sport hunting, tourism, mineral exploration, and transportation and shipping. The project could impact ecotourism activities by: changes in access to land and resources; changes to the experience of the natural environment; and changes to the abundance and distribution of resources. There are several best practice management and mitigation measures in place which serve to reduce potential adverse effects while maximizing beneficial outcomes. The residual and cumulative effects are not significant. Non-traditional land use does not extend beyond the boundaries of the Nunavut Settlement Area and do not result in transboundary effects.

Subsistence Economy and Land Use - The Inuit people of the Kitikmeot have always depended on their knowledge of the land and environment (Inuit Qaujimagatugangit). Subsistence economy and land use (hunting, fishing, trapping, and gathering) is potentially affected by: changes in access to land and resources; changes to the experience of the natural environment; and changes to the abundance and distribution of resources. There are several management and mitigation measures including: mitigation by Project design, best practice management measures, and monitoring. Negative residual and cumulative effects on the subsistence economy and land use are not significant. In addition, the benefits of the Project may serve to maintain traditional subsistence land use to a greater extent than would be possible without the economic growth and employment income associated with the Project. The Project is not expected to result in transboundary effects on subsistence land users.

Country Foods - There are a number of contaminants that could impact country foods during the life of the Project. Because the proposed Project is a metal mine, metal concentrations in the environment are most likely to change as a result of Project development. Extensive mitigation and management measures will be in place to minimize or eliminate potential effects on air, water, sediment, soil, and vegetation as well as country foods such as fish and wildlife. Potential effects are not significant and there are no anticipated Project residual, cumulative or transboundary effects.

Human Health and Environmental Risk Assessment - Human health and environmental risk baseline studies reviewed the existing levels of contaminants and noise in the Project areas to establish a benchmark for evaluating the potential future effects and to document pre-disturbance conditions for the purpose of reclamation activities. As part of the risk assessment, data were reviewed for air quality; freshwater and sediment quality; marine water and sediment quality; fresh water aquatic resources and fish; marine aquatic resources, fish, and wildlife; soil and vegetation; terrestrial wildlife; country foods; and noise. It was determined that the Project would not contribute negatively to overall human health and environmental health. Potential effects are not significant and there are no anticipated Project residual, cumulative or transboundary effects.

Additional Project Considerations

Environmental Effects on the Project - Extreme weather events such as storms, elevated rainfall or snowfall, frigid temperatures and geotechnical hazards such as seismicity, ground and slope instabilities, all have the potential to affect Project infrastructure and in turn represent concerns for human safety and the environment. Included in the context of extreme weather is the potential for global climate change to affect the Project. Possible future effects of a changing climate on the Project include:

- Changing sea ice conditions, sea level rise, and coastal erosion may impact inbound and outbound shipping of fuel and product at Bathurst Inlet; and
- Warming temperatures may affect permafrost in the vicinity of the Project site, potentially leading to an increased active layer thickness. This could directly affect infrastructure at the Project site in the long-term.

Based on the Project lifespan, it is anticipated that the effects of a potentially changing climate on the Project are not significant.

Accidents and Malfunctions - Major accidents and malfunctions may occur through natural events, breakdown of mitigation measures, or human error. Some potential malfunctions/accidents associated with Project include: spills, vehicle accidents, helicopter crashes, uncontrolled discharges, fires, explosions, and sediment releases. Management systems will mitigate most risks and limit consequences through:

- prevention of accidents and malfunctions via training, awareness, education and equipment maintenance;
- assessment of the risk of accidents and malfunctions throughout the design phase;
- employment of adaptive management procedures to ensure continual appraisal of risks; and
- design and implementation of effective emergency response plans and contingency plans.

The residual human and ecological effects were assessed to be minor, not detrimental, or the effects are considered manageable contingent upon the application of the precautionary approach in design and implementation of the management plans.

Summary of Conclusions

Overall, the Project is expected to result in no significant negative effects (residual, cumulative or transboundary) to the atmospheric, terrestrial, freshwater, marine, and human environments. The Project will result in positive effects on various socio-economic aspects including local employment and skills development.

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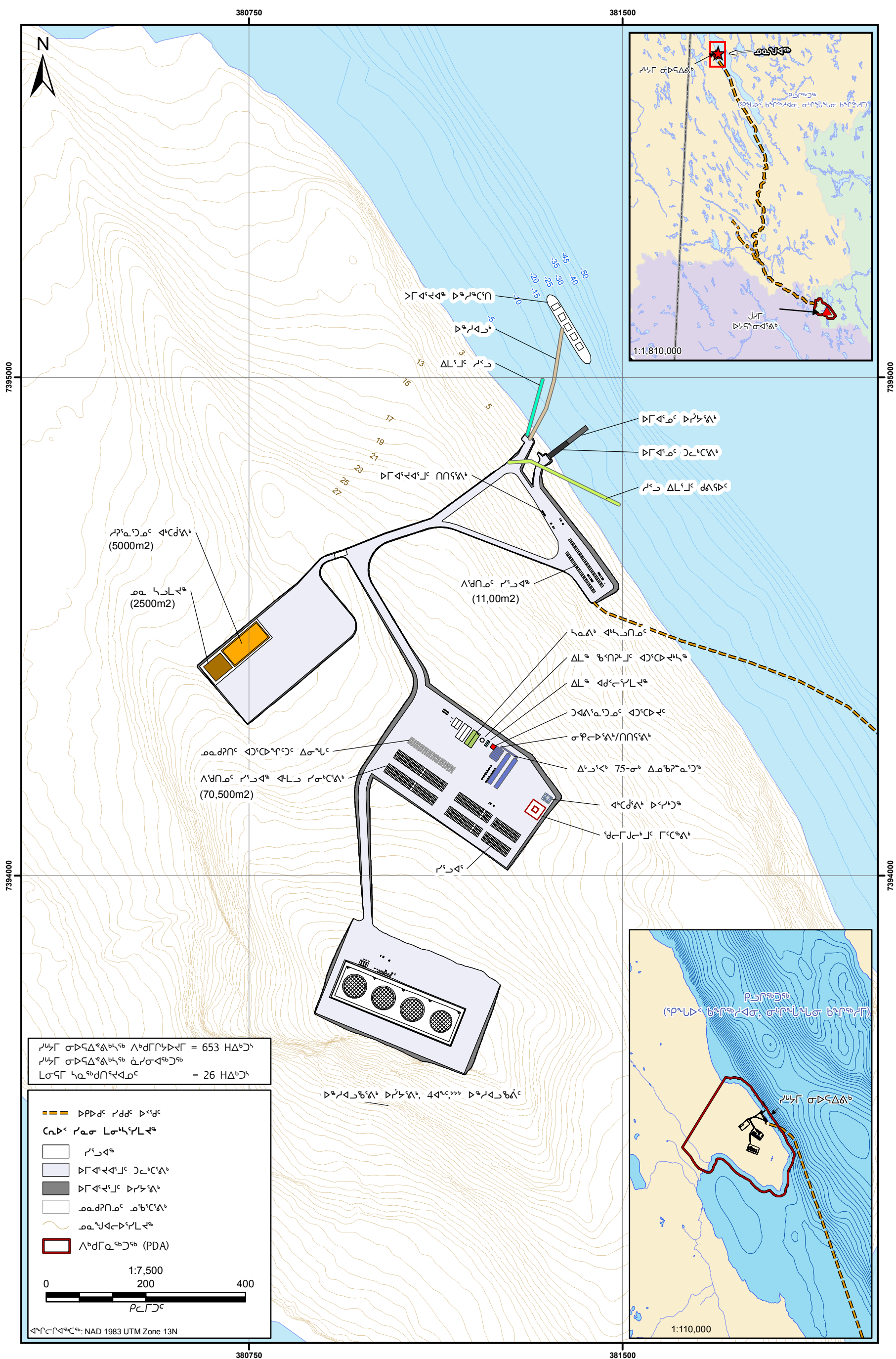
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Kangiqhinnaqtut Uqauhiit Nainaqhimayut

Sabina Guulit Silverlu Kuapurisan (Sabina-kut) hanaiyaqtat Uuktugut Avatiliqutinut Aktuanit Uqauhiit (Uuktugut EIS-nga) taphumunga uuktugauyuq pivaliatitnia tamna Hanningayuq Kuugaq Havanga (tamna Havanguyuq). Tamna Uuktugut EIS-nga tuniayuyuq tapkununga Nunavut Avatiligiyit Katimayit, Nunavut Imaligiyyit Katimayit, kavamatkut naunaiyaqni havaktit nunaliuyunilu ilauyut naunaiyaqninut uqauhiqaqvinutlu.

Una atuqtauvakniqhaq nainaqhimayut hatqiqtitai naunaiqnit tapkuat Uuktugutit EIS-nga, pinahuaqhugit pityutauyut naunaiqtait atuqtitlugu uqaqatigiknit havaqatigiknilu atuqniqpauninut tapkuat pilaqnit aktuanit nunaliuyut kavamaitlu naunaiyaqni havaktit. Tamna Uuktugut EIS-nga piqaqtitai unniqtuttiaqhimayut naunaiyaqni tapkuat Havanguyup huniumaittitlugu avatiliqutai, nigugiyat avatiliqutit inuliquititlu-maniliugutit aktuanit, hunavaluit aktuanit, nunaqatigingittut ihumaginit piqatailu ihuaqhautit munaqhityutitlu upalungaiyautit.

Tamna Uuktugutilik

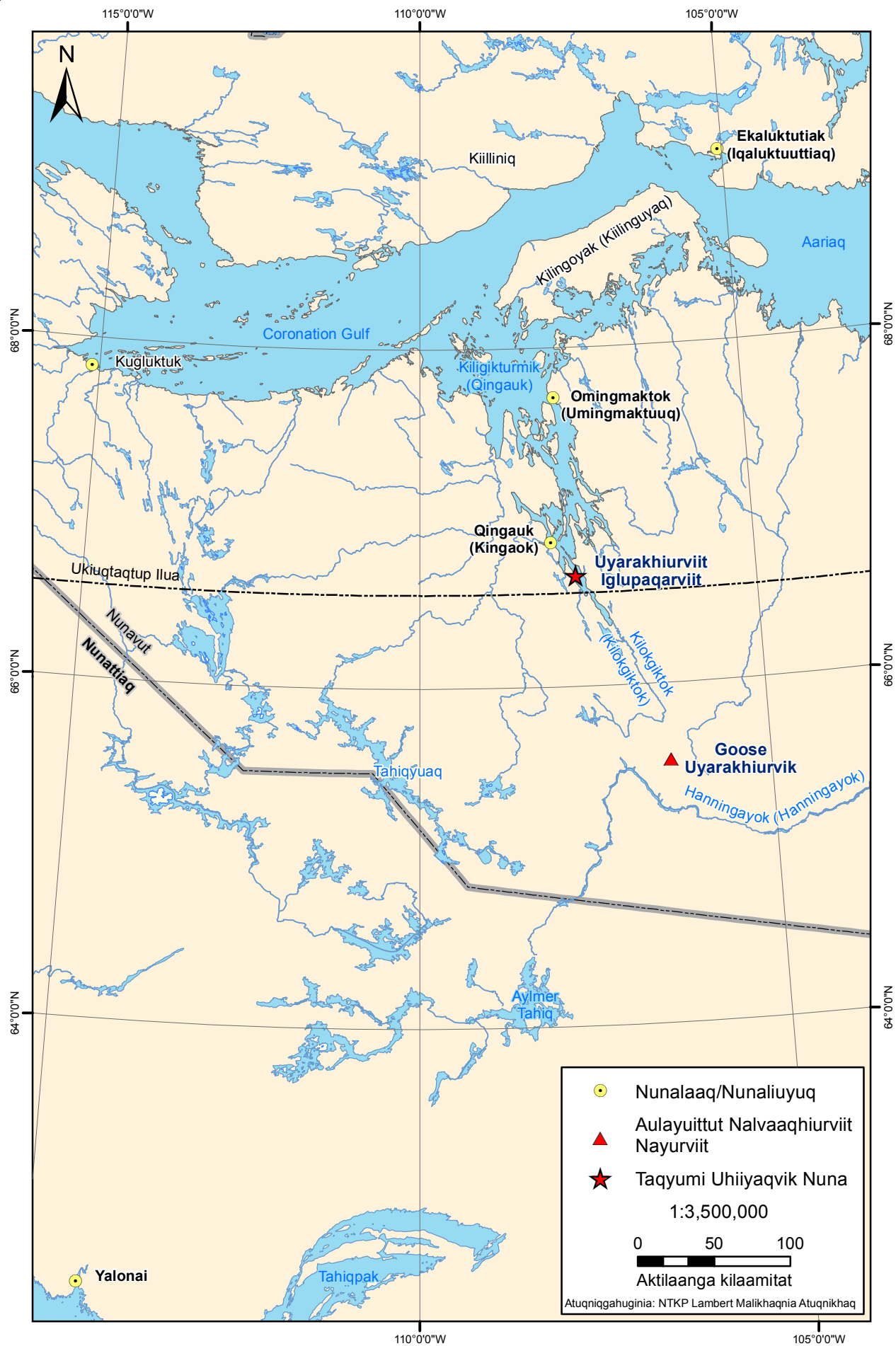
Sabina-kut tapkuat Kanatamiuni mikitqiyat piqaqnit nanminilgit pinahuat hivunmuktitni tahamna Hanningayuq Kuugaq Havanga. Sabina-kut ataniqaqvilgit talvani North Vancouver, British Columbia ahiinilu aapisilgit talvani Ikaluktutiak, Nunavut tamnalu Thunder Bay, Ontario. Sabina-kut maniyagiyaq havaqatigit amihunik havanguyumut pivaliatitni atuqpaknit pinahauqtutlu hivunmuktitnia tamna Hanningayuq Kuugaq Havanga atutqikhalamik, kiinauyaliqutinut havattiqtumik piplugu.

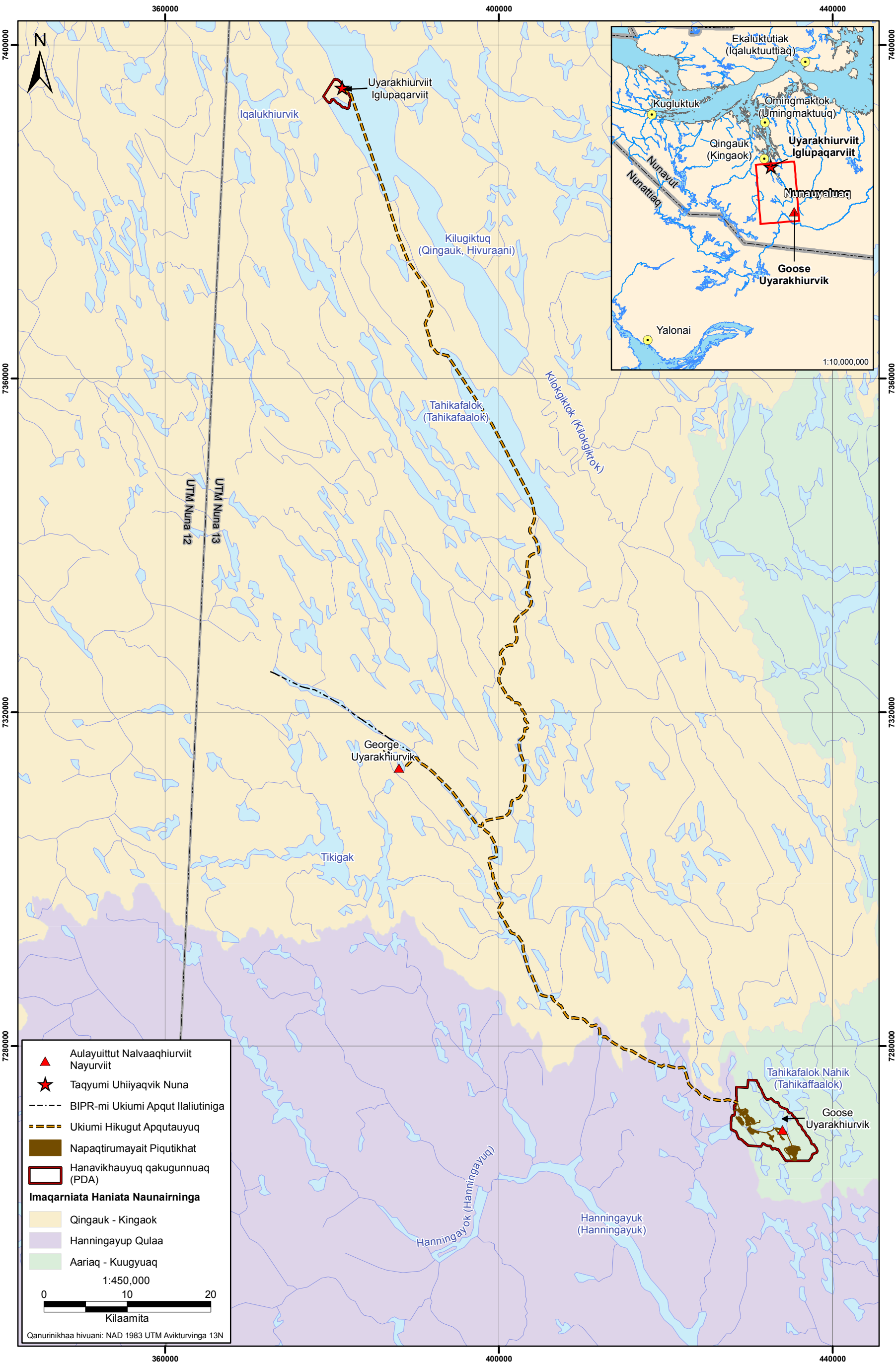
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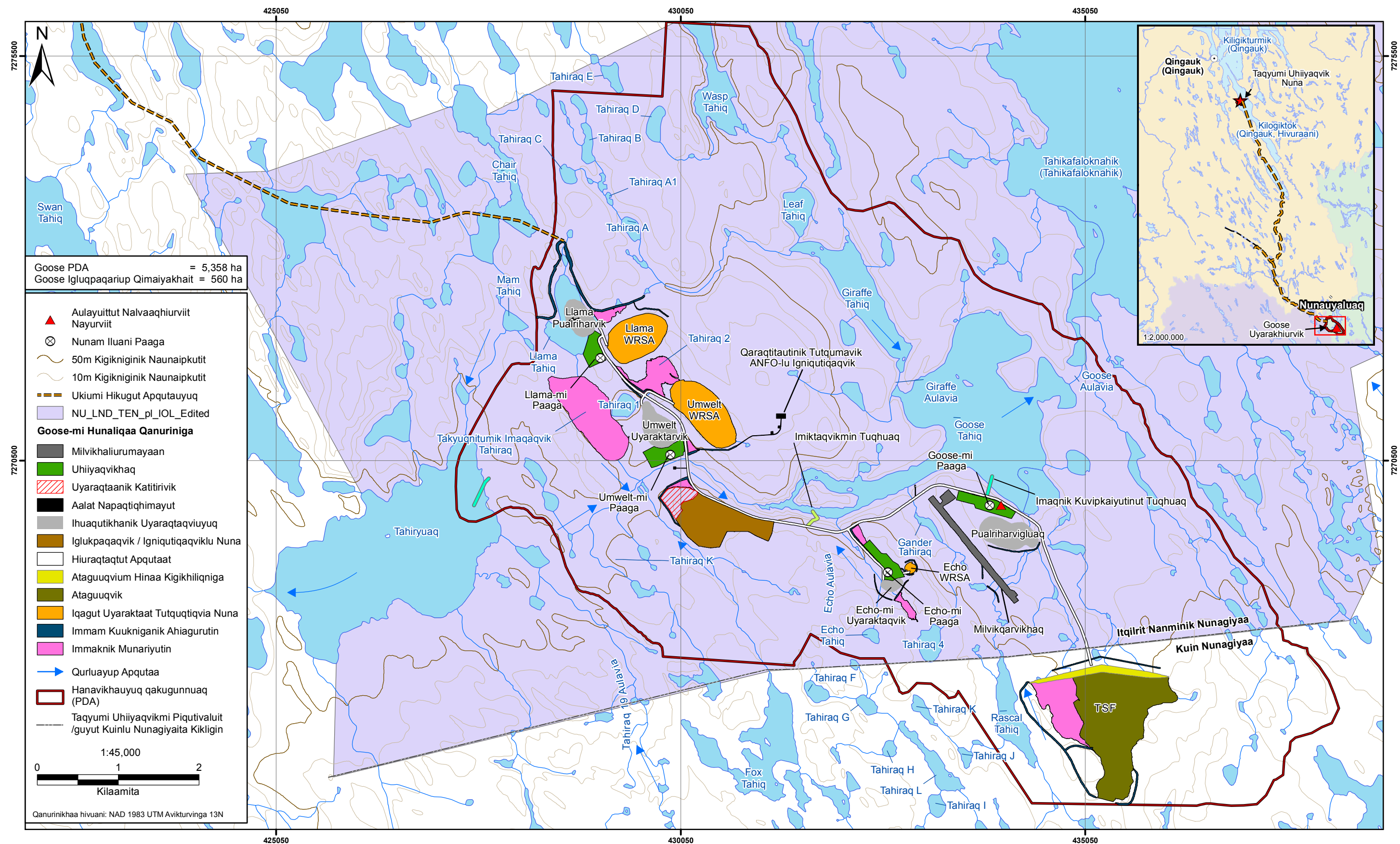
Sabina-kut 100% nanminigiyat Hanningayuq Kuugaq Havanga tamna uuktutilik guulit uyagakhiuqvik inilik tahamani nigingani Kitikmeotni tahamani Uataani Nunavut.

Tamna uuktugutauyuq Havanguyuq ilalik uyagakhiuqvik aulania malgukni atuni nunakni taiyauyuk tapkuak Goose Havanga tamnalu George Havanga, ikayuqhiqtut ukiumi apqutinut atatyutai tapkuat Havanguyut tamnalu Tagiumi Iliuqaivik Nuna kangiani Kingaok (Titigaulyaq 1 tamnalu 2). Tamna qanitniqhaq ukiup ilani nunaliuyut talvunga Havanguyumut tapkuat Kingaok (Bathurst Inlet) tamnalu Omingmaktok (Bay Chimo), inilgit tahamani kanangnangata-nigiani hinaani tahaphuma Kingaok, tukliginik. Ikaluktutiak tamnalu Kugluktuk qanitniqpak nunaliuyuk talvunga Havanguyumun, inilgit mikhaani 300 kilaamitat ungalata pingangnani tamnalu 375 kilaamitat talvunga Tagiumi Iliuqaivik Nuna, tukligiknit.

Goose Havakvia - Pingahut angmaumayut iluttuqhimayut pivaliatitauniat talvani Goose Havakvia, taiyauyuq Goose Atuqniqpaq, Umwelt tamnalu Llama. Tamna nunap iluani uyagakhiuqniq aulania amuhiviuniaq havikhanik talvunga ataani taphuma Umwelt angmaumayuq ilutunig, Tamaita havikhat piyauyut tamatiknit Havakviknit hanayauniat talvani Goose Havakviani. Guulit kikkagikhiyauyut kuviyauniat kinguliqpaamik hananit havaguhiqmi. Tapkuat amiakuit havikhat, taiyauyut uyagakhiuqnikut, tutquqtauniat uyagaktaqnikut kuvigaqvianut hiamaktailivik haniani havikhaliuqviup hanaviani. Uyaqat piittut guulinik (uvaluniit naamangittumik guulinik) qaligiktitauniat hanianut angmaumayuq ilutunigmun. Tamaita imait aktuqtait uyagakhiuqvikmun iqakutlu aulatauniat hapuhimalugit haniani imait qanugitni iqaluitlu. Ahii havagutit talvani Goose Havakviani ilaqaqniat hiniktaqvik havaktunut, mittaqvik, hannavik, hiqluaq, hannaviit uqhukhatlu tutquqvi qattaqyuqaqvik (Titigaulyaq 3).







George Havakvia - Tamna George Havakvia inilik mikhaani 50 kilaamitat talvanga Goose Havakvianit. Pingahut angmaumayut ilutunit pivaliatitauniat talvani George Havakviani, taiyauyuq Lone Cow Tahigaaq Ungallaq, Locale 1 tamnalu Locale 2. Tamaita havikhait uyagakhiugauyut talvanga George Havakvianit angmaumayut iluttuniq qaligiktitauniat atuqtitugu auyani nuktigaulutiklu ukiungani apqutmi talvanga Goose Havakvik hanayauyukhat. Tamna George Havakvia ilaqaqniaqmiyuq hiniktaqvik havagutinik, mittaqvik, hannavik, hiqluaq, hannaviit uqhukhatlu tutqumavi qattaqyuuaqavik (Titigauyaq 4).

Tagiumi Iliuqaqvik Nuna - Tamna Tagiumi Iliuqaqvik Nuna atuqtauniat ukiuq tamaat umiaqpakkut agyaqnit atuqtitlugu hikuqnia auyani kihimik. Atulaknia tulakvik kalutatluniit uhiyaqvia hanayauniat ikayuqnianut uhiyaqni umiaqpait agyaqnit umityat. Iliuqaqvik nunat pinguqtauniat tutqumaninut puugiyaayut hanalgutitlu tahapkuat uhiyaqtauyut hivuani hunat agyaqniahaqtitlugit talvanga Goose tamnalu George havakvit ukiumi apqutikkut. Uqhukhat tutqumavt qattaqyuuaqvik piyauniat ukhukhalgiagutit uhigiyaat uqhukhanikagyaqtauniat talvanga uyagakhiuqvik havakvinut ukiumi apqutikkut. Hiniktaqvik pinguqtauniaqluttauq (Titigauyaq 5).

Ukiumi Apqutit Atatyutai - Ukiup ilani ukiungani apqutit atuqtauniat ilakhanut aulatyutit. Tahapkuat apqutit aulaniat akungani Goose Havakvik tamnalu George Havakvik tamnaluttauq atatyuta talvanga Havakviknit talvanga Tibbitt talvanga Tahiqyuaqmun Ukiumi Apqut atuqtaulaqmiyuq atuqtitlugu tamna hivullit ikittut ukiut (Titigauyaq 2).

Atuqninit tamaita tukligikhat taphumunga Havanguyuuq, Sabinakut upalungaiqniaqtaai havaklugitlu aulanit pilugit hanatyuhikhat utiqtitninut tamna Havanguyuuq inaa hivuganaittumik avatiliqutinutlu huniumaittumik pihimania. Sabinakut havakniaqtat halumaqtiqpaliaania huliniit atuqniani tamna uyagakhiuqviyuq. Havagutit ituptigauniat ahivaqtiqlugitlu iniqat tapkuat atuguminaqnit. Angmaumayut iluttuqhimayut, iqakut uyaqat tutqumavit, uyagaktanikut hiamaktailivit, tuapaktaqvik, apqutit ahiilu aktuqtauyut inait takukhaunit avugiyauttaqnilu huniumaiqlugit, halumaqtiqnit atulaigiaqata. Avatiliqutit munaginit kayuhiniat umiaqtitlugu pivikha.

Tamna atuqnia taphuma Havanguyup tikitlugu 29 ukiunut. Una ilalik tapkuat hanayaunia tamna Havanguyuuq, uyagakhiuqvik tatya havakhat piqaqni, ituptiqnia umiknialu tapkuat havakvit, tamnalu havaknia kinguagut avatiliqutit munaginit:

- Hannavik Hannaiyaqnia: 2 ukiuk
- Hanania: 2 ukiuk
- Aulania: 10 ukiut
- Halumaqtiqnia Umiknialu: 10 ukiut
- Umiqaqtitlugu Munaginia: 5 ukiut

Atulaqnit Naunaiyaqni

Atulaqnit tahamani Havanguyuuq naunaiyaqhimayut malikhugit tahapkuat pityutauni: piluaqnaqtuliquitit atuguminaqni; akituni; atulaqnit aktuanit avatiliqutinut; atugaulaqlutlu halumaqtiqnit. Atutauni, uqaqatigikni iliquhitlu ilihimani ihumagiyaayut ilaginit tapkuat atulaqtut naunaiyaqnit.

Uqaqatigiknit Pipkaqnitlu

Uplumimun atuqpiqhimayut uqaqatigikni pipkaqnilu pivikhat tugangayunut nunaliuyut timiuyutlu piqatauyumalat taphumunga Havanguyumun. Tahapkuat ilalgit inungnut katimanit, katimanit atuqpiqatunut ilaayunut ilaayutlu ilagit (Hamlauyut, inutqutyat, Anguhiqiyit, inuuhuktut), katimanit nunaliuyunut uqauiyit ilagit Ikaluktutiakmi tamnalu Kugluktuk, tapkuat Kitikmeot Inuit Katutyiqatigiit,

Kavamatkut Nunavut tamnalu Nunatsiaq tapkuatluttauq tamaita tugangayut Kavamatuqatkut havakvit. Pihimayut piluaqtumik pinahuaqnit nunaliuyut tapkuat Ikaluktutiak, Kugluktuk, Kingaok, Omingmaktok, Uqhuqtuuq, Taloyoak, tamnalu Kugaaruk.

Tuhagakhat piyauyut atuqhugit tahapkuat uqaqatigikni pipkaqnilu pivikhat ikayuqtat Sabinakut naunaiqtat pityutit ihumalutitlu hugiaqnikhainut tapkunani Uuktugutit EIS-ngi. Sabinakut piniaqhimayut kayuhinit inungnut uqaqatigini pipkaqnilu huliniit atuqniani tapkuat avatiliqutit naunaiyaqni pityuhit atuqnialu tamna Havanguyuq.

Ilitquhit Ilihimania

Sabinakut illittugiyat tapkuat atuqpaknit pinaginia Ilitquhit Ilihimani atuqpiaqnilu nunalit nunaliuyut inait atuqnianut. Ilitquhit Ilihimani atuqpiagtut akayuqhiutikmata atuqtut naunaiyautit inuliquititlu-kiinauyaliugutitlu tuhakhat; piqaqtitni nutat tamnaluniit ahiagut titigaqhimaittut tuhakhat; piqaqtitnilu atulaqnit ihumagini tukiliuqniluniit tapkuat ihumagiyaqhaiyut.

Pinahuaqhugit auqpiaqni tugangayut Ilitquhit Ilihimaniit naamaktumik ihumagiyauni taphuma Havanguyup atuqnit katutyiqatai tapkuat Kitikmeot Inuit Katutyiqatigiit katitiqinut naunaiyaqnilu pilaqtut tuhakhat. Ilagiplugitlu inungnut piyaulat tuhakhat atuqtauyut ilaginit tahamani Nunatsiaq. Ilitquhit Ilihimaniit atuqnilgit angiyumik havangi tapkuat Havanguyuq hanatyuhikha ihumaliugutitlu.

Nainaqhimayut Aktuayaayut Naunaiyaqni

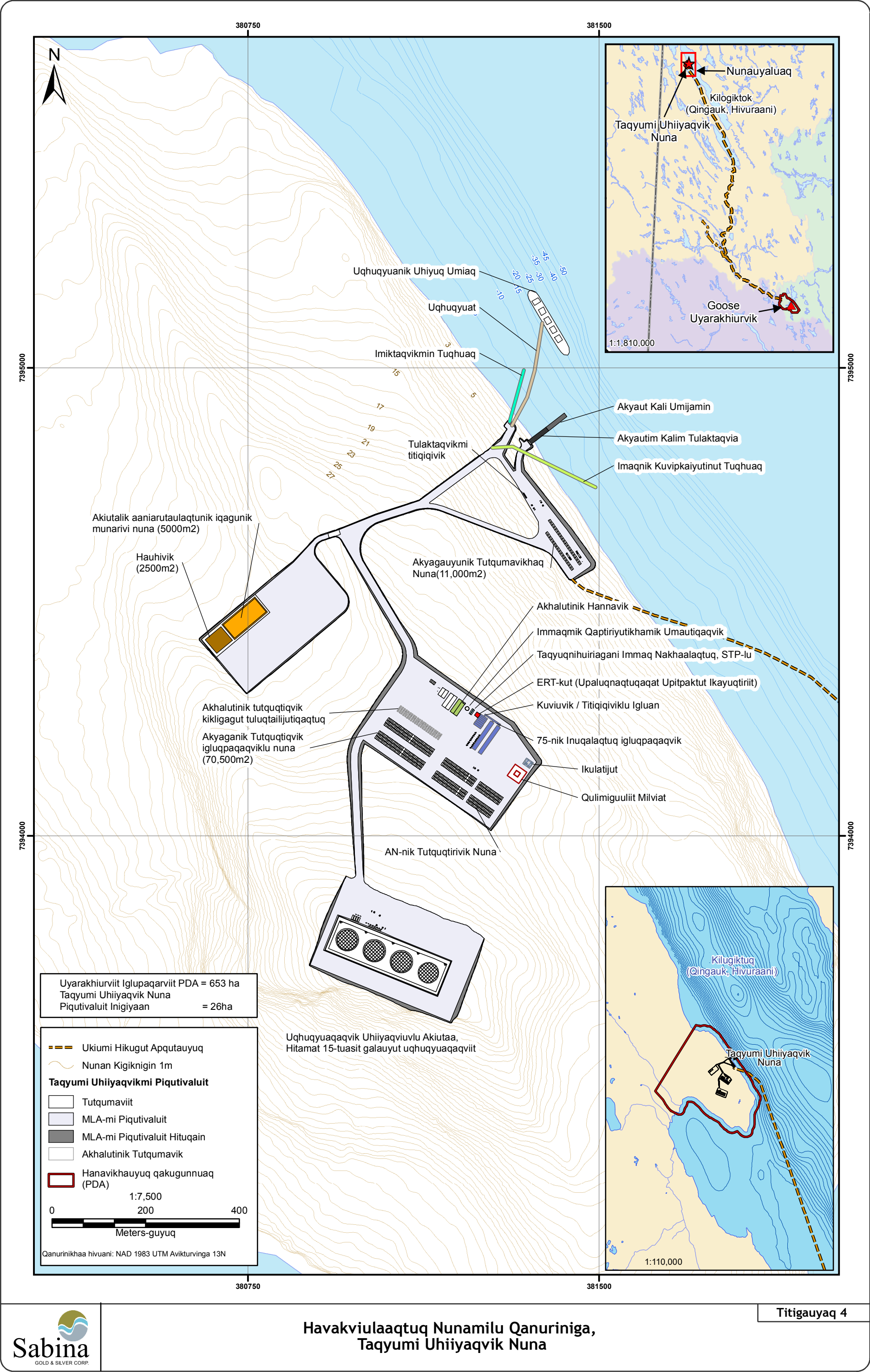
Pinnagiyat Uumatyutinut Ilagiyai (VEC-ngit) tapkuatlu Pinnagiyat Inuliquitit Kiinauyaliugutitlu Ilagiyai (VSEC-ngit) tahapkuat puqtuniqhat hivuliutyaqnit piplugit piluaqtumik nunalit avikhimania, nunaliuyut tamnaluniit inungnut tamaitnut. Tapkuat naunaiyaqni pilaqtut Havanguyup aktuanit tautuktai pilaqtut aktuanit akuniauyuq ihumaginilu pilaqni piplugit haniani Havanguyuq (nunaliani naunaiyaqni nuna), attaqtuniqhami nunami iluani nunaliit avikhimaniiani ilautitlugit atulat tamaitnut Nunavut.

Atuqhugu naunaiyaqniq pityuhiq tapkuat piqatigiktaqni Havanguyup tahapkununga allatqit VEC-ngit tapkuatlu VSEC-ngit naunaiqtauyut atuqniqhatlu naunaipkutat uumayut allatqit naunaiqtauyut qauyihaghugitlu. Naunaiyaiyit naunaiqtuqni ilaliutiplugit ilitquhit ilihimaniit atuqtauyut nalautagahuaqhugit kitutliqak atulat aktuanit. Tahapkunani ihuittumik Havanguyuq piqatainut pittaililaqnit, upalungaiyautit pivaliatitauyut mikhigiagahuaqhugit ihuaqhigiaqniluniit tahapkuat aktuanit.

Pinnagiyat Uumatyutinut Ilagiyai

Hilaliqutit Avatigiyait

Aniqhaktugap Qanugitnia - Havanguyuq huliniit pilaqtut pinguqtaqnit puyuit tahapkuatlu pityutaulat puyuuq tamnalu huguilat ilattaqnit. Nuktiqnit aulataunilu huliniit upalungaiyaqni mikhigiagutit piiyaqniluniit pilat aktuanit aniqhaktugap qanugitninut ilalgit: Ikumatyutit piyagakitnit pinahuaqni, pinahuaqni mikhigiaqni uqhukhat atuqni, tapkuat atuqni imaq puttiutittailititluniit imalgit mikhigiaqninut puyuuq uyaqiuqhimaittunut apqutinut, nuktigauni hunat hanalgutitlu hiqutigutitqaqvikmi havagutinut. Atuqnilu puyuuqnut munaqhityutit havagutit tahapkuatut kinipayut allaqtigutit, puqnut igluqpait, halumaigipkutitlu. Piplugit qulaani pinahuaqnit, tapkuat amiakut aktuanit aniqhaktugaqmun qanugitni angivalangittut. Piittuuq nigiugiyaqnut katittaqnit nunaliuqataungittunutluniit aktuanit aniqhaktugap qanugitninut.



Nipi tamnalu Hayukniq - Hanayaunia aulianilu taphuma Havanguyup pipkainiaq nipinik hayukniqniklu talvanga hanayauniani hanalgutinit, uhiyut akhaluutit, qaqtainiq akhaluutitlu tingmititlu aulaqtaqnit. Ihuaqhigiaqni aulataunilu pityutit upalungaiyaqni mikhigiaqninut piiqninut atulat aktuanit nipimun hayukniqmunlu ilalgit: atuqpiaqnit hanalgutit ihuaqhihimani naamaktunik huppuktautitnik nipikhigiaqutitniklu, atuqpalaqtailuni huliniit tahapkuatut qaqatainiq qangattaqtiqnilu tingmitit ilagut upluani, igluqpaqatitnilu hunialaittut hunat igluqpakni atuqlugitluniit puqtauhiimanit, avallut, nipikhigiaqutit aniattailitit qaligiktitaqnitlu. Piplugit tahapkuat qulaani pityuhit, tapkua tamiakut aktuanit angivalangittut. Piittuq nigugiyaqnik katittaqnit aktuari nunaligatigingittutlu aktuanit nipinut hayuktaqniqutlu.

Maniqami Avatigiyaayut

Piguaqhaqtut tahapkuatlu Ayyikkutaittut Nunat Qanugitni - Hanayaunia tamna Havanguyup pityutaulaq tammaininik piguqtut ayyikkutaittutlu nunap qanugitni. Tapkuat ihuaqhigiaqnit aulanilu pityutauyut hanatyuhikhat piiqninut mikhigiaqninutluniit pilat Havanguyup aktuari ilalgit: mikhigiaqni taphuma Havanguyup tunmigaqnit. Atuqni ukiumi apqutit, mikhigiaqnilu qimakkut puyut ayuqnaittagangit. Tapkununga aktuanit naunaiaqni, ihumagiyaayut tapkuat tamaita PDA-ngi tammaiyauniat. Ilaqpiaq, tamna nuna nauhimayut/ayyikkutaittut nunap qanugitni tammaint mikiniqpauniat avatqutaqtailiniaqmata kinguliqpamik tunmigaqnit taphuma Havanguyup. Tapkuat qimakkut katitlugit aktuanit (nauhimayut tammaint) angivalalaittut. Piittuq nuaqatigingittut ilagininik tapkuat angivalangitnit qimaint aktuari.

Tuktut - Piquaqtuq pingahunik iluilikmi tuktut amihuaqyuit tahamani nunalit avikhimaniani: tapkuat Kingaok amihuaqyuit, nalvaqtauyut atuqniahauuniani nugiuqniahaqtitlugit, tapkuatlu Beverly amihuaqyuit (tapkuangugaluit Ahiak amihuaqyuit), nalvaqtauyut auyauhuihaqni ukiakhalihamilu; tapkuatlu Dolphin Unionlu amihuaqyuit (titiqtauyut uumayunut allatqikni taiyaayut ihumalugiyaayut). Pilat Havanguyumun-tugangayut aktuari ilalgit: nayuqpaktat tammaint, ulapihaqni piplugu nipituniq, ulapihaqni nuktiqniqmun, tugaqpiaghugit tuqupkaqnit aaniqtitnilu, tugaqpiaghugit tuqunit, upakhigauni, hatqiqviuni halumailgunut, ikikligiaqniyt nugiuqnit piaganiktuqnit. Ihuaqhigiaqnit aulataunilu pityuhit piiqninut mikhigiaqniluniit atulat aktuanit ilalgit: mikhigiaqni Havanguyup tunmigaqni, nipitunit pittailini, kayumaqnit munaginit, atuqni ukiumi apqutit, iqakut aulanit avugiyaavaktutlu tiguttaqnit pittailininut upakhigini angutikhanit iqakunut pittailinilu hatqiumanit halumailgunut, atuqpalianilu tapkuat Angutikhat Ihuaqhigiaqni Munagininutlu Upalungaiyautit. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigugiyaqnik katittaqnit aktuari nunaligatigingittutlu aktuanit angivalangittut.

Akhait - Akhait tapkuat kavamatuqatkutnit titigaqtauyut angutikhat tapkuanguni “taihimayut ihumalugiyauni” titiqtauyutlu aktuagaulat Nunavutmi. Atulat Havanguyumun-tugangani aktuanit ilalgit: nayuqpaktai tammaint, ulapihaqni piplugit nipituniq (naunaipkutagiplugu ahianuktitnit nunanit nayuqpaktainit), ulapihaqni aulaqpakni, tugaqpiaghugit tuqupkaqni aaniqtitnilu, tugaqpiaghugit tuqunit, upaktauhiqnit, hatqiqnitlu halumailgunut, ikikligiaqnilu nugiuqni piagaqqaqnit. Ihuaqhigiaqni aulanitylu pityuhit piiqninut mikhigiaqniluniit pilat aktuanit ilalgit: mikhigiaqnit Havanguyup tunmigaqni, nipitunit pittailini, kayumaqtailinit, atqunit ukiumi apqutit kihimiuyup, iqakut aulani avugiyaayutlu tiguttaqnit pityuhit pittailininut upaktaqhigini angutikhat iqakunut pittailinilu hatqiqnit halumailgunut, atuqpaliani tapkuat Angutikhat Ihuaqhigiaqni Munagininu Upalungaiyautit. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigugiyaqnik katittaqnit aktuari nunaligatigingittutlu aktuanit angivalangittut.

Umingmait - Atulat Havanguyup aktuanit umingmaknut ilalgit: nayuqpaktai tammaint, ulapihaqni piplugit nipituniq (naunaipkutagiplugu ahianuktitnit nunanit nayuqpaktainit), ulapihaqni aulaqpakni, tugaqpiaghugit tuqupkaqni aaniqtitnilu, tugaqpiaghugit tuqunit, upaktauhiqnit, hatqiqnitlu halumailgunut, ikikligiaqnilu nugiuqni piagaqqaqnit. Ihuaqhigiaqnit aulataunilu pityuhit piiqninut

mikhigiaqniluniit atulat aktuanit ilalgit: mikhigiaqni Havanguyuq tunmigaqni, nipitunit pittailini, kayumaqnit munaginit, atuqni ukiumi apqutit, iqakut aulanit avugiyauvaktutlu tiguttaqnit pittailininut upakhiqni angutikhanit iqakunut pittailinilu hatqiumanit halumailgunut, atuqpalianilu tapkuat Angutikhat Ihuaqhigiaqnit Munagininutlu Upalungaiyautit. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigiugiyaqnik katittaqnit aktuani nunalikatigingittutlu aktuanit angivalangittut.

Qalviit tapkuatlu Mitqulgulgit - Qalviit (angutikhat ihumalugiyauyut) tapkuatlu aqyaluktut amaqut tikkuqaqtauyut piplugit mitqulgit angutikhat tapkununga EIS-ngit. Aktuanit ilalgit Havanguyuq huliniit ahiangugutaulat tahapkununga naunaipkutainut: nayuqpaktai tammait, ulapihaqni piplugit nipituniq (naunaipkutagiplugu ahianuktitnit nunanit nayuqpaktainit), ulapihaqni aulaqpakni, tugaqpiaghugit tuqupkaqni aaniqtitnilu, tugaqpiaghugit tuqunit, upaktauhiqnit, hatqiqnitlu halumailgunut, ikikligiaqnilu nugiugni piagaqaqnit. Ihuaqhigiaqnit aulataunilu pityuhit piiqninut mikhigiaqniluniit atulat aktuanit ilalgit: mikhigiaqni Havanguyuq tunmigaqni, nipitunit pittailini, kayumaqnit munaginit, atuqni ukiumi apqutit, iqakut aulanit avugiyauvaktutlu tiguttaqnit pittailininut upakhiqni angutikhanit iqakunut pittailinilu hatqiumanit halumailgunut, atuqpalianilu tapkuat Angutikhat Ihuaqhigiaqnit Munagininutlu Upalungaiyautit. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigiugiyaqnik katittaqnit aktuani nunalikatigingittutlu aktuanit angivalangittut. Atulat nunaqatigingittutlu aktuanit ihumagiyauyut tapkununga katitlugit aktuanit naunaiyaqni angivalangittutlu.

Tikitpaktut Tingmiat - Atulat Havanguyuq-tugangani aktuanit tahapkununga tikitpaktut tingmiat ilalgit: nayuqpaktai tammait, ulapihaqni piplugit nipituniq (naunaipkutagiplugu ahianuktitnit nunanit nayuqpaktainit), ulapihaqni aulaqpakni, tugaqpiaghugit tuqupkaqni aaniqtitnilu, tugaqpiaghugit tuqunit, upaktauhiqnit, hatqiqnitlu halumailgunut, ikikligiaqnilu nugiugni piagaqaqnit. Ihuaqhigiaqnit aulataunilu pityuhit piiqninut mikhigiaqniluniit atulat aktuanit ilalgit: mikhigiaqni Havanguyuq tunmigaqni, nipitunit pittailini, kayumaqnit munaginit, atuqni ukiumi apqutit, iqakut aulanit avugiyauvaktutlu tiguttaqnit pittailininut upakhiqni angutikhanit iqakunut pittailinilu hatqiumanit halumailgunut, atuqpalianilu tapkuat Angutikhat Ihuaqhigiaqnit Munagininutlu Upalungaiyautit. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigiugiyaqnik katittaqnit aktuani nunalikatigingittutlu aktuanit angivalangittut. Piittuq nigiugiyaayunut katitlugit aktuanit nunaqatigingittutlu aktuanit tikitpaktunut tingmianut.

Kilgaviit - Tapkuatkilgaviit naniyauyut tahamani nunaliit avikhimanianani nauyaqyaqtat nunat tahapkuat imnaqni-uplulgit kaayuat (angutikhat ihumalugiyauyut); tapkuat maniqami-uplulgit naittumik hiutilgit ukpiit (angutikhat ihumalugiyauyut); tapkuat naktugalliit (qanugililat); tamna kilgavik (qanugililat); tamnalu kaayuat (qanugililat). Pilat Havanguyumun-tugangayut aktuanit ilalgit: nayuqpaktai tammait, ulapihaqni piplugit nipituniq (naunaipkutagiplugu ahianuktitnit nunanit nayuqpaktainit), ulapihaqni aulaqpakni, tugaqpiaghugit tuqupkaqni aaniqtitnilu, tugaqpiaghugit tuqunit, upaktauhiqnit, hatqiqnitlu halumailgunut, ikikligiaqnilu nugiugni piagaqaqnit. Ihuaqhigiaqnit aulataunilu pityuhit piiqninut mikhigiaqniluniit atulat aktuanit ilalgit: mikhigiaqni Havanguyuq tunmigaqni, nipitunit pittailini, kayumaqnit munaginit, atuqni ukiumi apqutit, iqakut aulanit avugiyauvaktutlu tiguttaqnit pittailininut upakhiqni angutikhanit iqakunut pittailinilu hatqiumanit halumailgunut, atuqpalianilu tapkuat Angutikhat Ihuaqhigiaqnit Munagininutlu Upalungaiyautit. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigiugiyaqnik katittaqnit aktuani nunalikatigingittutlu aktuanit angivalangittut.

Imatqiktut Avatigiyaat

Nunap Qangani Imaliquitit - Pilaqnit Havanguyuq aktuani ilalgit immap atuqnia, havakvikmi imaq aulataunia huliniit, ukiumilu apqutit. Ihuaqhigiaqnit aulataunilu pityuhit tahapkuat piigutauyut

mikhigiagutitluniit pilaqnit aktuanit ilalgit: tapkuat hanatyuhikhat anginiqhamik imaq atuqnianut aktilat atuqpiaqtunut imaqaqniuyut hapuhimanahuaqhugit piyaqaqpiagtut lqaluit nayuqpaktai, tahapkuat Imaqmiutaligiyyit atuquyait ukiumi apqutit imaiyaqnit, kikliqaqtitni havagutit nunaliknut imaqaqniuyunut, tahapkuat ukiumi apqutit hanayauni ihuaqhihimanilu Imaqmiutaligiyyit aulaninut uqauhiit. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigigiyaayunik katitlugit aktuanit nunaqatigingittutluniit aktuanit imaliqutit.

Imatqiktut Imamp Qanugitnia - Pilaqnit Havanguyuuq-tugangani aktuayut ilalgit: Havanguyuuq Huliniit ahiangugutaulat tahapkununga naunaipkutat immap qanugitnianut piplugit kukniit, imaiyaqnit, halumaqtiqhimayut kuviyaqnit, tingmititlu katagaqviginin: immap qanugitni, katitlugit naptuyut puktalaqnit, piguqhautit, haviit, hydrocarbon-ngit, uumayuttauyut aniqhaktugiaaqnit, tuqunait, cyanidelu. Ihuaqhigiaqni aulataunilu piyauni piiqninut mikhigiaqniluniit tapkuat pilat aktuanit ilalgit: Havanguyuuq hanatyuhikhaliat piyuanit tahapkuatut atuqnit nualiqutinut naamaktunik atuqtakhat apqutitlu tungaviitlu, atuqpalianilu ihuaqhigiaqnit piyauni titigaqhimayut talvani Havakvik Immap Munagini Aulataunilu Upalungaiyautit. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigigiyaayunik katitlugit aktuanit nunaqatigingittutluniit aktuanit imatqiktut imat qanugitninut.

Imatqiktut Halumaitgut Qanugitni - Pilat Havanguyuuq-tuganganit aktuani ilalgit: Havanguyuuq huliniit ahiangugutaulat tahapkununga naunaipkutat piplugit kuukviunit, imaiyaqnit, halumaqtiqhimayut kuvigaqnit, tingmititlu katagaqnit, hunavaluit aktilangi, piguqhautit umayuvaluitlu carbon-ngi, haviit hydrocarbonlu. Ihuaqhigiaqni aulataunilu pityuhit piyauniat piiqninut mikhigiaqniluniit nungulaqtailiniit, atqupalianilu ihuaqhigiagutitpiyaunit titigaqhimayut talvani Havakviup Imaq Munaginia Anulataunilu Upalungaiyautit. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigigiyaayunik katitlugit aktuanit nunaqatigingittutluniit aktuanit imatqiktut imait qanugitninut.

Imatqiktut lqaluit/Imaqmiuttat Nayuqpaktai - Havanguyuuq huliniit tahapkuat pilat tugaqpiaghugit aktuani imatqiktut lqaluit/imaqmiuttat ilalgit: tapkuat tammainti tahiq nayuqtauvaktut piplugu imaiyaqni, pivaliatitni angmaumayut iluttuqnit, imiqtaqvut inungnut havikhaliugutitlu atuqninut, ukiumi apqut hanayauni. Tapkuat atuqniqhat ihuaqhigiagutit piyaunit pittailininut pilat aktuanit imatqiktunut lqaluit/imaqmiuttat nayuqpaktai hanayaunit havagutit piplugit pittailini imatqiktut lqaluit nayuqpaktai. Naunaipkutagiplugu, iliuqaqni uyagaktaqnikut hiamaktailivia iqakutlu uyaqat nunanut iquuqaqnilgunut imaqnut. Ahiattaq atuqpiaqtuq ihuaqhigiagutit pityuhiq pinguqtauni anginiqhamik imaugaqnit atuqnit. Piplugit tahapkuat pityuhit, piittuq, katitaqninut nunaqatigingittutluniit aktuanit nigigiyaungittut imagiktunut lqaluit/imaqmiuttat nayuqpaktainut.

Imatqiktumi lqaluqatigit - Uumani naunaiyaqnit pinahuaqtugut malguknik amigaitnit imatqiktumi imagipyaktumiluniit lqaluit allatqiknit, Tahiqmi Ihugaqyuit Hulukpaugatlu. Tamna atuqniqpaq pilq Havanguyuuq-tugangani aktuanit imatqiktumi lqaluqatigit tuquvaknit/amigaitnit ikiklivaliani piplugit tahiq imakhigiaqni, hanani ukiumi apqutit, hanani tapkuat Havanguyup tunmigaqni, imiqtaqvut inungnut havikhaliugutitlu atuqni ukiumiluniit apqutit hanayauni, qaqtainiqlu qaqtautinut. Tapkuat atuqniqhat ihuaqhigiaqnit piyauni pittailininut pilat aktuanit imatqiktut lqaluit/imaqmiuttat nayuqpaktaui hanayaunit havagutit piplugit pittailini imatqiktuni lqaluit nayuqpaktai. Ahii atqupiaqtut ihuaqhigaigutit piyaunit tahapkuat pinguqtauni anginiqhamik imaq imaugaqnia atuqnia. Piplugit tahapkuat piyaunit, piittuq qimaivini, katitaqnit nunaqatigingittutluniit aktuanit nigigiyaungittut.

Tagiumi Avatigiyaayut

Tagiumi Imaq Qanugitnia - Pilat Havanguyuuq aktuani ilalgit umiaqpait huliniit; halumailgut pipkaqnit imaqmut piplugit havakvikmi hannaiyaqnia, hanayaunia, halumaqtigaunialu; havakvikmi aktuqnit imait;

ukiumi apqutit; uqhukhat, uqhuqyuaq, kiniqtuvaluittu tipiqaqnit hydrocarbon-ngit (PAH-ngi); halumaqtiqhimayut kuvigaqnit; puyuqtaitittu. Ihuahigiaqni aulataunilu pityuhit piiqninut mikhigiaqniniluniit pilat aktuanit ilalgit: kayumiqpaliqni umiaqpait kayumaqnit pihimapkainaqnilu umiaqpait itiniapanut imaqnut, tugaqtitni kuukviunit ilutuniqnut tugaqtitnilu imait katitiquiyunut tahigaqnut talvani MLA-mi, atuqhugit nunaliqutit naamaknit hunat apqutitut tungaviknutlu, malikhaqhugit aulattiyit naunaipkutait halumaqtiqninut kuvigaqnit, atuqhugitlu nakuuniqhanik aulattiniqmun pitquhit tutquqviknut, nuktagainiqmun, atuqnilu uqhukhat, qaqtaitit, tamnalu hivuganaqtut hunat tahapqualuttauq puttiutittailitit ikualattivitlu. Piplugit tahapkuat qulaani pityuhit, tapkua tamaittut aktuanit angivalangittut. Piittuq nigugiyaayunik katitlugit aktuanit nunaqatigingittutluniit aktuanit imatqiktut imait qanugitninut.

Tagiumi Halumailgut Qanugitni - Pilat Havanguyuq aktuanit ilalgit umiaqpakkut huliniit; halumailgut pipkaqnit imaqmut piplugit havakvik hannaiyaqnia, hanayaunia, halumaqtiqnialu; havakvik aktuqni imaq; uqhukhat, uqhuqyuaq, kiniqtuvaluittu tipiqaqnit hydrocarbon-ngit (PAH-ngi); halumaqtiqhimayut kuvigaqnit; puttiutitaipkutatlu. Ihuahigiaqni aulataunilu pityuhit piiqninut mikhigiaqniniluniit pilat aktuanit ilalgit: tugaqtitni kuukviunit ilutuniqnut tugaqtitnilu imait katitiquiyunut tahigaqnut talvani MLA-mi, atuqhugit aulattiyit naunaipkutait tahapkununga halumaqhimayut kuvigaqnit, atuqnilu nakuuniahnik aulattiniqmun pitquhit tutqumaninut, nuktagaqninut, atuqnilu uqhukhat, qaqtaitit, hivuganaqtutlu hunat tahapqualuttauq puttiutittailitit ikualattivitlu. Piplugit qulaani pityuhit, tapkuat qimagaayut aktuanit angivalangittut. Piittuq nigugiyauninik katihimanit aktuanit nunaqatigingittutlu aktuanit imatqiktut immat qanugitninut.

Tagiumi Iqaluit/Imaqmiutat Nayuqpaknit - Havanguyut huliniit pilat tugaqpiqhugit aktuanit tagiumi Iqaluit/imaqmiutat nayuqpakni ilalgit tapkuninga immat-iluani hanayauni tapkuat MLA-ngi havagutit (immat-iluani hanayauniukiup ilaani tulakvik hinaanilu uhiliqtuqvik). Hanaplugit hanahimayut tagiumi tikigait, piiqhimalaqtavut angiyumikluniit mikhigiaqni uuma pilat aktuanit. Piittuq qimaivunina nunaqatigingittutluniit aktuanit nigugiyaungittut.

Tagiumi Iqaluaqniuyut - Pilat Havanguyuq aktyuanit pinahuat tapkuninga Ukiuqtaqtumi Iqalukpiit ilalgitlu: pilat tugaqpiqhugit tuqunit tahapkununga immat iluani hanayaunit qaqtaititlu, amigaitni aktuanit tahapkuat atuliqninit uumayut allatqit nakhiutyaayut umiaqpait imaqtaitnit, tamnalu immat ataani nipitunit umiaqpait huliniit. Ihuahigiaqni piyaunit piiqninut mikhigiaqniniluniit pilat aktuanit ilalgit kikkililyutai aktilangaimaqmi hanayaunit, pilaitnit umiaqmi imait himiqtaunit, atuqtitnilu kayumaqtiqnit kikkiliyait umiaqpaknut aulagait tahamuna nunaliit avikhimaniagut naunaiaqni nunat. Piplugit qulaani piyaunit, tapkuat qimagaunit katitauunilu aktuanit angivalangittut. Piittuq nunaqatigingittunut ilagiyanik tapkuat angivalangittut qimagaunit aktuanit.

Tagiumi Tingmiaqyuit/Tagiumi Tingmiat - Tagiumi Tingmiaqyuit tagiumilu tingmiat ilalgit tikitpaktut tingmiat allatqit atuqtaulat tagiumi nunat atuqtitlugu quyaqitnaq ukiungani piplugitlu allatqikni ilagit qaplunaani uumayut allatqit ilautitlugit mitqit, tingmianuit, kangut qukyuitlu, tingmiavaluit, nauyat, aahangitlu ihumagiyaayut qanugililat uumayut allatqit. Pilat Havanguyuq aktuanit ilalgit ulapihaqnit (naunaipkutagiplugu, nipitunit) mikhigiaqninilu piaganiktaqnit. Ihuahigiaqutit piyauni piiqninut mikhigiaqniniluniit pilat aktuanit ilalgit: naunaqnit pittailliniluniit tagiumi tingmiaqyuit tagiumilu tingmiat utaqivakvit, pittailliniluniit ulapihaqnit qanugililat nunat pivaliatitninut naunaipqagihimayut tingmivakvit apqutai ayuqnaittagangit piqaqtitninut qunmut hanimutlu pittaillinivikhaik ungahiknit utaqivuyunit tingmianut, pingutitni tingminit puqtuni 650 miitat qulaani naunaqat utaqivit nunat. Piplugit tahapkuat qulaani pityutit, tapkuat qimainit katittaqninilu aktuanit angivalangittut. Piittuq nunaqatigingittut ilagiyanit angivalangittut qimaivit aktuanit.

Nattinait - Pilat Havanguyuq aktuanit ilalgit: ahianguqni nayuqtauvaktut, ulapihaqnit (naunaipkutagiplugu, nipitunit), tugaqpiqhugit tuqutauni aaniqnitlu, tugaqpiqhugit tuqunit,

hatqiumani halumailgunut, mikhigiaqnilu piaganiktuqnit. Ihaqhigaiqni piyauni piiqnit mikhigiaqniluniit pilat aktuanitilalgit: naunaiqni pittailinilu nattiit ivavi. Nigiungittugut kitunikliqak qimaiviuni, katihimanit nunaqatigingittutlunit aktuanit nattiqnut.

Pinnagiyaayut Inuliqutit-kiinauyaliugutit Ilagiyai (VSEC-ngit)

Inuliqutit Avatigiyai

Inituqlit Inait - Tapkuat hanayauni taphuma Havanguyup pilaqnilgit aktuani inituqlit inait. Tamna atuqniqhaq ihuaqhigagut piyaunia pinia inigiyait pittailini Havanguyumun hanatyuhikhainut. Kitutliqak inituqlit inait naunaiqtauyut atuqtitlugu hanayaunia, aulania, umiktaunialu naunaiyaqtauniat tapkunanga Havanguyup pituqaligiyanit, titigaqtaulutik, tuhaqhityutaulutiklu tapkununga Kavamatkut Nunavut, Iltiqhigiliyit. Pittailininut tamnalu/tamnaluniit ihuaqhigagut atuqtauni, nigiungittugut kitunikliqak qimaiviunit, katitaqnit nunaqatigingittutluniit aktuanit ilihimayayut inituqlit inait.

Inuliqutit-kiinauyaliugutit

Kiinauyaliugutit Pivaliatitni - Ilagiqnit kiinauyaliugutit allatqiknit nigiugiyaayut piplugit tapkuat Havanguyup qanugitnilgit tapkunanga: ilagiqni nunalit havaktitaunit, ilagiqnit maniliugaayut, niuvgutaayutlu; Havanguyup-tugaqnit akiliqtutit (nunalikni, nunalit avikhimani) piplugit atuqtut nanminilgit iniaqtut Kitikmeotni quyaqitnaqlu Nunavutmi, ilagiqagutauni kiinauyaliqutit piqaqnit pilqni atqutunut nanminilgit; tapkuat ilagiqni nutat nanminilgit atatqutuhivaliqniluniit atuqtut nanminilgit tahamani Kitikmeotni piqaqtitiyut hunanik kivgaqtutinikluniit hivagut pilaqnit; tamnalu/tamnaluniit pivaliatitni tapkuat; ilagiqutitluniit hanivaiviunit tapkuat, Inuit-nanminigiyai nanminilgit. Ilagiqni kiinauyaliugutit aglivalianit, allatqiknit, havagiyaunilu nigiugiyaayut nakuuyumik qimaiviunit aktuani kiinauyaliugutitut pivaliatitnit.

Nanminilgit Pilaqnit - Havanguyup hulinit nigiugiyaayut atugahuaqtitninut aglivaliani allatqiknilu tahapkunani Inuit ukiuqtaqtumilu nanminilgit ilalgit: piqaqtitni kanturagutit kanturakpaliqtitnilu pilaqnit, piluaqtumik pitaginit hunat kivgaqtutitlu tahapkunanga nunalikni piqaqtitiyut; tunityutaunilu inmingnut maniliugutait, ilagiqnit niuvilaqninut nunalikni nunaluyunut. Tapkuat nigiugiyaayut ilagiqnit nunalikni nanminilgit huliniit inmingnut nigiugiyaayut pipkaqnit ilagiqutikhat angiyunut hanivaivit (hanivaivit attaqtuhivaliqnit nanminilgit pinguqtauniluniit nutat nanminilgit) nigiugiplugu tamna Havanguyup. Nunalikni nanminilgit hatqiqviuniat pilaqniqnut uktugutit tapkununga Havanguyup havakhat, ikayuqtigiplugit tahapkuat Havanguyup atquhugit ihuaqhigagut aulataunilu pityuhit pinguqtauyut anginiqhamik ihuaqtauni kanturagutit pilaqnit nunaluyutlu piqaqnit hunat kivgaqtutitlu. Ahianguqni aglivalianit allatqiknilu Inuit ukiuqtaqtumilu nanminilgit nigiugiyaayut pihimani nakuuyumik qimaivit aktuanit.

Havaktitni - Tamna Havanguyup nigiugiyaayup aktuaninik havanguyut atquhugit: 1) ahianguqnit havakhat maniliuguhitlu aktilat; 2) ahianguqnit pilaqnit havaktiuyut ; tamnalu 3) ahianguqnit uktuqataulat nunalikni havaktit. Ihuaqhigagut aulataunilu pityutit pinahuaqni iliaqnit, havaktikhaqhiuqnit, pihimainaqtitlu pivaliatitaayut pivaliqtitninut piqataunit nunalikni Inuit Havanguyumi havaktit tapkuatlu unniqtutiaqhimagut tapkunani Havaktiuyunut Upalungaiyautit. Tugaqpiaghugit Havanguyup havaktit pitagaunilu pityutaulat ihuittumik ahianguqnit nunalikni uktuqataunit havakhanut. Tamna Havanguyup pingutitai atulat inungnut tatya havaktitni Kitikmeotni qimakinut tatya havagiyaqtik tapkununga uyagakhiuqviki-tugangayut havakhat. Atuhugu una pilaqnit aktuani, pilaitpiagunaqhiyuq nigiugingitavutlu kitutliqak qimaiviunit, katihimanit nunaqatigingittutluniit aktuanit.

Ilihaqniq Ilihautitlu - Tapkuat atulaqnit aktuani Havanguyup iliaqniqmun iliahtitlu ilalgit ahianguqnit piyaayumaqpiagininut iliaqniq iliahtitlu, ahianguqnilu inuuhuktut qanugiliuguhit ilitquhitlu

ilihaqniqmun ilihautitlu. Sabina-kut nigiuktut katutyiqatigikni nunaliuyuni kavamauyut, ilihavuiyutlu, Inuit timigiyai, ahiilu uyagakhiuqniqmun uuktugutilgit ikayuqnik tapkuat pinguqtitnit nunaliit avikhimaniani ilihavuiqmun havagutit ilagiagutitlunit uyagakhiuqviki havakhat ilihavuit havagutit. Ahianguqnit piyauyumaninut ilihavuiq ilihavuitlu, tahapqualuttauq ahianguqni inuuhuktut qanugiliuguhit ilitquhitlu ilihavuiqmun ilihavuitlu, nalautagauyut nakuuyumik gimaiviuni aktuaniit.

Aaniaqtailiniq Nunaliuyutlu Inuuhiqnikit - Tamatiknikit nakuuyumik ihuittumiklu qimaiviunit aktuanit nalautagaayut Aaniaqtailiniqmun nunaliuyutlu inuuhiqnikit piplugit ahianguqni inmingnut ilagitlu niuvipaknikit. Pipkata nunalikni nunaliuyut pitaqtut havakhanik taphumunga Havanguyup niguagata niugutigini ilagiagutngit manikhat nakungittunut (naunaipkutagiplugu, pinakniqmun, angayaqnaqtut, imingaknaqtutluniit) pilutiklu nakungittunut inuliquit pitquhinut, una piniaq nakungitumik aktuanit nunaliuyunut. Kihimik, manikhat atuqtauyut nakuhivaliqninut atuqtauvaktut inuuhiqmun (naunaipkutagiplugu, nakuhivaliqni igluqpak, niqiqattiaqniq) ilagiplugit ahiit amigaittut nakuuyumik aktuanit piqatai taphuma Havanguyup havaktitaunit pilqtut piplugit angipyaktumik ilagiagutait. Tamaitnut, tapkuat qimaiviuni, katitlugit nunaqatigingittutlu aktuanit nakungittumik ahianguqnit inmingnut ilaginutlu niuvgutauni, nakungittumiklu ahianguqnit ilaginut iglumiutatlu qanugitnit, naunaqtauyut Angivalangittut.

Nunap Atuqnia

Ilitquhiungittut Nuna Piqaqnitlu Atuqnit - Maniliugutit nuna atuqnia ilalgit piluaqtumik kiinauyaliugutit angunahuaqtit, pulaqtuliginiq, havikhaqhiuqniq, aulagutit umiaqpaitlu. Tamna havanguyuuq aktualaaq kiinauyaliugutit pulagaqtuligutit huliniit piplugit: ahianguqnit pilaqni nuna piqaqnitlu; ahianguqni atuqpaknit tahapkuat nunamittutuqat avatigiyait; ahianguqnitlu tapkuat amigaittut ulapihaqtatlu piqaqnit. Piqaqtuq qaphinik nakuniqhanik pitquhit aulanit ihuaqhigiagutitlu piyauni pihimayut kivgaqtutauyut mikhigiaqninut nakungittumik aktuanit, pititlugit anginiqpamik ihuaqutauni qanugitnit. Ilitquhiungittut nuna atuqtauni pihimaittut avataanu tapkuat kikligiyai tahaphuma Nunavutagaup Nuna pilaittuqlu nunaqatigingittunut aktuanit.

Ilagiagutit Kiinauyaliugutit Nunalu Atuqnia - Tapkuat Inuit Kitikmeotni atuinaqpaktut ilihimaniqmingnik nunamik avatigiyaunuklu (Inuit Qaujimagatuqangit). Ilagiagutit kiinauyaliugutit nunaplu atuqni (angunahuaqniq, iqalukhiuqniq, nanigiaqtuqniq, katitiginiq) pilaq aktuani tapkunanga: ahianguqnit pilaqninut nuna piqaqnitlu; ahianguqnit atuqtauhimayut nunamittutuqat avatigiyaait; ahianguqnilu tapkuat amigaitni humittaqnilu piqaqnit. Piqaqtuq qaphinik aulaninut ihuaqhigiagutitlu piyauni ilautitlugit: ihuaqhigiagutit tapkunanga Havanguyuq hanatyuhikha, nakuniqpanik pitquhit aulanit pityuhit, munaginitlu.

Tamaitnut, tapkuat nakungittumik qimaiviuni katitlugitlu aktuanit tahapkununga ilagiagutit kiinauyaliugutit nunaplu atuqnia angivalangittut. Ilagiplugitlu, tapkuat ihuaqutit taphumanga Havanguyuq kivgaqtutaulat ihuaqhihimaninut ilitquhit ilagiagutit nunap atuqtauni anginiqhamik piplugit tapkuat pilaqniqhauninut pihimaittumik kiinauyaliugutit aglivaliani havakhatlu maniliugutauni piqatait taphuma Havanguyup. Tamna Havanguyuq nigiuqiyaungittuq qanugitninut nunaqatigingittut aktuanit ilagiagutauyunut nuna atuqtiuyunut.

Angutat Niqit

Piqaqtuq qaphinik halumailgunik pilaqninik tapkuat angutat niqit atuqtitlugu tamna Havanguyuq, Piplugu tamna uktugutauyuq Havanguyuq haviknut uyagakhiuqviunia, haviit katihimanit tahamani avatigiyauyumi ahianguqniaqtukhauyut piplugu Havanguyuq pivaliatitnia. Angiyumik ihuaqhigiaqnit aulanilu piyauni pihimaniat mikhigiaqnit piiqniluniit pilat aktuanit avatigiyauyumut hunanut (hila, imaq, halumailgut, nuna, nauhimayutlu) angutatlu niqit inmingnut (lqaluit, angutikhatlu). Piplugit tapkuat aktilangit qanigitnilu piplugit tahapkuat aktuanit naunaiyaqni, tapkuat qanugitni angutat niqit

nigiugiyaungittut ahianguqni angipyaktumik tahapkunanga huniumaittitlugu qanugitninit. Piplugu nigugiyaungittut Havanguyuuq qimaiviunit aktuanit, piittuuq pilat katitlugit nunqaqatigingittutluniit aktuanit.

Nainaqhimayut Iniqtigutit

Tamaitnut, tamna Havanguyuuq nigugiyauiyuuq qanugitninut angivalangittumik nakuungittunut aktuanit (qimaiviuyut, katihiimanit nunaqatigingittutluniit) tahaminga hilaun, nunamun, imatqiktunut, tagiumun, inungnutlu avatigiyainut. Tamna Havanguyuuq piniaq nakuuyumik aktuanit allatqinut inulikutit-kiinauyaliugutit piplugit ilautitlugit nunalikni havakhat ayuitnitlu pivaliatitnit.

Executive Summary

Executive Summary

The Back River Project (the Project) is a proposed gold mining project owned by Sabina Gold & Silver Corp. (Sabina) located within the West Kitikmeot region of Nunavut. Sabina is a Canadian junior resource company focused on the advancement of the Back River Project. Sabina is headquartered in Vancouver, British Columbia, with a satellite office in Cambridge Bay, Nunavut. Sabina's management team has a wealth of project development experience and is focused on advancing the Back River Project in a sustainable, financially responsible manner.

The Project is comprised of two main areas with interconnecting winter ice roads: the Goose Property and a Marine Laydown Area (MLA) situated along the western shore of southern Bathurst Inlet. Sabina has prepared an Environmental Impact Statement to identify and assess potential environmental and social effects resulting from the Project that meets the requirements outlined in the Nunavut Land Claim Agreement and the Nunavut Impact Review Board Guidelines for the Preparation of an Environmental Impact Statement for the Back River Project (NIRB File No. 12MN036; NIRB 2013).

Sabina intends to build a mine that is safe, environmentally responsible, and beneficial to all parties involved. Sabina will balance good stewardship in the protection of human health and the natural environment with the need for economic growth. The Project will bring much needed training and employment opportunities, as well as increased investment in services, to the people of the Kitikmeot region and Nunavut as a whole. The Feasibility Study, completed in June 2015, positively identified the economic viability and potential of the Back River Project.

Mine Plan

The mine plan reflects an estimated ten year operating mine life, based on currently identified reserves, with a total ore feed of 19.8 million tonnes to a single process plant at the Goose Property. Continued exploration may extend projected mine life. Such deposits would likely be mined as satellites of the currently planned operation in order to make full use of existing infrastructure. Any significant increases to the Project may trigger subsequent Environmental Assessment processes.

The Project includes several mineral deposits: Umwelt, Llama, Echo, and Goose Main at the Goose Property. Ore will be mined using conventional open pit and underground methods and will be trucked to the process plant for segregated stockpiling or direct feed to processing. Waste rock will be stored in several designated waste rock storage areas (WRSAs) on the surface or backfilled in mined out workings. Tailings from the process plant will first be stored in a Tailings Storage Facility (TSF) located near the process plant, and subsequently tailings will be backfilled in mined out open pits.

Annual resupply will be completed using the MLA, located in Bathurst Inlet, and winter ice roads will interconnect these sites.

Project Phases

The life of the Back River Project, from mobilization to post-closure, is 27 years. It is expected that mobilization and construction activities could begin as early as 2016 (Table 1). The Operations Phase is expected to continue for 10 years, based on the proposed mine plan.

The available mineral reserves will ultimately be exhausted, whereupon the mine will enter the closure and reclamation phase. During this phase, which is expected to last approximately eight years, the mine,

equipment, and infrastructure will be decommissioned and the site will be returned to a stable condition leaving no significant effect on the environment. Post closure monitoring will be conducted for a period of approximately five years to ensure the area remains both chemically and physically stable.

Table 1. Project Phases

Phase Name	Activities	Duration	Project Year
Mobilization and Construction	Mobilization, earthworks, facilities, equipment, mine development	4 years	-4 to -1
Operation	Mining, processing, progressive reclamation	10 years	1 to 10
Reclamation and Closure	Deconstruction, decommissioning, reclamation, WRSA closure, water treatment	8 years*	10 to 18
Post Closure Monitoring	Monitoring of water quality, geotechnical, terrestrial and aquatic effects	5 years*	18 to 23

**years do not sum due to rounding*

Alternatives

Alternatives within the Project have been evaluated according to the following criteria: technical feasibility; economic validity; potential impacts to the environment; and amenability to reclamation. Input received during community and government engagement and consultation has been considered in the alternatives assessments.

Two categories of alternatives are identified. Tier one alternatives outline options for different methods of executing the project in key areas, for example open-pit versus underground mining. Once the decisions are made related to these larger alternatives, a second tier of alternatives were considered with the aim of optimizing performance. These alternatives consider various ways to execute each of the chosen key components. Trade-off analyses were undertaken to choose the best approach. As the Project advances, alternatives will be further refined and evaluated. This refinement may alter the final details of the Project plan.

Economic and Operating Environment

The Project will create significant socioeconomic benefits. If the mineral resource is not developed, the potential effects and predicted benefits would not be realized. The Project will substantially benefit Nunavut and will contribute as much as \$44 million in GDP to Nunavut during the two year construction period. Construction is estimated to result in a total of about 4,300 person-years of direct, indirect, and induced employment across Canada.

Over the 10 years of production, total Canadian GDP impacts of the Project are predicted to exceed 2 billion dollars. Total tax revenue is estimated at \$400 million and Nunavut mining royalties of \$97 million over the life of the mine. The Project will substantially benefit Nunavut and will contribute as much as \$380 million in GDP. The total direct, indirect and induced employment for Canada as a whole will be approximately 21,000 person-years over the operations phase of the Project.

Throughout the Project life, Sabina will seek to recruit a stable workforce capable of operating the mine efficiently and safely while giving first opportunity to northern residents.

The remote location, long supply route, and Arctic climate pose challenges to the project that most southern Canadian projects do not face. As a result, the Project depends on the relatively high gold grades discovered to date that are relatively easy to recover along with stable or increasing gold

prices.. Low gold prices and rising costs for wages, materials, and supplies could impact Sabina's ability to economically construct and sustain the Project.

Logistics

The preferred methods of accessing this remote location are via year-round air transportation; two open water marine shipping routes to Bathurst Inlet; and winter ice road links between the Properties. There is an existing all-weather airstrip at the Goose Property that will be used for the life of the project. The MLA at Bathurst Inlet may be serviced by an ice strip in the winter, and float plane in the summer months. Crew movements to the Goose Property and the MLA will be facilitated by chartered air service from Edmonton, Yellowknife, Cambridge Bay and Kugluktuk. The current use of helicopters and fixed-wing aircraft to service exploration crews will continue in proportion to Sabina's continued exploration and environmental monitoring efforts during mine construction and operation.

The majority of freight will be brought in by sea during summer sealifts. This freight will originate from one of two ports: from Bécancour, Quebec in the east or from Vancouver, BC in the west. Ports will be selected based on the origin of the goods. Freight staged at Bécancour will travel by barges and by ships. Freight at Vancouver will travel by barges. The ships and barges will be self-sufficient for offloading cargo. Lightering barges will be used to transfer cargo from the vessel to the MLA.

Fuel will be delivered in tanker ships and/or barges and then will be transferred using floating hose to storage tanks on land at the MLA. Incoming and outgoing cargo and incoming fuel will be staged at the MLA while awaiting transfer to the project sites by winter ice road or awaiting the appropriate vessel for back-haul.

Winter ice roads will be constructed for the Back River Project. The Goose-MLA Winter Ice Road is approximately 160 km in length. The George Winter Ice Road, a spur road connecting George Exploration Camp to a junction on the Goose-MLA Winter Ice Road, is approximately 13 km in length. This spur may further extend to provide a connection to the proposed Bathurst Inlet Port and Road (BIPR) road. These spur roads are being proposed to allow for additional regional flexibility for ongoing exploration and project advancement. Ground transportation within each site is by all-weather roads. These all-weather routes cross only shallow, seasonal creeks. These crossings will comprise of culverts.

Project Infrastructure

Both Project locations will have self-sufficient operating infrastructure including: accommodations, administration, laydown areas, power generation, maintenance shops, warehousing, and water and waste management facilities.

The Goose Property is the hub of the Project with the process plant, all-weather air strip, four open pits, four underground mines, and a camp capable of housing its employees. A diesel fuel tank farm will store in excess of one year's supply of fuel in three 15 ML tanks. A 40,000 m² pad has been designated for bulk storage for freight. At the Ammonium Nitrate storage facility and explosives storage magazines, there will be capacity for up to 3,900 tonnes of ammonium nitrate and 32 tonnes of explosives.

The MLA is located approximately 130 km north-northwest of the Goose Property. It is the primary staging area for equipment, material, fuel, and other supplies required for the construction and operation of the Project. It is comprised of a single grounded terminal barge that will accept lightering barges, laydown areas, and storage and maintenance facilities. There will also be accommodations for staff supporting its operation. A tank farm will contain diesel fuel in four 15-ML field erected tanks. There will be dedicated storage for ammonium nitrate shipped in sea containers. No storage or mixing of explosives takes place at the MLA.

A direct implication of the remoteness of the site is a heavy emphasis on all aspects of health and safety and the proper maintenance of the equipment and infrastructure. Equipment must be well-maintained and safety provisions must be rigorously enforced as assistance from external sources is not readily available. Thus, on-site emergency and medical facilities will be relatively self-reliant.

Borrow Pits and Quarry Sites

Initial open pit mining will provide the bulk of crushed rock and aggregate to build local all-weather roads, laydown areas, airstrip extension, and support other such construction and maintenance activities. Sabina will establish borrow pits and/or quarries as supplemental sources of crushed rock and aggregate. At the MLA, small borrow pits and/or quarries are planned for building the required infrastructure.

Mineralogy and Mining

The gold is hosted in iron formations that are found in Archaean-age rock types common in the Canadian Shield. The sulphide content of the ore ranges from near 0 to 5%. Silver is the only other valuable metal present in the ore. Silver is not currently accounted for in the project's economic assessment but some will be recovered along with the gold. The gold occurs as fine native gold, only occasionally visible to the naked eye. The minable mineral reserves for the Back River Project total 19,792 kt at 5.70 g/t for a quantity of contained gold of 3,628 koz.

The ore at all open pits (Umwelt, Llama, Echo, and Goose Main) will be recovered using conventional truck and shovel open pit mining methods. All four deposits extend below the depth proposed for the open pits. All four deposit extensions have been identified as economically viable for underground mining operations. Different underground mining methods have been proposed to suit the various deposits.

Waste Rock and Tailings Management

The Tailings Storage Facility (TSF) is sited south-southeast of the Goose Main open pit. The containment-side of the TSF dam's embankment will be lined with high-density polyethylene (HDPE) geomembrane which will be sandwiched between nonwoven geotextile to mitigate damage and losses. After the TSF has received the design quantity of tailings, it will continue to be used to store contact water until water treatment ceases and its dam is breached with closure.

The Goose Property will utilize three waste rock storage areas designed to properly manage potentially acid-generating (PAG) and non-potentially acid-generating (NPAG) mining waste. This includes the TSF in which the tailings will be capped with an NPAG cover.

Mineral Processing

During operations, all ore will be processed using conventional gravity concentration and cyanidation techniques. The process plant's nominal capacity is 6,000 tonnes of ore per day. The process will comprise primary and secondary crushing, grinding by ball mill followed by fine grinding mill, gravity concentration followed by intensive cyanide leaching, whole ore leaching followed by carbon-in-pulp, and gold recovery by electrowinning from the solution loaded after carbon stripping. Gold doré bars will be produced on site and then flown off-site for further refinement.

Water Management

Initially process water will be reclaimed water from consolidated tailings. Additional make-up water may be required from a fresh water source during periods of insufficient reclaim.

Freshwater will also be required to support the domestic and industrial water requirements at the Goose Property and MLA. The Goose Property will draw fresh water from Goose Lake with supplemental water from Big Lake. A desalination unit will be installed at the MLA drawing seawater from Bathurst Inlet. Water treatment facilities will provide potable water at both properties.

The terrain at both sites is relatively flat with weakly developed, wandering, seasonal creek drainage. However, the overall approach to site water management is to divert water around mine workings and infrastructure to minimize impacts.

In order to access the mineral resources at Goose, partial or complete dewatering of some surface lakes will be required. Llama Lake will need to be dewatered to access the Llama deposit and Umwelt Lake will be dewatered for use as a temporary connate water reservoir. A dewatering plan will be prepared and implemented upon regulatory approval prior to any dewatering.

All open pits will be situated in permafrost with the exception of Llama open pit, which intercepts the talik associated with Llama Lake. Significant groundwater inflow is not expected. Inflow from snowmelt and summer precipitation will be managed by conventional pumping to settling ponds prior to discharge to the environment. Dewatering of the underground mines will be achieved using a combination of submersible and horizontal pumps located in sumps throughout the working levels. At the Goose Property, contact water will be diverted to the Tailings Storage Facility, mined out open pits (Tailings Facilities), or pumped into mined out underground workings, treated beforehand if required.

Waste Management

Waste products will be sorted at waste management facilities located at each site after which the material will be reused or recycled wherever possible. The Goose Property will utilize landfills for approved nonhazardous solid waste. Other materials will then be safely stored pending transportation to approved offsite recycling or disposal facilities. Both sites will have hazardous waste storage areas and incinerators for combustion of nonhazardous, combustible waste including sewage sludge. Sewage and grey water from the camp and maintenance facilities will be treated in wastewater treatment plants at the Goose Property. Treated sewage effluent will then be discharged to the tailings storage facilities or a designated and approved area in the terrestrial environment. Any discharge will be conveyed through structures designed to minimize erosion and degradation of the permafrost.

Closure and Reclamation

Sabina will undertake progressive reclamation activities throughout the mine life. Facilities will be decommissioned and removed at the end of their useful life. Achieving chemical and physical stability will be a key focus of final mine closure. This will include encapsulation of mine wastes (potentially acid-generating waste rock and tailings) with non-potentially acid-generating rock, flooding the open pits, and treating out-of-compliance water. In order to minimize the amount of water treatment required, the open pits will be passively and actively filled with lake water to mitigate the generation of acid and the leaching of metals. Mine closure is expected to take eight years and consist of two stages (active and passive) followed by five years of post-closure monitoring.

Industry standard reclamation methods will be employed to close out the remainder of the Project sites. Hazardous materials will be collected for off-site disposal. Equipment will be stripped of hazardous materials and disposed in an open pit or within a closure landfill. Buildings will be demolished and disposed of in the same closure landfills. Culverts will be removed from roads and the natural drainage restored but the roads will otherwise remain intact.

At the MLA, surface infrastructure will be similarly handled; however, all elements designated for landfilling will be shipped off-site for disposal at a designated Goose Property landfill or near the port of destination. At both sites, once all buildings and equipment have been removed, the footprints (whether bedrock or thermal pads) will be re-contoured to allow for sheet flow drainage to the receiving environment.

Environmental Management

Sabina's Environmental Management System contained in Volume 10, provides a framework for the environmental and socio-economic monitoring activities to be implemented through the life of the Project. The system incorporates the strategies employed for adaptive management using the precautionary principle to pursue the goals of sustainable development. Within this framework, individual management plans have been drafted to address all aspects of the company's activities and contain the detailed mitigation measures and monitoring programs that will be implemented throughout the life of the Project in order to eliminate or minimize adverse effects.

The Environmental Management System also verifies that standard operating procedures reflect legal requirements pertaining to the Project, and that conditions set at the time of the Project's authorizations as well as requirements pertaining to the relevant laws, regulations and permits are met. All Project employees and contractors are required to comply with these management plans. The reporting and documentation requirements, auditing, and processes for management review and revisions are all specified in the Environmental Management System. This system will offer enough flexibility to respond to the monitoring results in a timely fashion to reduce or eliminate potential adverse residual effects to the natural and socio-economic environments.

Public Consultation and Engagement

Public consultation and engagement is a legal requirement in Nunavut, an industry best practice, and an important corporate commitment. Effective public consultation and engagement helps ensure that community members are informed and knowledgeable about proposed projects, that community support for those projects is more readily obtained, and sustainable development goals are achieved. A key goal of Sabina's public consultation and engagement program has been to ensure the Company obtains a social licence to operate, by securing the support of a majority of residents from potentially impacted local communities.

The establishment of open, respectful, and jointly beneficial relationships with local communities and stakeholders has been and will continue to be key priorities for Sabina. Sabina further recognizes the unique characteristics of the Inuit lifestyle and has strived to engage local communities in a culturally sensitive and appropriate manner. Sabina is also committed to maintaining ongoing dialogue with local communities and will continue to be open to suggestions as to how its public consultation and engagement activities can be improved. Sabina's public consultation and engagement program is multi-faceted using various community engagement methods and tools

Sabina has and will continue to engage with the Kitikmeot Inuit Association (KIA), which is the primary Inuit organization with rights and responsibilities in the Project area. An Inuit Impact and Benefit Agreement to be negotiated with the KIA will further outline Sabina's benefits-oriented commitments.

A number of Northwest Territories Aboriginal organizations have been (or will be) engaged for the Project. Engagement has occurred (or will occur) primarily through informational meetings with the leadership and other representatives of these organizations. Publically available traditional knowledge from these organizations has also been reviewed by Sabina and documented in a report on Northwest Territories Aboriginal Traditional Knowledge.

Sabina began its public consultation and engagement program in June 2012. Since that time, dozens of formal meetings and numerous informal meetings with Project stakeholders have been held. A public consultation database has been developed that contains 165 topic directories. This database has been analyzed to identify key issues and concerns amongst communities and stakeholders. These issues and concerns can be categorized under three main themes: community benefits and engagement, employment and training, and environmental management and monitoring.

Information obtained through public consultation and engagement has played a role in the planning and design of the Project through baseline data collection, impact prediction, significance assessment, and the development of mitigation and monitoring programs. No major issues were raised by community stakeholders. However, community feedback has been incorporated into various aspects of the alternatives assessment.

Public consultation and engagement will also provide new information to be considered as the Project advances. For example, Sabina's Community Involvement Plan (see Volume 10) commits the company to regular meetings and community engagement throughout the Project's development and operation. Likewise, procedures are in place to document and respond to any community feedback, suggestions, and concerns that arise.

Government Engagement

The purpose of Sabina's government engagement program is to provide government officials with clear and comprehensive information regarding the proposed Project and the various management and mitigation plans that support its development. Sabina has also regularly communicated important Project timelines and milestones to government officials, so that they can more effectively plan their workloads and be sufficiently prepared to participate in the environmental assessment process.

Sabina has engaged a number of federal agencies on various occasions about the Project, including the Canadian Northern Economic Development Agency (in particular, the Northern Projects Management Office), Fisheries and Oceans Canada (including the Canadian Coast Guard and Canadian Hydrographic Service), Aboriginal Affairs and Northern Development Canada, Environment Canada, Natural Resources Canada, and Transport Canada. Sabina has often looked to the Northern Projects Management Office to help coordinate information exchange, and assemble the most appropriate federal officials to participate in meetings and other events such as site visits.

The Government of Nunavut participates in, and provides expertise during, the environmental assessment and review process for proposed mines in Nunavut. The Government of the Northwest Territories has been involved primarily in the assessment of transboundary and cumulative effects for the Project.

Sabina has used a wide range of government engagement methods and has emphasized building trust and personal relationships to the greatest extent possible. Sabina recognizes there will be an on-going need for both formal and informal government engagement activities. Any significant Project-related correspondence will be provided directly to NIRB and will become part of the public record, as required by their process.

Traditional Knowledge

Traditional Knowledge (TK) can be defined as a "cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission" (NIRB 2007). TK studies provide a valuable way of documenting spatial and temporal patterns of hunting, harvesting, fishing, habitation, and travel in a given area. They can also provide detailed information on local ecological processes, socio-cultural patterns and institutions, spirituality, ethical, and other matters.

Sabina has made significant efforts to engage local communities through incorporation of their TK into the Project's planning and design. Sabina has utilized six primary sources of TK: a Naonaiyaotit Traditional Knowledge Project (NTKP) database report for the Project; theme-based TK workshops; a report on existing and publically available Northwest Territories TK; the results of public consultation and engagement activities; a TK study on the Bernard Harbour Arctic char fishery; and other sources.

Likewise, Inuit Qaujimajatuqangit values have helped guide Sabina's decision making for the Project and have been incorporated into the design of the Company's overall Project management approach.

Sabina has considered TK on an equal basis with all scientific forms of information collected for the Project. For example, TK has been integrated into various environmental and socio-economic baseline studies conducted for the Project. Some of the wildlife baseline studies also involved the advice and help of local land users in the field to assist with the placement of remote cameras on the tundra in areas deemed as important habitat for wildlife, particularly caribou. Land users were similarly consulted and included with regards to the positioning of posts used for the wildlife DNA mark-recapture study.

TK has helped inform the effects assessment that was conducted for the Project. The results of the NTKP database report (i.e., KIA 2012) were also used for scoping and refining the Project's initial VEC and VSEC list for the Project. Finally, TK has helped inform the development of mitigation and monitoring programs for the Project. TK will be used when appropriate in the future monitoring of potential Project effects.

The ways in which TK was incorporated into the development of various mitigation strategies are summarized in Volume 3 and detailed elsewhere throughout respective chapters in the FEIS.

Valued Components

The scoping of potential Valued Ecosystem Components (VECs) and Valued Socio-economic Components (VSECs) involved Sabina-led public consultations, the use of TK, regulator consultations and regulatory considerations, and recommendations presented in the NIRB EIS guidelines (NIRB 2013). The Inuit Traditional Knowledge of Sabina Gold & Silver Corp., Back River (Hannigayok) Project, Naonaiyaotit Traditional Knowledge Project Report (KIA 2012) was consulted extensively for TK information. Based on these sources, the following VECs and VSECs and Subjects of Note were identified:

Atmospheric Environment (Volume 4)

- VECs: Air Quality, Noise and Vibration
- Subject of Note: Climate and Meteorology

Terrestrial Environment (Volume 5)

- VECs: Vegetation and Special Landscape Features, Caribou, Grizzly Bear, Muskox, Wolverine and Furbearers, Migratory Birds, Raptors
- Subject of Note: Geology, Permafrost, Landforms and Soils

Freshwater Environment (Volume 6)

- VECs: Hydrology, Water Quality, Sediment Quality, Fish and Aquatic Habitat, Fish Community
- Subject of Note: Groundwater, Limnology and Bathymetry

Marine Environment (Volume 7)

- VECs: Water Quality, Sediment Quality, Fish and Aquatic Habitat, Fish Community, Seabirds and Seaducks, Ringed Seals
- Subject of Note: Physical Processes

Human Environment (Volume 8)

- VECs: Archaeology, Socio-Economics, Land Use, Country Foods
- Subject of Note: Paleontology, Human Health and Environmental Risk Assessment

All VECs and VSECs were assessed over both spatial and temporal scales appropriate to the specific VEC and VSEC. Spatially, potential effects were evaluated within a Local Study Area (LSA) and a larger Regional Study Area (RSA). Temporally, potential effects were considered during the Construction, Operations, Reclamation and Closure, and Post-closure Project phases. Specific legislation was considered during the assessment, including appropriate federal and territorial objectives and standards.

The following presents summaries of the existing environment, primary Project activities that are anticipated to interact with the VECs and VSECs, mitigation measures, effects assessment, and if applicable, cumulative effects assessment for each VEC and VSEC. Information required in the EIS guidelines for the Subjects of Note can be found in the detailed supporting volumes.

Atmospheric Environment*Air Quality*

The air quality in the atmospheric RSA is predominantly pristine, reflecting the Project location's remoteness and the lack of, and localized nature of, sources of anthropogenic air emissions sources.

The main sources of emissions associated with the project are stack emissions, vehicle exhaust emissions, fugitive dust emissions from vehicles travelling on unpaved roads, emissions associated with blasting and aircraft emissions. Eight air quality indicators: nitrogen oxide (NO_x as NO₂); sulphur dioxide (SO₂); carbon monoxide (CO); total suspended particulates (TSP); particulate matter (PM₁₀); respirable particulate matter (PM_{2.5}); dust deposition; and acid deposition were included in the assessment and an air quality modelling study was conducted to characterize the highest concentrations of each air quality indicator within the atmospheric LSA. Volatile Organic Compounds (VOCs) and ozone (O₃) were scoped out of the assessment due to emission rates that are considered insignificant.

Mitigation and management activities planned to reduce or eliminate potential effects on air quality include: energy efficiency measures, measures to reduce fuel use, the use of water or dust suppression fluids to reduce dust from unpaved roads, transported material and equipment in the crushing facility, and the use of emission control systems such as wet scrubbers, baghouses, and filters. The significance of residual effects for air quality is predicted to be Not Significant.

There are no potential cumulative effects or transboundary effects on air quality.

Noise and Vibration

The existing noise and vibration environment is pristine with no significant nearby anthropogenic noise or vibration sources. With the exception of readings taken near the current exploration camps, all baseline readings were comparable to estimated baseline levels for quiet, rural areas.

Construction and operation of the Project will introduce noise and vibration sources largely in the form of construction equipment, haul vehicles, blasting, and vehicle and aircraft traffic. A review of the potential Project interactions with noise and vibration identified nine potential effects that may occur - seven potential effects on humans and two potential effects on wildlife.

Mitigation and management activities planned to reduce or eliminate potential effects on noise and vibration include: ensuring equipment is fitted with appropriate mufflers and silencers, limiting activities such as blasting and take-off and landing of aircraft to certain times of the day, and housing stationary sources in building or using enclosures, berms, acoustic screening and shrouding. The results of quantitative noise modelling for the peak activity year show that predicted noise levels are below the criteria for interference with speech communications (humans), complaints (humans), high annoyance (humans), noise induced rattling (humans) and noise induced hearing loss (humans). Similarly, there are not expected to be any cosmetic and structural damage of buildings (humans) effects from Project-generated vibration. However, noise levels are predicted to exceed relevant criteria for loss of habitat (wildlife) and disturbance (wildlife) at various identified receptors due to construction and operation activities, blasting, road traffic and aircraft movements. In addition, noise levels from mine construction and operations are predicted to temporarily exceed the sleep disturbance (humans) criteria at the proposed location of the Goose camp.

However, the significance of any residual effects is predicted to be Not Significant.

There are no potential cumulative or transboundary effects on noise and vibration.

Terrestrial Environment

Vegetation and Special Landscape Features

Vegetated ecosystems, constituting 73% of the LSA, are dominated by mesic tundra, dry-sparse tundra, and moist shrub-dominated tundra. Sparsely-vegetated ecosystems constitute nearly 9% of the total LSA. Non-vegetated ecosystems, constituting approximately 18% of the LSA, are dominated by freshwater lakes and ponds. Special landscape features include esker complexes, cliffs, bedrock outcrop and lichen-dominated ecosystems, riparian ecosystems, wetland ecosystems, and marine beaches and old beach heads.

Potential Project effects on the VEC vegetation and special landscape features include the direct loss or degradation of vegetation or special landscape features. The mitigation and management measures designed to eliminate or minimize potential Project effects on vegetation and special landscape features include: minimizing the Project footprint, using winter ice roads, and reducing fugitive dust where possible.

Contingent on the implementation of mitigation measures outlined in the Air Quality Monitoring and Management Plan (Volume 10, Chapter 17) and the Site Water Monitoring and Management Plan (Volume 10, Chapter 7), the significance of residual effects on vegetation and special landscape features is predicted to be Not Significant.

A cumulative effects assessment was conducted and the significance of the residual cumulative effects is predicted to be Not Significant. There are no potential for transboundary effects.

Caribou

There are three barren-ground caribou herds whose ranges interact with parts of the wildlife RSA. Satellite collaring data indicate that the Bathurst herd, the Beverly and Ahiak herds (considered

together in this assessment) and the Dolphin and Union herds are found in the terrestrial RSA during portions of the year.

The Bathurst caribou herd calves between the Hood and Burnside Rivers, approximately 240 km northwest of the Project site. Following calving, the Bathurst caribou travel in large groups south-east passing 30-60 km to the west of the Project site (their closest approach), on their way to their summer range surrounding Contwoyto and Nose Lakes, 60-100 km south-west of the Project site. This herd winters south of the treeline.

The Beverly and Ahiak caribou herds calve and spend their post-calving period in the Queen Maude Gulf area on the coast, 300-550 km northeast of the Project site. During the summer, this herd spreads south and west, with some caribou found on site during late summer and fall. The Beverly and Ahiak herds generally winters to the east of the Bathurst herd, both below treeline and as far north on the tundra as Bathurst Inlet.

The Dolphin and Union herds, also known as island caribou, calve and spend the summer on Victoria Island and winter on the mainland, likely overlapping the marine RSA during the winter.

These potential Project-related effects on the VEC caribou were evaluated: habitat loss, disturbance, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. The Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20) describes the measures that will minimize or eliminate effects on wildlife, including minimizing the Project footprint, noise control, speed limits of on roads, the use of winter ice roads to supply the Project, helicopter management, waste management and camp hardening to avoid attracting wildlife, and safe chemical handling to eliminate exposure to contaminants. The Wildlife Mitigation and Monitoring Plan also includes regional and on-site monitoring programs for caribou, as well as a program for staged reductions in project activities whenever caribou are observed on site, and an activity shutdown procedure should caribou ever choose to use the Project area during the sensitive calving and post-calving periods.

With the mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan, the significance of residual effects for caribou is predicted to be Not Significant.

A potential cumulative effects assessment was conducted. The geographical boundary used for the potential cumulative effects assessment was based on the post-calving and summer seasonal ranges of the Bathurst herd and the summer and winter ranges of the Beverly herd, and included areas within Nunavut and the Northwest Territories.

In order to support the potential cumulative effects assessment for caribou, a broad-scale Resource Selection Function model was developed for the Bathurst caribou herd on their post-calving and summer ranges. With the mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan and assuming similar measures for future projects, the significance of residual cumulative effects for caribou is predicted to be Not Significant.

The cumulative effects assessment spatial boundary included a portion of the Northwest Territories for both the Bathurst herd and the Beverly herd. As such, the potential transboundary effects are evaluated in the cumulative effects assessment and are predicted to be Not Significant.

Grizzly Bears

Using a DNA mark-recapture analysis, the regional population of bears was calculated to be 72 females and 54 males in 2012 and 64 females and 54 males in 2013. TK indicates that grizzly bears are found

throughout the RSA especially in association with major river systems such as the Western River and coastal areas, including Bathurst Inlet.

Potential Project-related effects on the VEC grizzly bear were evaluated, including: habitat loss, disturbance due to noise (e.g., displacement from areas of habitat), disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Winter ice roads were excluded from the assessment as grizzly bears are hibernating when these roads are constructed and used. The primary mitigation and management measures that will minimize the potential effects are a strong waste management and camp hardening plan to avoid attracting bears to site. A Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20) includes both regional monitoring in collaboration with the Government of Nunavut and on-site monitoring of the camp no attractants are available and for grizzly bears.

With mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan the significance of residual effects for grizzly bear is predicted to be Not Significant.

A potential cumulative effects assessment was conducted. The geographical boundary used for the potential cumulative effects assessment was based on a buffer around Project infrastructure using the diameter of the largest area within which a typical grizzly bear can range and still interact with the Back River Project. With mitigation measures outlined in the wildlife Mitigation and Monitoring Plan and assuming similar measures for future projects, the significance of cumulative effects for grizzly bear is predicted to be Not Significant.

The cumulative effects assessment spatial boundary included a portion of the Northwest Territories for grizzly bears and is anticipated to be the largest area that any one grizzly bear may be able to interact with the Project. As such, the potential transboundary effects are accounted for in the cumulative effects assessment and are predicted to be Not Significant.

Muskox

Muskox occur at moderate to low densities across the Canadian Arctic and are valued by the Inuit as a source of food, hides, horns, and wool, as well as for the commercial export of meat. TK indicated that muskox populations have been undergoing a long-term recovery from previously low numbers and occur throughout and surrounding the RSA at low densities. Aerial baseline surveys agreed with TK information.

Potential Project-related effects were evaluated for the VEC muskox, including: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures will eliminate or minimize the potential effects. The Wildlife Mitigation and Monitoring Plan include both regional monitoring of muskox in collaboration with the GN and local, on-site monitoring.

With mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan the significance of residual effects for muskox is predicted to be Not Significant.

A potential cumulative effects assessment was conducted for muskox. The geographical boundary used for the potential cumulative effects assessment was based on a diameter around the Project using the longest straight line distance travelled by a radio-collared muskox in the west Kitikmeot region. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan and assuming similar measures for future projects, the significance of cumulative effects for muskox is predicted to be Not Significant.

The cumulative effects assessment spatial boundary included a portion of the Northwest Territories for muskox and is anticipated to include the largest straight line distance that a muskox may be able to interact with the Project. As such, the potential transboundary effects are accounted for in the cumulative effects assessment and are predicted to be Not Significant.

Wolverine and Furbearers

Wolverine and grey wolves were selected as representative VEC furbearer species. Baseline studies estimated the local population of wolverine to be very low. However, habitat suitability modeling for wolverine indicates that there is approximately 44.7% high-quality habitat within the wildlife RSA.

TK identified eskers as the primary denning habitat for wolves. Habitat suitability modelling calculated the habitat covers approximately 1% of the RSA. Denning surveys conducted for grey wolf supported TK information with eight dens identified in the RSA on eskers, of which five dens produced pups.

Potential Project-related effects on the VEC wolverine and furbearers were evaluated, including: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. The primary mitigation and management measures that will minimize the potential effects are a strong waste management and camp hardening program to avoid attracting wolverine to site. Other mitigation includes: minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, and chemical handling measures to eliminate exposure to contaminants. The Wildlife Mitigation and Monitoring Plan includes monitoring for both the regional population of wolverine with the GN and local monitoring on the Project site. With mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan the significance of residual effects for wolverine and furbearers is predicted to be Not Significant.

A potential cumulative effects assessment was conducted. The geographical boundary used for the potential cumulative effects assessment was based on the movement distances defined for wolverine and wolves that interact with the Project. For wolverine, this area is the RSA. For wolves, this area represents the summer ranges of the Bathurst and Beverly caribou herds as wolves follow caribou for prey when they occur within range of the Project. With mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan and assuming similar measures for future projects, the significance of cumulative effects for wolverine and furbearers is predicted to be Not Significant.

Wolverine that may interact with the Project are not anticipated to travel into the Northwest Territories, thus transboundary effects for wolverine are not anticipated. The cumulative effects assessment spatial boundary for wolves included a portion of the Northwest Territories. As such, the potential transboundary effects are accounted for in the cumulative effects assessment and are predicted to be Not Significant.

Migratory Birds

Aerial surveys for water birds indicate that Canada geese accounted for 80% to 90% of all detections of water bird species. Additionally, a key staging site was identified on the western side of the RSA where large flocks of geese and ducks were consistently observed during both spring and fall staging surveys. Ground-based surveys for upland birds indicated that counts of upland birds (species and individuals) were highest in survey plots along the shoreline of Bathurst Inlet, relative to elsewhere in the RSA.

Potential Project-related effects on migratory birds were evaluated, including: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Mitigation and

management measures that will be in place to eliminate or minimize the potential effects include minimizing the Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste and chemical handling measures to avoid attracting wildlife to wastes and contaminants. The Wildlife Mitigation and Monitoring Plan includes both regional monitoring for migratory bird populations and on-site monitoring to reduce the chance of birds interacting with the Project.

Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan the significance of residual effects for migratory birds is predicted to be Not Significant.

A potential cumulative effects assessment was not conducted for migratory birds as the zone of influence of Project-related effects on migratory birds is expected to be limited to within the Project PDAs. Similarly, no transboundary effects are expected, as the Project PDAs fall entirely within Nunavut.

Raptors

Ground-based surveys for upland birds confirmed that ground-nesting raptors occur relatively rarely within the wildlife RSA. Thus, baseline studies for raptors were focused on mapping the location of cliff-nesting raptor nests, and measuring the productivity of breeding pairs. A total of 147 raptor nest sites were mapped; nests of the peregrine falcon were the most abundant of all raptor species. Two nest sites occur within the PDAs, and an additional seven raptor nest sites occur within a 12 km radius of the PDAs.

Potential Project-related effects on raptors were evaluated, including: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include minimizing the Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste management and chemical handling measures to avoid attracting wildlife. The Wildlife Mitigation and Monitoring Plan include both regional monitoring for raptor species and on-site monitoring. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan the significance of residual effects for raptors is predicted to be Not Significant.

A potential cumulative effects assessment was not conducted for raptors as the zone of influence of Project-related residual effects on raptors is expected to be limited to within a 12 km radius from the Project infrastructure which corresponds to the maximum expected home range of breeding raptors. Similarly, no transboundary effects are expected, as the Project PDAs fall entirely within Nunavut.

Freshwater Environment

Surface Hydrology

Baseline hydrology data are available for the Goose Property LSA from 2010 to 2015. Potential Project effects include water use, site water management activities, and winter ice roads. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include: the design of maximum water use volumes for waterbodies in order to protect fish habitat, following DFO protocols for winter water withdrawal, confinement of infrastructure to local watersheds, management of non-contact, contact, and saline waters, and following DFO's measures to avoid causing harm to fish and fish habitat. Contingent on the implementation of mitigation measures outlined in the Site Water Monitoring and Management Plan (Volume 10, Chapter 7), the significance of residual effects for hydrology is predicted to be Not Significant. There are no anticipated cumulative effects or transboundary effects on hydrology.

Freshwater Water Quality

Baseline water quality data have been collected in the Goose LSA since 1994, with extensive water sampling programs being carried out from 2010 to 2015. Potential Project-related effects include Project activities that could alter the following indicators for water quality via runoff, water withdrawals, treated discharge, and aerial deposition: pH, TSS, nutrients, metals, hydrocarbons, BOD, chlorine, and cyanide. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include: Project design features such as using geochemically suitable material for roads and pads, and the implementation of mitigation measures contained in the EMS. Contingent on the implementation of measures outlined in the Site Water Monitoring and Management Plan (Volume 10, Chapter 7) and the Aquatic Effects Management Plan (Volume 10, Chapter 19), the significance of residual effects for freshwater water quality is predicted to be Not Significant. There are no anticipated cumulative effects or transboundary effects on freshwater water quality.

Freshwater Sediment Quality

Baseline freshwater sediment quality data have been collected in the Goose LSA since 2007, with the most continuous sampling conducted from 2010 to 2015. Potential Project-related effects include Project activities that could alter the following indicators via runoff, water withdrawals, treated discharge, and aerial deposition: particle size, nutrients and organic carbon, metals, and hydrocarbons. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include: erosion protection and the implementation of site-specific measures outlined in the EMS. Contingent on the implementation of mitigation measures outlined in the Site Water Monitoring and Management Plan (Volume 10, Chapter 7) and the Aquatic Effects Management Plan (Volume 10, Chapter 19), the significance of residual effects for freshwater sediment quality is predicted to be Not Significant. There are no anticipated cumulative effects or transboundary effects on freshwater sediment quality.

Freshwater Fish and Aquatic Habitat

Comprehensive baseline studies on freshwater fish and aquatic habitat have been conducted in the Goose Property LSA from 2010 to 2015 with more than 30 streams having been characterized. Within the Goose LSA, there are permanent barriers to fish migration along the stream between Pond A and Giraffe Lake and along the stream between Umwelt Lake and Goose Lake. Potential indirect effects are addressed as part of the freshwater water quality and sediment quality assessments. Project activities that have the potential to directly affect freshwater fish and aquatic habitat include the loss of lentic habitat due to lake dewatering, development of open pits, water management activities, a tailings storage facility, water intake and discharge pipe construction, water withdrawal for domestic and process use, airstrip and road crossings, and winter ice road construction. Stream habitat may also be lost due to the construction of mine infrastructure. The primary mitigation measure to avoid potential effects on freshwater fish and aquatic habitat is the Project design of siting infrastructure to avoid freshwater fish habitat wherever feasible. The camp and plant site, ore stockpile, and waste rock storage areas have been located to avoid fish-bearing waters. Another key mitigation measure is the establishment of maximum water volume uses which have been based on protecting sensitive life stages of fish in Goose, Propeller, and Big lakes. Unavoidable losses of fish habitat (e.g., loss of Llama Lake due to Llama Open Pit) will be compensated through the implementation of a Fish Offsetting Plan. Therefore, no residual effects are anticipated on the VEC freshwater fish and aquatic habitat. No cumulative effects or transboundary effects are expected.

Freshwater Fish Communities

The freshwater fish communities in the Goose Property LSA are characteristic of Arctic freshwater ecosystems and include freshwater as well as anadromous species at the MLA. Baseline studies have been conducted from 2010 to 2015 within the LSA. The freshwater fish communities are typical of

inland, headwater regions of the Canadian Arctic. Lake Trout was the dominant species, followed by Round Whitefish, Arctic Grayling, Slimy Sculpin, and Ninespine Stickleback. Other species found within the LSA include Burbot and Lake Whitefish. No Arctic Char have been captured within the Goose LSA, although they are likely present within the freshwater RSA.

Potential Project-related effects on the VEC freshwater fish community focused on the two abundant freshwater fish species in the LSA, Lake Trout and Arctic Grayling. The main potential Project-related effects are direct mortality or population decreases due to lake dewatering, building of winter ice roads, construction of the Project footprint, water withdrawal for domestic and process use or winter ice road construction, and blasting with explosives. The primary mitigation measure to avoid potential effects on Lake Trout and Arctic Grayling is the Project design of siting infrastructure to avoid freshwater fish habitat wherever feasible. The camp and plant site, ore stockpile, and waste rock storage areas have been located to avoid fish-bearing waters. Another key mitigation measure is the establishment of maximum water volume uses which have been based on protecting sensitive life stages of fish in Goose, Propeller, and Big lakes. Unavoidable losses to these freshwater fish species (e.g., loss of Llama Lake due to Llama Open Pit) will be compensated through the implementation of a Fish Offsetting Plan. Contingent on the implementation of mitigation measures outlined in the Site Water Monitoring and Management Plan (Volume 10, Chapter 7), the Aquatic Effects Management Plan (Volume 10, Chapter 19), and the Fish Offsetting Plan (Volume 10, Chapter 21), no residual effects for VEC freshwater fish (Lake Trout and Arctic Grayling) are anticipated. There are no anticipated cumulative effects or transboundary effects.

Marine Environment

In addition to the complete assessment of the marine VECs and information on the Subjects of Note, the FEIS also contains additional information on the commercial shipping route and key migratory bird nesting areas and marine mammals such as seabirds, seaducks, and ringed seals. A marine diesel fuel spill model was also developed for the Project.

Marine Water Quality

Baseline studies show that water in southern Bathurst Inlet is typical of pristine Arctic marine waters, with low concentrations of nutrients, suspended solids, and metals.

Potential Project effects on the marine water quality VEC include: shipping activities; sediment introduction to water as a result of construction and reclamation; site contact water; winter ice roads; explosives; fuels, oils, and polycyclic aromatic hydrocarbons (PAHs); discharges; and dust deposition. The mitigation and management measures designed to control pathways for Project effects on the marine water quality include: minimizing vessel speeds and restricting vessels to deeper waters, using geochemically suitable material for roads and pads, adhering to regulatory guidelines for treated discharges, and using best management practices for the storage, transport, and use of fuels, explosives, and hazardous materials as well as for dust suppression and incineration.

Contingent on the implementation of mitigation measures outlined in the Aquatic Effects Management Plan (AEMP; Volume 10, Chapter 19) and the Site Water Monitoring and Management Plan (Volume 10, Chapter 7), the significance of residual effects for marine water quality is predicted to be Not Significant.

There are no anticipated cumulative effects or transboundary effects on marine water quality.

Marine Sediment Quality

The sediment environment in Bathurst Inlet is generally a function of water depth and physical processes. Shallower, near-shore areas are subjected to increased erosion and re-suspension due to the interaction of the wind-driven water currents and the seabed. Metal concentrations in marine sediments were strongly correlated to the relative abundance of silt and clay particles, and therefore were generally greater in the deeper waters. Naturally elevated concentrations of arsenic, chromium, and copper were observed in the deeper sediment samples and were often greater than the CCME sediment quality guidelines for the protection of aquatic life. Sediment metal concentrations near the MLA were observed to be naturally low, as expected because of the relative dominance of sand-size particles.

Potential Project effects on marine sediment quality shared the same pathways and mitigation and management measures as outlined for marine water quality. The same mitigation and management measures would be applied as described in the marine water quality section.

Contingent on the implementation of mitigation measures outlined in the Aquatic Effects Management Plan (AEMP; Volume 10, Chapter 19) and the Site Water Monitoring and Management Plan (Volume 10, Chapter 7), the significance of residual effects for marine sediment quality is predicted to be Not Significant.

There are no anticipated cumulative effects or transboundary effects on marine sediment quality.

Marine Fish and Aquatic Habitat

Based on nearshore surveys and TK, potentially important habitat areas for marine and anadromous fish were identified in the LSA and RSA. The outlets of some rivers are important habitat for Arctic Char.

The assessment of potential Project-related effects on marine fish and aquatic habitat involved the direct effects of Project activities on the physical habitat of marine fish. Potential indirect effects are addressed as part of the marine water quality and sediment quality assessments. Project activities that have the potential to directly affect marine fish and aquatic habitat include shipping effects and the project infrastructure footprint.

Mitigation measures to eliminate or reduce potential effects to the marine fish and aquatic habitat include: limiting the amount of in-water construction; following DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat; enforcing speed limits for ships navigating through the RSA; and implementing measures to eliminate or reduce potential effects to water quality and sediment quality.

Following the application of mitigation and management measures the residual effects are predicted to be Not Significant.

No cumulative effects or transboundary effects are expected.

Marine Fish Community

The marine fish community of Bathurst Inlet is characteristic of Arctic marine ecosystems and includes marine, anadromous, and freshwater/estuarine species. Nineteen fish species typically found in the Arctic have been captured during baseline studies in the marine LSA. Although no Arctic Char were captured, they are presumed to occur due to favourable habitat and appropriate spawning streams that flow into the Inlet.

Potential Project effects on marine fish community focused on Arctic Char and include: potential direct mortality from in-water construction of pipes and the barge terminal; population effects from

introduced species carried by ballast water; vessel propeller wash and underwater noise from shipping activities. Mitigation measures to eliminate or reduce potential effects to the marine fish community include: limiting the amount of in-water construction; eliminating ballast water exchange; and enforcing speed limits for ships navigating through the RSA.

Contingent on the implementation of mitigation measures outlined in the Aquatic Effects Management Plan (AEMP; Volume 10, Chapter 19), the Shipping Plan (Volume 10, Chapter 15), and the Noise Abatement Plan (Volume 10, Chapter 18), the significance of the residual effect for marine fish communities as assessed for Arctic Char is predicted to be Not Significant.

No cumulative effects or transboundary effects are expected.

Seabirds and Seaducks

Aerial and ground surveys documented a total of 23 species of seabirds in the marine RSA. No evidence of breeding was recorded during breeding surveys in any years. In spring, staging areas appeared to occur in open-water areas and near major river drainages. In late-summer and fall (mid-July and August), large numbers (> 50 birds) of Canada geese and ducks were observed in the shallow bay southwest of the MLA footprint. The greatest abundances of seabirds and seaducks were observed in late-summer and fall periods.

Two types of Project-related activities were evaluated for potential effects to seabirds and seaducks, including shipping, construction, and operation activities at the MLA. Mitigation measures to minimize or eliminate the effects of the Project on seabirds and seaducks include avoiding identified staging area and designing project components to avoid sensitive habitats.

Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Management Plan, the residual effects are predicted to be Not Significant.

No cumulative effects or transboundary effects are expected.

Ringed Seals

Aerial surveys were conducted during the spring moulting period (mid-May through mid-July) between 2007 and 2013 to assess the abundance and distribution of ringed seals. Results indicated that ringed seal abundance was spatially variable in Bathurst Inlet, with moderate densities present in most parts of the inlet except in the southern RSA south of Kingaok where very low densities of adult and 8 to 10-week-old pups were found. Ringed seal lairs were only found in the northern RSA during surveys; no lairs were observed in the southern RSA or the LSA. During the summer, ringed seal density is anticipated to be very low in Bathurst Inlet.

Two types of Project-related activities were evaluated for potential effects to ringed seals - shipping and construction and operation activities at the MLA (e.g., aircraft and traffic on winter ice roads that overlap marine areas). Mitigation measures include ensuring project activities do not occur when ringed seals are expected to be present. Thus residual effects are not predicted for ringed seals and no cumulative or transboundary effects are anticipated to occur.

Human Environment

Archaeological Sites

There are 269 known archaeological sites within the archaeology RSA. There are 64 known archaeological sites within 1,000 m of the PDAs and the road rights-of-way that may be impacted either directly or indirectly by the Project.

The potential Project-related effect on archaeological sites is the disturbance of archaeological sites through project activities.

The Project has been designed to minimize effects on archaeological sites. Archaeological site locations were considered during Project design and were avoided where possible. The use of temporary winter ice roads further limits potential effects to archaeological sites by reducing overland traffic. However, where avoidance is not possible, mitigation of archaeological sites will be conducted. Any archaeological sites not previously recorded that are discovered will be inspected by the Project archaeologist, documented, and reported to the Government of Nunavut, Department of Culture and Heritage using the Chance Find Procedure. These sites will be subject to the same level of management and mitigation afforded to the currently known archaeological sites outlined above.

With avoidance and/or mitigation implemented, residual effects on known archaeological sites are anticipated to be Not Significant.

Due to the spatially localized nature of the archaeological sites there are no cumulative effects or transboundary effects from the Project.

Socio-economics

The assessment of potential effects of the Project on socio-economics considers five VSECs: 1) economic development; 2) business opportunities; 3) employment; 4) education and training; and 5) health and community well-being. A total of 10 potential effects were identified, resulting in seven positive residual effects, two negative residual effects, and one effect with both positive and negative residual effects. Positive residual effects were described but were not evaluated for significance or carried in to potential cumulative or transboundary effects assessment. Negative residual effects were further evaluated for determination of significance and were also included in potential cumulative and transboundary effects assessments.

Economic Development

The Kitikmeot Region has a mixed economy, focusing on public sector services, private sector market economies, and traditional activities. Formal economic sectors of particular importance include: government administration; health care and social services; education; retail; construction; transportation; tourism services; arts and crafts; and mineral exploration and development. The service sector is the base of the Kitikmeot economy, providing employment to around 80% of the employed labour force. In contrast, primary and secondary industries—including resource-based industries and construction—account for about 15% of local employment.

Project activities have the potential to result in positive changes to economic growth, diversity, and performance. The economic impacts of the Project are a result of direct procurement and workforce employment, which are expected to also have indirect and induced effects to employment, personal income, GDP, and government revenues. Benefits will be enhanced through experience with the Project, support for local Inuit and northern businesses, capacity building, and community investment.

Increased economic growth, diversity, and performance are expected to have a positive residual effect on economic development. As the residual effect was determined to be positive, the effect was not carried through for further cumulative or transboundary assessment.

Business Opportunities

The Government of Nunavut dominates the service sector and is the major economic driver of the Kitikmeot communities. Government employment and income support provides the main source of income for residents and this, in turn, supports the presence of the private sector in each community.

Dependence on the public sector results from multiple conditions, such as the harsh climate, geographic remoteness, small population, and underdeveloped infrastructure systems, as these conditions have constrained private sector economic development. Private sector businesses predominantly include accommodation and retail, as well as a range of smaller-scale goods and service providers in each community.

Project activities are anticipated to promote growth and diversity among Inuit and northern businesses. The expected increase in local business activity itself could bring about an increase in capital investment. Local businesses will be presented with opportunities to bid on Project work, facilitated by the Project through mitigation and management measures established to maximize the benefits of contracting opportunities and the local sourcing of goods and services. Changes to the growth and diversity of Inuit and northern business are anticipated to have a positive residual effect on business opportunities. As the residual effect was determined to be positive, the effect was not carried through for further cumulative or transboundary assessment.

Employment

The potential labour force within the Kitikmeot communities was approximately 3,925 in 2011. The active labour force among these same communities was approximately 2,410 individuals, indicating an average participation rate of 61.4%. All Kitikmeot communities exhibit high labour participation rates in the education, business, retail, and other services sectors. These trends are typical for small, relatively isolated northern communities. However, Cambridge Bay, and to a lesser extent Kugluktuk, stands out as a community where the private sector has a more important role in the economy

The Project is expected to affect employment through: 1) changes to employment and income levels; 2) changes to the capacity of the labour force; and 3) changes to competition for local labour. Mitigation and management measures that focus on training, recruitment, and retention have been developed to enhance the participation of local Inuit in project employment. The targeted recruiting of Inuit employees is expected to reduce their higher than average unemployment rates. The Project will also inform local businesses, organizations, and hamlets of their hiring requirements and procurement practices in advance of the implementation of Mobilization and Construction and Operations phases and will collaborate to reduce any adverse effects of increased competition for local labour.

Overall, the employment and income effects of the Project are highly beneficial and have the potential to enable increased standards of living for Kitikmeot families. Direct Project employment and procurement are expected to increase the capacity of the labour force, specifically the skills and experience of Kitikmeot workers. Increased capacity is predicted to lower unemployment rates, promote economic growth, and enhance the ability of the regional workforce to support future projects. Changes in income and employment levels, as well as changes in the capacity of the labour force, are anticipated to have positive residual effects on the VSEC employment.

Direct Project employment and procurement may cause negative changes to local competition for labour. However, the residual effect of changes to competition for local labour is assessed as being of low magnitude and is predicted to be Not Significant.

Special consideration was given to potential transboundary effects to employment and businesses within the socio-economic RSA. The transboundary effects assessment concluded that competition for local labour is not expected to be substantial outside the Kitikmeot Region but is expected to provide desired employment. The transboundary effects of the Project were determined as positive and therefore not further characterized.

Education and Training

Each of the study communities, with the exception of Bathurst Inlet and Omingmaktok, has kindergarten, elementary, and secondary schooling. Students are provided with the opportunity to obtain their high school certificate (or equivalent) within their home community. In general, high school completion rates remain low in all communities. Among the Kitikmeot communities, Cambridge Bay had a relatively high proportion of the population with a university certificate or diploma (18.9%) or a college degree or diploma (17.6). Post-secondary education is offered through the Nunavut Arctic College (NAC). The college serves Kitikmeot communities through its central campus in Cambridge Bay, which is responsible for all college programming in the region.

The potential effects of the Project on education and training include changes to the demand for education and training, and changes to youth attitudes and behaviours toward education and training. Sabina expects to partner with local governments, educational institutions, Inuit organizations, and other mine proponents to contribute to the creation of a regional training facility and/or additional mine employment training programs at the NAC.

Changes to the demand for education and training, as well as changes in youth attitudes toward education and training are predicted to have positive residual effects on the VSEC education and training. As a result, effects to education and training were not subject to cumulative or transboundary effects assessments.

Health and Community Well-being

Nunavummiut experience lower rates of arthritis, diabetes, asthma, and high blood pressure as compared to Canadians. Fewer Nunavummiut also reported themselves as overweight or obese in 2014 (49%), compared to the Canadian average (54%). However, Nunavummiut typically have higher rates of cancer incidence and higher mortality rates as compared to Canadians generally. Residents of Nunavut can expect a much shorter lifespan than the average Canadian. Despite the relatively small populations, there are a wide range of health services and programs available in Kitikmeot communities. Although Cambridge Bay is the only community that provides full-time physician services, visiting doctors see patients in the other communities on a rotational basis. With respect to community health within Kitikmeot communities, relatively high suicide rates are a concern.

General community well-being (CWB), as described by AANDC's CWB indicator, was relatively low within Kitikmeot communities. Income, labour force activity and housing contribute to community health and well-being. Housing challenges exist in all Kitikmeot communities and public housing is the most common type of tenure, and dependence on the public sector for housing is likely to continue.

The effects of the Project on health and CWB are anticipated to be both positive and negative and include: changes to the life skills of those employed with the Project; changes to individual and family spending; and changes to family and household function. Engagement in economic productive work, the management of finances, and responsibility associated with employment are expected to assist with or support decision making and increase life skills.

Both positive and negative residual effects are predicted on health and CWB due to changes to individual and family spending. Should local residents who obtain employment with the Project choose to spend their increased incomes unproductively (e.g., on gambling, drugs, and alcohol) and engage in negative social behaviours, this will have a negative effect on CWB. However, income used to improve standards of living (e.g., improvements to housing, food security) coupled with the other numerous positive effects associated with Project employment have the potential to result in substantial increases to CWB. Overall negative residual effects are predicted to be Not Significant.

Special consideration was given to potential transboundary effects to health systems in the NWT as a result of Project reliance on medical services. The Project is not expected to have transboundary effects on the health system in the NWT due to the fly-in/fly-out operation of the Project and the provision of required medical services at the Project site. Project employees are expected to continue to utilize health services in their home communities and will have access to health services at the Project site as required.

Land Use

The assessment of potential effects of the Project on land use considers two VSECs: 1) non-traditional land and resource use; and 2) subsistence economy and land use.

Non-traditional Land and Resource Use

Commercial land use consists primarily of sport hunting, tourism, mineral exploration, and transportation and shipping. Seasonal lodges and adventure tourism companies operate throughout the Kitikmeot Region. One is located near the community of Bathurst Inlet (the Bathurst Inlet Lodge). Ecotourism activities include boating in Bathurst Inlet, hiking, sightseeing, and culture and nature interpretation.

The only interaction between the Project and non-traditional land and resource use is predicted for ecotourism activities potentially affected by: changes in access to land and resources; changes to the experience of the natural environment; and changes to the abundance and distribution of resources. The management and mitigation measures can be found in both built-in Project design components, as well as specific additional measures that were developed based upon identified needs. Mitigation has been identified as it specifically applies to noise and vibration, and air quality.

Contingent upon implementation of the mitigation measures, any residual effect on non-traditional land use is predicted to be Not Significant.

No cumulative effects or transboundary effects are expected.

Subsistence Economy and Land Use

The Inuit culture and way of life are intrinsically connected with the land. The Inuit people of the Kitikmeot have always depended on Inuit Qaujimajatuqangit, or knowledge of the land and environment. Subsistence land use such as hunting, fishing, trapping, and gathering take place throughout the land use RSA. Approximately 10 to 20 active hunters continue to hunt in the Bathurst Inlet area.

Subsistence economy and land use is potentially affected by: changes in access to land and resources; changes to the experience of the natural environment; and changes to the abundance and distribution of resources. There are several management and mitigation measures in place which serve to mitigate impacts to the subsistence economy, including: mitigation by Project design; best practice management measures; and monitoring. Subsistence land use activities will also be facilitated through the provision of the worker rotation schedule, fly-in/fly-out Project operation, and support of land users and the development of land use knowledge. Mitigation has been identified as it specifically applies to noise and vibration, and air quality. Ongoing communication with local individuals and communities will be facilitated by regular public meetings and meetings with the Cambridge Bay and Kugluktuk Community Advisory Groups (CAGs), amongst other methods.

After the implementation of mitigation and management measures, the negative residual effects on the VSEC subsistence economy and land use are rated as Not Significant. In addition, the benefits of

the Project may serve to maintain traditional subsistence land use to a greater extent than would be possible without the economic growth and employment income associated with the Project.

A potential cumulative effects assessment was conducted. Overall, the three residual cumulative effects are each rated as Not Significant.

Kitikmeot Region land users did not report travel outside the NSA for the purpose of subsistence harvesting. As a result, the Project is not expected to result in transboundary effects on subsistence land users.

Country Foods

Country foods are animals, plants, and fungi used by humans for nutritional or medicinal purposes that are harvested through hunting, fishing, or gathering of vegetation (Health Canada 2010). These foods are an important part of a healthy diet, have medicinal qualities, and are of high cultural and traditional importance. People obtain country foods by hunting, trapping, and collecting (berries, mushrooms, and medicinal plants) from the LSA, and by fishing inside and downstream of the LSA.

The quality of country foods is directly related to the quality of the surrounding soil, water, and vegetation.

There are a number of Contaminants of Potential Concern (COPCs) that may be present in the country foods during the life of the Project including compounds used in mineral processing, chemicals found in treated sewage effluent or blasting residues, and fuels. In addition, by-products of combustion such as polycyclic aromatic hydrocarbons (PAHs), dioxins, and furans may also be present due to the operation of vehicles or incinerators. Extensive mitigation and management measures will be in place to minimize or eliminate potential effects on air, water, sediment, soil, and vegetation as well as country foods (fish and wildlife).

Based on the available information, Project-related effects to the quality of country foods are not expected to lead to changes in human health. No residual effects were identified and no health effects to human consumers of country foods are expected as a result of the Project activities or infrastructure during any phase of the Project. As there are no anticipated Project residual effects, there are no potential cumulative effects or transboundary effects.

Human Health and Environmental Risk Assessment

Human health and environmental risk assessments involve comprehensive and systematic processes designed to identify, analyze, and evaluate the effects of the Project on environmental and human health. Baseline studies reviewed the existing levels of contaminants and noise in the local and regional study areas of the Project to establish a benchmark for evaluating the potential future effects of the Project and to characterize pre-disturbance conditions for the purpose of reclamation activities. As part of the human health and environmental risk assessment, data were reviewed for air quality; freshwater and sediment quality; marine water and sediment quality; freshwater aquatic resources and fish; marine aquatic resources, fish, and wildlife; soil and vegetation; terrestrial wildlife; country foods; and noise.

The environmental risk assessment identified 13 VECs important to the assessment of Project effects on environmental health associated with the freshwater environment, the marine environment, or the terrestrial environment. For all factors assessed, the project would not contribute negatively to overall human health and environment health.

Effects of the Environment on the Project

Extreme weather events such as storms, elevated rainfall or snowfall, frigid temperatures and geotechnical hazards such as seismicity, ground and slope instabilities, all have the potential to affect Project infrastructure and in turn represent concerns for human safety and the environment. Structures must be built to withstand local environmental conditions to ensure uninterrupted Project operations, maintenance of Project assets, and safety of personnel. Sabina has assessed these potential environmental effects and incorporated them into the Project design.

Included in the context of extreme weather is the potential for global climate change to affect the Project. The flat terrain and permanently frozen subsoil also add to the engineering challenges which the Project must surmount. Climate change may result in an environment that is different from current conditions; less severe winters, changing precipitation patterns or other considerations may impact future operations and affect the operation of infrastructure associated with the Project.

Preliminary design to mitigate these environmental effects is presented. This design is based on best management practices, similar operations, and general climate change predictions as site-specific thermal models. Sabina has completed a qualitative assessment of how global climate change could affect Project infrastructure. Possible future effects of a changing climate on the Project include:

- Changing sea ice conditions, sea level rise, and coastal erosion may impact inbound and outbound shipping of fuel and product at Bathurst Inlet; and
- Warming temperatures may affect permafrost in the vicinity of the Project site, potentially leading to an increased active layer thickness. This could directly affect infrastructure at the Project site in the long-term.

The specific interactions between the climate risk factors identified above and Project infrastructure or operations are discussed in individual impact assessments elsewhere in the FEIS. However, based on the Project lifespan, it is anticipated that the effects of a potentially changing climate on the Project are not significant.

Accidents and Malfunctions

Despite an ongoing effort to identify and manage risks, major accidents and malfunctions may occur through natural events, breakdown of mitigation measures, or human error. Understanding the factors that govern whether such risks are likely is essential to a proactive environmental management approach. Sabina will seek to minimize the risk of accidents and malfunctions, along with ensuing consequences to people and the environment. Management systems will mitigate most risks and limit consequences through:

- prevention of accidents and malfunctions via training, awareness, education and equipment maintenance;
- assessment of the risk of accidents and malfunctions throughout the design phase;
- employment of adaptive management procedures to ensure continual appraisal of risks; and
- design and implementation of effective emergency response plans and contingency plans.

The list of potential malfunctions or accidents associated with Project facilities and activities include: spills, vehicle accidents, helicopter crashes, uncontrolled discharges, fires, explosions, and sediment releases.

For all of the accidents or malfunction events screened to interact with the Project, the residual human and ecological effects were assessed to be minor, not detrimental, or the effects are considered manageable contingent upon the application of the precautionary approach in design and implementation of the management plans detailed in Volume 10.

Project-Related Effects Assessment Conclusions

Results from the Project-related effects assessment identified non-significant residual effects, but no significant residual effects. All identified residual effects were either of low magnitude, confined to a localized area, reversible, or short term once mitigation and management measures were considered. Positive residual effects were identified for the VSECs economic development, business opportunities, employment, and education and training.

Hence, the overall affect of the Project on the atmospheric, terrestrial, freshwater, marine, and human environments is determined to be Not Significant.

Cumulative Effects Assessment Conclusions

Potential cumulative effects assessments were conducted for each VEC or VSEC that had an identified Project-related residual effect.

Results from the cumulative effects assessment identified no significant residual cumulative effects. All identified residual cumulative effects were either of low magnitude, confined to a localized area, reversible, or short term once mitigation and management measures were considered. Positive residual effects were not included in a potential cumulative effects assessment or transboundary analysis.

Hence, the overall effect of the Project to act cumulatively with other past, present or reasonably foreseeable future projects on the atmospheric, terrestrial, freshwater, marine, and human environments is determined to be Not Significant.

Transboundary Assessment Conclusions

The transboundary nature of residual effects was addressed as part of the cumulative effects assessments, and no significant residual cumulative effects are anticipated.

Hence, the Project is not expected to result in significant transboundary effects to the atmospheric, terrestrial, freshwater, marine, and human environments.

Summary of Conclusions

Overall, the Project is expected to result in no significant negative effects (residual, cumulative or transboundary) to the atmospheric, terrestrial, freshwater, marine, and human environments. The Project will result in positive effects on various socio-economic aspects including local employment and skills development.

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[illegible][illegible][illegible]

የኢትዮጵያ ልብ ወለድ	የጥያቄው ዝርዝር	የሰነድ ቁጥር	የሰነድ ቀን
የጥያቄው አገልግሎት	የጥያቄው ዝርዝር፣ የሰነድ አገልግሎት፣ የሰነድ አገልግሎት፣ የሰነድ አገልግሎት	4	-4 to -1
የሰነድ አገልግሎት	የሰነድ አገልግሎት፣ የሰነድ አገልግሎት፣ የሰነድ አገልግሎት፣ የሰነድ አገልግሎት	10	1 በሰኞ 10
የሰነድ አገልግሎት	የሰነድ አገልግሎት፣ የሰነድ አገልግሎት፣ የሰነድ አገልግሎት፣ የሰነድ አገልግሎት	8	10 በሰኞ 18
የሰነድ አገልግሎት	የሰነድ አገልግሎት፣ የሰነድ አገልግሎት፣ የሰነድ አገልግሎት፣ የሰነድ አገልግሎት	5	18 በሰኞ 23

$\Delta \rho \Delta J^c \Delta D^{fb} C \Delta \epsilon^{fa} Q^{fb} D^{fb}$

[illegible][illegible]

[illegible]

Δ⁹-CΔJN^c P₀ΔL^cΔP₂N^c ΔL₃ ΔD_cJN^c

[illegible][illegible][illegible]

$\Delta^{\text{b}} \Delta^{\text{c}} \sigma^{\text{b}}$ $\Delta^{\text{c}} \Delta^{\text{c}} \sigma^{\text{b}}$

[illegible][illegible]

[illegible][illegible][illegible]
$$\underline{\wedge^{\mathfrak{c}} d \cap^{\mathfrak{c}} \lhd \triangleleft \triangleright^{\mathfrak{c}} \sigma^{\mathfrak{c}b}}$$
[illegible][illegible][illegible][illegible]

[illegible]

ᐅᓴᑦᑲ ᐃᒋᕗᑲᐣᐃ ᐃᑦᔪᑦᑲᕗᔫᓂᓚ ᑲᒪᒋᓴᑦᑳᓄᑦ

[illegible][illegible]

$\Delta^{\epsilon} b \sigma^b \rho^b c^c \rho^b c^c \sigma^c \Delta^{\epsilon} \supset \Delta^{\epsilon} \sigma^c \Delta^{\epsilon} \delta^{\epsilon} \Gamma$

[illegible][illegible][illegible][illegible]

ገጽ ፭

[illegible]

[illegible]

$\Delta \nabla \Gamma \triangleright C_{\sigma} \sigma^{\epsilon} \Gamma^b \wedge C_{\sigma} \Delta^{\epsilon b} \sigma^{\epsilon b} \text{ bLr } \gamma^b \sigma^{\epsilon b}$

[illegible][illegible]
$$\Delta L^{\epsilon} \Gamma^b \text{ bLr}^{\epsilon} \text{b}^{\epsilon} \sigma^{\epsilon} \text{ b} \triangleleft \triangleright \text{c}^{\epsilon} \gamma^{\epsilon} \sigma^{\epsilon} \text{ b}$$
[illegible][illegible]

ርዕሰ ጉዳዩ ሲሆን ለግልጽ ምላሽ ለሚገባው ጥያቄ ምላሽ ማስገባት ነው። ለዚህም ምላሽ ማስገባት ለሚገባው ጥያቄ ምላሽ ማስገባት ነው። ለዚህም ምላሽ ማስገባት ለሚገባው ጥያቄ ምላሽ ማስገባት ነው።

[illegible]

[illegible]

$\Delta L^{\text{ኛ}} \propto L^{\frac{2}{3}} r^{\frac{1}{3}} \omega^{\frac{1}{3}}$ ንዚ ይገኝ ፡

[illegible]

$L \triangleright \sigma^a L \triangleright \zeta^a \sigma^b \Delta^b$ ካሁን $L^{\zeta^b} \zeta^b C \triangleright \sigma^a L$

[illegible][illegible]

[illegible]

የኮሚሽኑ አባላት ለሚኒስቴሩ ማስቀመጥ ያለባቸው ጥያቄዎች

[illegible][illegible][illegible][illegible]

[illegible]
$$L^{\infty} L^b d^c \Delta_c \triangleright \sigma^a \Gamma^c$$
[illegible][illegible][illegible][illegible]

ΔοΔ^c ἑβδελζδἑβ^ορ^c

[illegible]

[illegible]

ልረሰር ሙረባኤፍልሮ ሶራሲሞሙ ልረርሳዊሶሪረ ልረኤኤጋሮ ስኤበሰከሪሪሪሪሪ ልረረ ልከረኤርረረረረ
 ሙረራሪ ሙረሪ ልጋኤበረረረ ሙረ ልከረኤኤጋሪ ልሪሪረረረረረረረ ልሪረረረረረረ ልጋረረረረረረ
 ሙረረረረ ለረረረረረ ሙረረረረ ለረረረረ ጋረረረረ ሙረ ልጋኤበረረ ረረረረረረ ስኤበሰከረረረረ
 ልረረ ልረረረረረረረረ ለረረ ረረ ሲረረረረረረ ረረረ ልጋኤርረረረረ ሙረረረ ልረረ ረረረረረረረረ
 ረረረረረረረረ ረረረረረረረረረ ልጋከረረረረረረረ ልረርሳዊሶሪረ

[illegible][illegible]

◁▷⁹σ⁹bᶜᶜᵁᶜσᶜᵣᶜ

[illegible]

$$\rho_{\text{CCO}} \sigma^{5b} (\Delta^{\text{L}} \nabla^{\text{C}} 4)$$

- ንፍልጣት ንጥራት (ፍልጣት፡ ልዩነት ንጥራት ኣገልግሎት፣ ምልክት-ፍልጣት ኣገልግሎት ልዩነት)
- ልዩነት ንጥራት፡ ምልክት-ፍልጣት

00 400725 (Δ 4445)

- [illegible]

ርዕሰ ልሳን ነገረ ሰላም ለደብዳቤ (በጥናት/ሥራ 6)

- [illegible]

$$\Delta L \sigma^{sb} (\Delta^{b\bar{b}c})$$

- [illegible]

$$\Delta \mathcal{O}^{\mathfrak{b}} \mathfrak{A} \Delta^{\mathfrak{b}} \mathcal{C}^{\mathfrak{b}} \mathcal{D}^{\mathfrak{c}} (\Delta^{\mathfrak{z}} \mathcal{V}^{\mathfrak{c}} 8)$$

- [illegible]

[illegible][illegible]

[illegible][illegible]ooΓ▷CΔ^c

$\partial \Gamma \wedge P^{\flat} J^c \text{ } ^{\flat} b \partial C^{\flat} L \sigma^{\flat} L \rhd \partial \text{ } ^{\flat} L$

ለጥናታችን ትኩረት ሰጥተው የሚመዘግቡ አካል ይሆናል።

ለጥናታችን ትኩረት ሰጥተው የሚመዘግቡ አካል ይሆናል።

[illegible][illegible]

כ"ב

[illegible][illegible][illegible]

[illegible][illegible][illegible][illegible][illegible] $\Delta^b \zeta \Delta^c$ [illegible][illegible]

[illegible][illegible][illegible][illegible] $\Delta \Gamma^2 L^2$ [illegible][illegible][illegible]

[illegible][illegible]

$\gamma_b \delta^c \Gamma^{\gamma b} \delta^c \omega \rightarrow \Delta L \nu \Delta^c$

[illegible][illegible][illegible][illegible]

[illegible]

$\cap^{\mathfrak{a}} \Gamma^{\mathfrak{c}} \Delta^{\mathfrak{a}} \Gamma^{\mathfrak{c}} \zeta^{\mathfrak{b}} \zeta^{\mathfrak{c}} \zeta^{\mathfrak{b}} \zeta^{\mathfrak{c}}$

[illegible][illegible][illegible][illegible]

$\rho^{\mu} \gamma_{\mu} \Delta^{\nu} \gamma_{\nu} \Delta^{\rho}$

[illegible]

[illegible][illegible]

ငါ့အဖေအမေတို့အား

00Δ< 5b²ℓσ Δℓ^{5b}

[illegible]
$$\Delta L \gg C/\gamma^q j^{qb} < b_0 \Delta^a \sigma^q l \lesssim L \sigma^q l$$
[illegible]

[illegible]

$C^{\gamma} \Gamma \triangleright C^{\gamma b} \Delta L^{\gamma b} \hookrightarrow L^{\gamma} \Gamma^{\gamma} \sigma^{\gamma b} \sigma^{\gamma} L$

[illegible]

CPGDCΔ^cΔ^bΔ^cΔL^cPGDCΔ^c

[illegible]
$$C^{\gamma} \Gamma \Delta C \sigma^b \Delta^{\gamma b} \gamma^b \gamma^b \gamma^c \partial \partial \dot{c}^c$$
[illegible]

[illegible]

Cn▷^cΓ▷CΔ^c

[illegible]
$$C_n \triangleright \Gamma \triangleright C \Delta^c \Delta L^{\text{fb}} \text{ ካላቸው } L \sigma^a \bar{L} \rho^c$$
[illegible][illegible][illegible]

[illegible]
$$\Delta \dot{L} \sigma \Delta \epsilon^b \epsilon^L \epsilon^b \sigma \epsilon^L$$
[illegible][illegible][illegible]
$$C_{\alpha} \Delta^{\alpha} \Gamma \Delta C \Delta^{\alpha} \Delta^{\alpha} b \Delta^{\alpha} \Delta \sigma \Gamma^{\alpha} \Gamma^{\alpha} \Delta$$
[illegible][illegible][illegible][illegible]

$$\Delta L \, {}^{\circ}\Gamma \triangleright C \Delta^c \, C \Delta \triangleright \Gamma \, \Delta^{\circ} b \triangleright \Delta^c$$
[illegible][illegible][illegible]

ΓΟΓΟΓΓΔΔΔΔΔΔΔΔΔΔ

[illegible][illegible][illegible][illegible]

$$Q^{\zeta\zeta}$$
[illegible][illegible]
$$\Delta C^{\epsilon} \sigma C^{\epsilon} b^{\epsilon} \delta^{\epsilon} \Delta \sigma^{\epsilon} \rho^{\epsilon}$$
[illegible][illegible][illegible]

ኃላጋው ምክር ቤት ለጋራ ጥራት ማረጋገጥ ለሚችል ሁኔታ ማፍጠር ይገባል፡፡

[illegible]
$$\Delta\rho_{\sigma^a}\sigma^b-\dot{\rho}_a\Delta\gamma_{\sigma^a}\sigma^b$$
[illegible]

ታሪካዊና ልማዳዊ ልዩነቶችን ማስታወሻ ማድረግ አለብን፡፡ ሌሎችም ማስታወሻዎችን ማድረግ አለብን፡፡ ለምሳሌ፡፡ ልማዳዊ ልዩነቶችን ማስታወሻ ማድረግ አለብን፡፡ ሌሎችም ማስታወሻዎችን ማድረግ አለብን፡፡

ለድርጅቱ ልማት

የዋናውን ልማት ማስታወሻ ማድረግ አለብን፡፡ ሌሎችም ማስታወሻዎችን ማድረግ አለብን፡፡ ለምሳሌ፡፡ ልማዳዊ ልዩነቶችን ማስታወሻ ማድረግ አለብን፡፡ ሌሎችም ማስታወሻዎችን ማድረግ አለብን፡፡

ለሀገራችን ልማት ማስታወሻ ማድረግ አለብን፡፡ ሌሎችም ማስታወሻዎችን ማድረግ አለብን፡፡ ለምሳሌ፡፡ ልማዳዊ ልዩነቶችን ማስታወሻ ማድረግ አለብን፡፡ ሌሎችም ማስታወሻዎችን ማድረግ አለብን፡፡

ዲፍሰት ልማት ማስታወሻ ማድረግ

ዲፍሰት ልማት ማስታወሻ ማድረግ አለብን፡፡ ሌሎችም ማስታወሻዎችን ማድረግ አለብን፡፡ ለምሳሌ፡፡ ልማዳዊ ልዩነቶችን ማስታወሻ ማድረግ አለብን፡፡ ሌሎችም ማስታወሻዎችን ማድረግ አለብን፡፡

$$\Delta^{\epsilon_b b_Q} \Delta^{\epsilon_L L^b} \Delta^c$$
[illegible][illegible][illegible][illegible]
$$\Delta C^a \sigma \nabla^{\zeta} \sigma^{\zeta b} \Delta C^a \sigma \nabla^{\zeta b} \cap \cap \sigma^{\zeta b}$$
[illegible]

[illegible][illegible][illegible]

$\nabla^a \sigma \nabla^b \zeta_a \nabla^c \gamma_{bc} \sigma = -\frac{1}{2} \nabla^a \sigma \nabla^b \rho \Delta_L \gamma_{ab} \sigma$

[illegible][illegible][illegible]

[illegible]
$$\partial\partial\Gamma^b\triangleleft\triangleright^{\varsigma}\sigma^{\varsigma b}$$
[illegible]
$$\Delta \partial \Delta^c \text{ } \partial \partial \mathcal{J}^b n \text{ } \mathcal{I}^c \mathcal{I}^c \text{ } \Delta \mathcal{J}^b \mathcal{C} \mathcal{D} \sigma^c \mathcal{I}^c \text{ } \partial \partial \mathcal{I}^c \mathcal{C}^c \mathcal{I}^c \text{ } \mathcal{J}$$
[illegible][illegible][illegible]

መጠንቀቃሪያ ስራዎችን በጥቅምት 2019 ዓ.ም. ለማጠናቀቅና ለመጀመሪያ ጊዜ ለማድረግ ይህን ደብዳቤ አቅርባለሁ።

[illegible][illegible]

[illegible][illegible]
$$\Delta \partial \Delta^c \sigma^{\epsilon} \rho \mathcal{D}^{\epsilon} b^{\epsilon} \epsilon^{\epsilon} \rho^c$$
[illegible][illegible][illegible]

ፈጽሞ ለሕግና ለጥበቃ ምክር ቤቱ ለሚገኝ ስልጣን ምክር ቤቱ ለሚገኝ ስልጣን

[illegible][illegible]

ᐅᑲᓃᐱᓂᕐᒪ ᐅᑦᑎᑦᑎᓂᑲ ᐱᑦᑦᑲᐅᕐᑭᑦ

[illegible][illegible][illegible]

- [illegible]

- [illegible]

$\Delta^{\epsilon_2} \gamma_{\Delta^{\epsilon_1} P} \sigma^{\epsilon_b} \Delta L \gamma_{L^c} \Delta^{\epsilon_c} R^{\epsilon_d} \Delta^{\epsilon_e} Q$

[illegible]

- [illegible]

[illegible][illegible]

ለፍርድ ቤቱ አባል ሆኖ በፍርድ ቤቱ ስር ለሚገኝ ሁሉም ጉዳዮች ለሚገኝ ሁሉም ጉዳዮች ለሚገኝ ሁሉም ጉዳዮች

[illegible][illegible]

$$\Delta^b \wedge J^r J C \triangleright \sigma \triangleleft {}^{\mathfrak{c}b} \triangleright \sigma^b \text{ } {}^{\mathfrak{c}b} \triangleright \lambda^r C \triangleright \underline{C} \triangleright {}^{\mathfrak{c}b} \triangleright^c \Delta^r \text{ } \text{ } \text{ } \sigma^a \text{ } \sigma^r$$
[illegible][illegible][illegible]

ወደፊት ሕዝብና ጥናታዊ ምርመራዎች ምክር ቤቱን ለማሳደግ ይረዳሉ።

መደጋገሚያው የፌዴራል ፍርድ ቤት የፍርድ ምርመራ ሪፖርት ላይ የተመሰረተ ሲሆን፣

CΔL^aα, ΛCηΔ^ψ_b Δbd^ψπCΔ^ψ_bππσΔ^ψπC^ψ_b ወደሩ ንኲንፍይሊኖርCDΠJበኢየሞቅ
Δbd^ψπCΔ^ψ_bππσΔ^ψπC^ψ_b ላምጎኒኔ)ናስልፀፀፀ, ለጎኑ)ሙ, Cፂሙ, Cሁሙ ልዎሚኃ.

၁။ အခြေခံဥပဒေနှင့်အညီ

[illegible]

Atanguyat Onipkangit

Una Hanningayomi Kuungani Havaghak (una Havagiyaoyok) toghiotaohimayok gold-nik uyagaktakviovomavloni havagiyaoyomayok nanminigiyaat ukkua attikaktot Sabina Gold & Silver Corp. (Sabina) eloani haffuma Oatani Kitikmeotni Aviktoghimaningata Nunavut.

Una Havagiyaoyok ilaliotihimayok hapkununga pingahunot ihomagiloaktaitnun havaghagiyaitnot paaktaotiyonik okioni apkohioktaoviokataklotik hapkunani: una Goose-mi havagiyaoyok, una George-mi Havagiyaoyok, tatvaniloTagiokmi Laydown Kaningani takunaktok una hinnigahugo hamna kivamuyok tahamunga kivatani Kilohiktop. Sabina-kut hanaighihimaliktot haffuminga Avatilikinikut Kanogiliyokaknikat Parnaiyaotighanik naonaiyaotigivlugit hapkua etogahoakutigivlugit avatilikinikut uvalu inolikinikut alangokpaliatjutighait pitjutigivlugo hamna Havagiyaoyok hamna malikatjutiginahoaklogit hapkua Nunavumi Nunatakutaita Angekutat uvalu ukkua Nunavumi Kanogiliyoakakhimanikat Ihivgioktiovtot Katimayiita Malikakiyait hamna Hainnaiyaotaovaktot hapkununga Avatilikinikut Kanogiliyokaknikat Parnaiyaotighanik tatvani Hanningayomi Kuungani Havaghak (NIRB File No. 12MN036; NIRB 2013).

Sabina-kut tonighimayot hannayomavlotik uyagaghiokvikmik kayagnaitpiaktomik, avatilikinikut namatiaktomik, uvalu ikkayotaoyunngaktomik tamaitnun kitionot ilaokataoyonot. Sabina-kut pinahoakniaktot nakoatoklotik monagitiagaloaklogit hapkua inuit anniaktailitjutighait uvalu manigak monagitiagahoaklugolo hapkua manighiotighat pivalianikut ihomagilogit. Hamna Havagiyaoyok hatkitiniaktok hapkununga ihagiagiyaoloaktonik iliaotighanik uvalu havaghanik oktogomayonot, tatvalo amigaikpalioatoniaktok ikkayotighaitnik hapkununga togaghimayonik inuknun Kitikmeotni aviktoghimaningani uvalu Nunavummiunot tamatikloget. Maniktoghotik Naonaiyaotigiyait hapkua enektaohimayot Aktopa 2013-mi, nakuatot naonaiyaotaohimayok hamna pivaliatjutighaitnik uvalu maniliokutighaitnik tatvani Hanningayomi Havagiyaoyok.

Uyagaghiovikhami Parnaiyaotaoyok

Una uyagaghiovikhsmi parnaiyaotaoyok naonaipkutikaktok etkokahoaklogo 10-nik okionik havakvioloni aolaniaktok uyagaghiovikvioloni taima kaoyimayaoligami ublomimut, uyagaktakvighait hapkua kititjugit emagalok 15.0 million tonnes-nik akyaktaokataklotik tatvunga atahikmot hikomivighanitnun uyagaghioikhimayait tatvani Goose-mi Havakvigiyatni. Huli nalvakhioikhimakniaktot hamna aolahimakutighanik haffuma Havagiyaoyop uyagaghioikhimakvighaitnik. Taimainiakat angiklivaliatjutigha haffuma significant Havagiyaoyok pityotaoyagiakniaktok hamna huli Avatilikinikut Naonaiyaotighata aolatjutigha.

Una Havagiyaoyok ilaliotihimayok hapkununga uyagaktakvighaitnun ihomayigaoyok hapkua: Umwelt, Llama uvalu Main tatvani Goose-mi Havagiyaoyomi; Lone Cow Pond North (LCP North), Locale 1, uvalu Locale 2 tatvani George-mi Havagiyaoyomi. Aipagukaikpat omiakut akyaktaotighait enektaoniaktot atoklogit hapkua Tagiokut omitjat engayangat atoklogit, uvalu hapkua okiomi hilokut apkohioktait atoktaoniaktot hapkua paktakviolotik hapkununga havakviovonot.

Hapkua uyagaktaktait havagiyaoniaktot atoklogit hapkua angaomayok nunap kangani uyagaghiovot uvalu nunap iloani atogaovaktot tatvunga ahalotikut akyaktaklogit tatvunga uyagaktaktaitnik ehoaghakvigiyatnun tatvani Goose-mi Havagiyaoyomi tatvani uyakat hikoptiklogit havagiyaoniaktot. Uyagaktaktait tatvunga tamaitnik Goose-mi uvalu George-mi Havagiyaoyoni ehoaghaktaoniaktot tatvani atahikmi havakvigiyatni tatvalu hapkua ekaktoghat atoktaolaitot totkoktaoniaktot kaffioyoni ehoaghaktaohimayoni totkokvighaitni kangani nunami uvalunin nanikpani totkokviovoni tapkunani

havakvioyoni. Hapkua koviogakvioyot tatvanga uyagaktakvioyomit totkoktaoniaktot tatvani ataohikmot Koviogakvioyomot hanikpaniitomi kanigiyan haffuma uyagaktakvioyop.

Havagiyaoyop Eliitkohigha

Hamna Havagiyaoyok tatvani Hanningayomi aolaganginakniaktok ema 29-nik (havagilugit Havakvikmi Hanaiyaknik tatvunga Omiktikutighainiklo). Tatva hamna nigikiyaoliktot hapkua havaghat Havakvighami hannaiyakpalialotik aolakutigomik tatvani 2014-mi malikalugo taima malgoknik ukkionik igluliopalialotik takulugo una (Naonaipkuta 1).

Hamna Aolaninga Havagiyaoniaktup nigigiyaoyok emakak 8-nik 10-nut okionik, naonaighimalikmata hapkua uyakat nalvaktaohimalikhutik. Sabina-kut huli nalvaghioghimaakniaktot uyagaghioghimaaklotik tahamani kaningani uvalu huli nalvaffiaknigomik hamna angaomaninga etotat imakak 10-nik okionik kangiffaklugo.

Hamna gold uyagaktakniaktaat aolaginagalaitok nunguniaktok ilihimayaat, tatva kakukugalok hamna uyagaghiokvioyok omiktaoniaktok naonaitok haliktaovalikloni pektaokpiakloni. Hamna havgiyaoloni, nigigiyaoyok aolahimaakniaktok emakak 10-nik okionik havagiyaovakloni, Etoptoklogit hapkua igluutait, tatvalo otiktinahoaklugo hamna nuna iglukakvigihimayaat taimanitot halumaktigahoaklugo avatilikitjutinot ihoiyaotaongitangani. Tatva omighimalikat, kimilgoktaokatainakniaktok namigihimagomavlugo hamna nuna uyagaktakviahimayok ihoiyaotikangitangani huangayunik uvalu iliitkohitoka naovalianigiaghanik.

Naonaiyaota 1. Havagiyaoniaktot

Havakhait	Enekvikhat	Okiot (Havaginiaktait)
Uyagakyakvikhap Hainaiyaotait	2 okiok	2014-2016
Iglukpiuktot	2 okiok	2016-2017
Aolatjutikhait	10 okiot	2017-2026
Haligaknia Omiktiknialo	10 okiot	2027-2037
Omiktaohimalikat Kimilgokninga	5 okiot	2038-2043

Tatva hamna Havagiyaoyok havagiyaohimaaktitlgo, Sabina-kut kinnighiahimaakniaktot ayungitonik havaktoghanik tatvani uyagaghiokvikmi nakuatot kayagitiaklotik tatvalo hivuliotinahoaklogit hapkua okioktaktokmiot havagomayot.

Himaotighait

Himaotighait tatvani Havagiyaoniaktomi naonaiyaktaohimaliktot malikavlugit hapkua havagiyaait: kagitaoyakutighaita naonaiyaotait; akiliktotaoniaktot; kangogiliyokaknikat hapkuni avatilikinikut; uvalu ehoaghaotighait hapkuninga haligaotighaitnik omiktaohimalikat uyagaghiokvik. Okaotaohimayot katimakatigivlugit nunaliitni uvalu kavamatkut katimakatigihimangmatjuk ihomakhutaohimayot hinaotighait naonaiyaotaita ubalu naonaiyaihimakutighait, unalo naonaiyaotaoniaktok ilaliotilugo nunaliit namaginiakatjuk uvalu naliak namagikmatjuk, emakak namakiyaoningit ehoakutighait hapkununga inulikinikut - pivalianikhakut ikayotighaitnik.

Malgok ukkua himaotighait naonaiyaktaohimaliktok. Una hvulikpak naonaipkutat hapkuninga alatkinik oktotighanik tatvani Havagiyaoniaktomi hapkua ihomagiloaghugit, oktotigilugo hamna nunaap kangani uyagaghiokvighak tatvaonganit iloagot nunaap uyagaghioknik. Hapkua ihomakhutaohimalikata pitjutaoniaktot angetkiyanot himaotighaitnun, hapkua aipangit himaotighaginiaktait ihomaghutaoniakmiyot ehoaghivaliotighait tatvani havakvioniaktomi. Hapkua himaotighait

ihomaghutaohimaakniaktot naliaknot ihomagiyaoloaktonot tatvalo naliak nakunighaokpata naonaiyaotait oktotigiloakniaktat ihoakutighak. Hamna hannaviyok havagiyaoloalikata hapkua himaotighait ehoaghaktaohimakniaktait tatvalo himaotaoloaktot ehoatkiyaonikata tatvani Havagiyaoyomi parnaiyaotaitni.

Pivaliatjutighait uvalu Aolatjutighaita Pinahoakutighait

Una Havagiyaoyok ihomagiyaat angiyomik inulikinikut uvalu pivalianikut ikkayotaoloakniaktot. Hamna ugaghiokvioniaktok hannayaongitpat, hapua ihomagiyaoyot pitjutighait uvalu ihomagiyaat ikkayohiakutighait piyaoyungnangitot. Hamna kititlugo GDP ikkayotighak etoktaohimayok ema \$600 million talaniaktok iglulioktaovalianiaktitlugo tatvani havakvioniaktomi. Una Havagiyaoyok atkonaotaoniaktok taksiliokutighait maniliokviginiaktaat ematot \$53 million tatlamik ukkua kavamatokatkut kavamatokatkunot uvalu tatva \$44 million tala aviktoklogo hapkununga nunatlanot uvalu aviktoghimayoni kavamakaktonot nanilikak Kanatami hapkua iglulioghimaktitlugit. Una Havagiyaoyok naonaitok ikkayotaoloakniaktot Nunavumionot uvalu huli maniliokutaoniaktok emakak ematot \$97 million talanik Nunavut tugaklogit tatvani malgokni okioni atokniaktomi. Hamna iglulioknik ekokhimayaat havagiyaoloni emailingayoyaklone 6,250-nik havaktikaklotik okkioni havaghimaaktitloget havagiaghimayot naktitlikak Kanatamin.

Kititluget hapkua Kanatami GDP-git atonaotainiaktot tatvanga Havagiyaoyomit nigiyogiyaoyot ematot \$2,857 million talaoloni avatkokmata hapkua 10-nik okioknik havaghimaaktitlugit hapkua uyagaghioktit. Kititloget hapkua taksiliokutait tatvani aolahimaaktitlugit havagiyaat etkomayat ematot \$519 million talaghaotighait, maniliokutiginiaktat \$263 talanik ukkua kavamatokatkut uvalu \$255 talanik ukkua nunalaat/aviktoghimayoni taksilioknikut manikhagilugo. Una Havagiyaoyok pitjutoniaktok atkonaotaoloaklone hamani Nunavumi uvalu ikkayotaoloaklone ematot \$532 million talanik GDP-nik ikkayohiaktititloget Nunavumionik hamna Aolatjutighait havagiyaohimaaktitlugo. Una havagiyaoyok ekokhimayaat havagiyaoloni emailingayoyaklone 28,000-nik havaktikaklotik okkioni havaghimaaktitloget havagiaghimayot naktitlikak Kanatamin kangiknigomitko 10-nik okionik.

Hamna inukangitomi manikami havakvioniaktitlugo, tatvalo unghiktomit tamayanik akyaktakviolone tatvalo hamani Okioktaktomi hila onnaitpiaktitlugo okiomi ayoknaotaoniaktogalokit hapkua tatvani Havagiyaoyomi, taimatot ajikohiongimatjuk ahinni kaplonaat nunaitni Kanatami Havakvigiyaitni. Taimaitmat, una Havagiyaoyok nigiyogiyakaktot hapkuninga akkitoyonik gold-nik uyagaghiokhimayaitnik nalvaguyaochimayonik ublumimut ihomagivlugitlo tatva hapkua gold-nik akkitoghimaaktitloget taimatot akkitokhimalikamta kaffinik okionik. Tatva katakpalialiknikata hapkua gold akkiit uvalu akkitokpalianikata hapkua havaktot manikhagiyakhait, iglukpiukutighaitlo uvalu tamayaotait ikpiginiaktait ukkua Sabina-kut ayokhaotigilugo igluliokiarningni uvalu aolapkgahoaklugo Havagiyaoyok.

Ingilgatjutighait

Hapkua ihomagiyaoyot oktotighait tatvani inukangitomi havakviyoyomi okiogalok ingilgatjutiginiaktat ayaktaotigiloget tingmiaktut, malgok ukkua hikokangititlugo omiakut ingilgayaat tatvunga Kilohiktomit uvalu okiomi apkohioklotik apkohioknik paktakviolotik hapkununga Pingahunot Havakvioniaktunot. Tatvalo okiogalok tamaat mitakvikaklotik hapkunani Goose-mi uvalu George-mi Havagiyaoyungni tatvataok tatvani Tagiokmi Laydown Area-mi tatvani Kilohiktomi milvikakniaktot hikomi okiongotitlugo, uvalu tingiaktot kayalikmik aoyami. Havagiakataktot tatvunga Goose-mi Havagiyaoyomot havagiyaoniaktot tingmiaktut akyaktaokataklotik nanminikaktonit. George-mi Havagiyaoyok havaktighait tingmiakukatakniaktot tatvanga Goose-mi Havagiyaoyomit mikiyokut tingmiaktut. Tatja aolahimaktonik atokhuget hapkua halikaptat naliaknot nalvaghioktot tingmitjutigikataktait aolalimaitot havagihimakmatjuk ukkua Sabina-kut havagivlugit nalvakhioklotik uvalu avatilikinikut kimilgogiaktokatakhtut hamna uyagaghiokvikhak igluliokviotitlugo uvalu aolayaohimaaktitlugo.

Tatvaetkomayaoyok ema 80%-mik hamna aoyami omiat tamayanik akyaktakniaktot hapkunanga Belledune, New Brunswick, ammigaitkiyait tatvangaaklotik Hay River, Nunatiamit. Tamayat akyaktaoniaktot tatvanga Belledune-mit mikkitkiyakut omiakmik atokatakniaktot. Ohokyoat akyaktaokatakniaktot hapkununga omitjat ohokyoakakvikaktonot uvalu tatvangat tiktiktainagomik emakmi toghoakut popotalaktonik nunamot ohokyoakakviknun koviogaktaoniaktot tatvaniTagiokmi Laydown Area-mi. Tamayat tatvangaktot originating Hay River-mit akyaktaokatakniaktot akyaktaotikut omiakut kuuktigokataklotik Mackenzie River-kut Kingaok kangiklugo Kilohiktomut Oatanit tikitlotik. Hapkua tigikataktot aolaktitaokatakotlo tamayat ohokyoakhait tatvunga paagiaktokvioloni akyaktaokatakniaktot tatvungaTagiokmi Laydown Area-mut otakivioloni ohiyakviokataklo ohiliktokviokataktonilo akyaktaokataktoghanik Havagiyaoyunot hikkukut apkohiokhimayokut uvalunin otakiokvigilugo naliaknik omitjanik otimmot akyaktoghanik.

Ukkua Malgok apkohioktaoniaktot tatvunga tikiotiloni Hanningayomi Havagiyaoyok. Una Goose-miTagiokmi Laydown Area-milo Okiomi Apkohioktat ematot 160 km takitigiyok. Una Goose-mi George-milo Okiomi Apkohioktat kipingayok apkot tikiotiyok tatvanga George-mit paakutiloni hapkununga Goose-mutTagiokmi Laydown Area-mut huli Okiomi Apkohioktanot tatva 20 km takkitigiyok. Onataok takkitiyaoyok 220 km takkitigiyok Okiomi Apkohiokhimayomot, Tatva ingilgayakaliklotik tatvunga Havagiyaoyomit tavunga Tibbitt-mut Tahikyoamotlo tatva hamna ihomakhutaovaliayok. Nunakut ingilgannik avatinnoktaotighait havakvionyot ingilgayagiakniaktot tamaat okiogalok aoyamilo aghalotikut ingilgavikhak apkohioktaoloni. Hapkua ingilgayangit apkohiokvighaita paakutikataktot ekatoni, nalokut emaittikataktonik kugaoyakut. Hapkua naloit hannavioniaktot pingahunik amigaikniakata talimangoklogit mikiyonik tummikaliokniaktot, ilangi kokloakvilioktaolotik emmap aolavighaitnik.

Taimaitmat ahokhahnakinga hamna inukangitok havagiyaoniaktup tatva ihomagiyaoloaktot hapkua anniaktailitjutighat uvalu kayangaipkutighat, ilalioitloget hapkua hannatjutighat uvalu tamayaotait aolatjutaitlo. Hannatjutait hapkua aolayaotiagiakaktot uvalu hapkua kayangaipkutighat malikayaotiagiakaktot nalaktaotiaklotik tatva kanogiliyokakniakat ahinnit ikayokighanik pinahoakluni kainginalaitungmat. Tatva taimaitmat tatvani havakvionyomi hapkua havakaktot opalunaktitlugo uvalu monakhikavioyot nigiokiyaoniaktot opalonaikhimainaklotik.

Havagiyaoyomi Tamaghait Aolatjutighaitlo

Tapkunani Goose-mi Havagiyaoyok, George-mi Havagiyaoyok uvaluTagiokmi Laydown Area-mi ilikoaktonik aolatjutikakniaktot iglutaitlo tamayaotaitlo, hinniktakvit, atanikakvit, alatinik tamayat totkomaviat, ohokyoaktoktonik ingnikutit koliktotit, tamayakakviit, emmakakviit uvalu halomaitokakviita igluutait.

Una Goose-mi Havagiyaoyok havakvioloakniaktot hapkunani Havagiyaoyoni uyagaktaktaitnik ehoaghaikvikakloni, pingahunik nunaap kangani uyagaghiokvikakloni, ataohikmik nunaap ilagot uyagaghiokvikakloni, tatvalu una iglukpakakvik inukagungnaktot ema 700-nik havagiaghimayonik igluliolikata uvalu 350-nik havagiaghimayoni havakviahimaaktitlugo. Una ohokyoakakvikhak tatamaniaktot ohokyoakakviit namayomik ataohikmi okiomik ohokyoat totkomayaolotik hitamani angiyokjuani 10-million litre-nik (ML) ilalioitlugo una ataohik 5-ML ohokyoakakvik. Tatvalo totkomavikakniaktot hapkua okomaitigiyot 20,000 tonnes-nik hapkua kagaktaotit totkomavighaitnik.

Una George-mi Havagiyaoyok tunngayok tahamani 60 km Hivuggani haffuma Goose-mi Havagiyaoyok tatvalo pingayonik nunaap kangani uyagaghiokvikakniaktot. Kihiani, pihimayakangitok tatvani uyagaktaktaita hikomtikvighatnik uvalu hapkua uyagaktangit mikitiyaoniaktot. Taimaitmat hapkua tamayaotait iglukpiokvighait akkitovalalaitot. Una havagiyaoyok iglukpakakvighak inukagungnaktot 300-nik havaktonik iglukpioktonik uvalu 150-nik Aolatjutaohimaaktitlugo. Una ohokyoakakvighak

hanayaoniaktok pingahunik hapkuninga 5-ML ohokyoakakviknik uvalu totkomavioniaktok hapkuninga 100 tonnes-nik hoangayonik haviktalnik.

UnaTagiokmi Laydown Area-mi tatvani Kilohiktomi tahamaniitok kanningani 130 km hivogani-NW haffuma Goose-mi Uyagaghiokvighatni. Una totkomavioniaktok hapkuninga hannatjutaitnik, tamayaoyaitnik, ohokyoanik uvalu ihoakutighaitnik hapkua iglulioktot uvalu aolatjutighaitnik tatvani Havagiyaoyomi. UnaTagiokmi Laydown Area-mi pikakniaktok malgoknik omitjat tolaktakvighainik, haffumingalo ahivaktaokataktomik tolaktakvighamik, ohiyakvighamik, totkomavighamik uvalu hannavikakloti. Una ohokyoakakvik emiktaokatakniaktot hapkua hitamat 10-ML ohokyoakakviolet uvalu ataohikmik 5-ML ohokyoakakvik. Tatvataok kayangnaikahoaklugo una totkomavioniaktok hapkuninga 20,000 tonnes-nik kagaktaotnik. Una iglukpakakvik inukagungnaktok ematot 100 havaktonik iglukpioktitlugit uvalu 50-nik Aolahimaaktitlugit.

Ikkaktaoyonik Uyakanik uvalu Koviogakvighaita Monagitjutighait

Una Koviogakviokatakniaktok nayugagha tahamaniniaktok Hivugani-NW tahaffuma Uyagaktaktaita Hikoptigikviata. Hamna piyungnakniaktok koviogakvioloni hapkuninga halomailgonik tatvanga uyagaktakvioletonik hamna uyagaktakvioletimaaktitlugo hapkuningalo upingami mannigak aoktokpatiatitlugo uvalu nipaliktitlugo kokloakvioletoni. Hamna kokloakvioniaktok uvalu attakninga illioghaktaoniaktok haffuminga hakugiktomik himmaktailitjutighani (HDPE) kangagot himiktoktaoloni kalliktokpaloktomik tatvanga himatjangitangani koviyoaknikat tatvanga ohokyoakakvikmit.

Goose-mi Havagiyaoyomi atokniaktaot ukkua malgok ikkakokvighak uyagaktaghimayaitnik atoktaongitonik totkomavighaitnik uvalu tatvani George-mi Havagiyaoyomi atokniaktaot ukkua malgok ikkakokvighak uyagaktaghimayaitnik atoktaongitonik totkomavighaitnik hapkua hannayaoniaktot kayangnangitangita hoangayonik uvalu hoangangitonik halomailgonik koviogakviolotik. Una uyagaghiokvighak angmaomainaktitlugo, tatva kititlugit ematot 133,000 kilotonnes-nik (kt) tatvanga uyagaghiokvioletonik halomailgot koviokaktaoniaktot, ilalioitlugit hapkua avatkohimayot. Tatvanganin, Goose-mi koviogakvioniaktot ematot 60,000 kt-nik hapkuninga hoangayonik halomailgonik uvalu 51,000 kt-nik kayangnangitonik hoangangitonik halomailgonik uvalu tatvani George-mi kokloakvioniaktok ematot 7,000 kt-nik hoangangitonik halomailgonik koviogakviolotik uvalu ematot 8,000 kt-nik kayangnangitonik hoangangitonik halomailgonik. Hapkua ikkagoktaohimayot uvalu omiktaohimayot halomailgot Aolagotaoniaktot haliktaokatakotik taima hamna aolayaohimaaktitlugo, tatva havagiyaolotik himiktoktaoniaktot hapkua hoangayot kayangnaktot oluktoktaolotik hapkuninga kayangnangitonik kaliktokpaloktonik taimatot ilalioitiniakmata hapkunnga hikmikhamot kikomayomot nunaap atani.

Atoktaoyughat Uyagakakvioletonik uvalu Uyagaghioktaohimayot

Sabina-kut hananiaktot hapkuninga atoktaoyughanik uyagakakvioletonik uvalu/uvalunin uyagaghioktaohimayot ammiakoinik tatvani Goose-mi ogaghiokvikmi tatva hapkua atoktaoniaktot hikoptiktaohimayot uvalu katighokloget atogaoyoghat okkiogalak atoktaoyughanik apkohiokutigilugit, totkokvighaliokvigiloget, mitakvioletonik taghivaliatjutighanik uvalu atokvigikatakloget igluliokutighanot uvalu hannatjutighaitnun. Hapkua nunaap kangani uyagaghiokvioletonik huli hannaighimainakniaktait uyagaktaghimayaitnik uvalu katighoktaohimayonik pihimainakniaktot atoktaoyoghanik. Tatvani George-mi uvaluTagiokmi Laydown Area-milo, hapkua mikitkiyanik katighoktaohimayonik uyagaghiokvighanik parnaighimaniaktot hannatjutighanik hapkuninga iglukpiolikata. Taimatot atokpalalaitot apkohiokutighanik hapkua uyakat apkohiokutighat atoktaogomik.

Nalvaghioknik uvalu Uyagaghioknik

Hamna gold nalvangovaktok haviktalnikni taimaniknitani uyakatokaoyoni tahamanitot nanilikak Kanatami kaiktoitni. Tatva hamna kiplikninga hapkua uyakat naonaitot ema 5%-mik. Ahianik haviktakangitok

hamna uyagak maniliokutaoyughanik. Hamna gold nalvanguyaoyok tahamaninak ahiani pikangitok taimatot, ilani takughaokatangitkaloaklotik takunaktot igginakhogit. Hapkua uyagaghioktaoyungnaktot uyakat illipkayaoyot tatvani Hanningayoni Havagiyaoyomi kititlogit ematooyok 14,990 kt tatvani 5.85 g/t kipliktonik gold-nik ematot 2,464 Koz.

Hapkua uyagaktaktait tamaitni nunaap kangani uyagaghiokvionyoni (Goose-mi Umwelt-mi, Llama-mi uvalu Goose Main-mi; George-mi Locale 1-mi, Locale 2-mi uvalu LCP North-mi) haliktaoniaktot atoklotik oblumi aolatjutaoyonik ohiliktokataklogit ahalotinot akyaktaotinot oyagaghiokvionyot atokpagaitnik. Tamaita hapkua 6-nit uyagaghiokvighat natkangit kangikniaktait hapkua kiklikhait atani haffuma nunaap kangani oyagaktakvionyot tatvalo kikigha haffuma nunaap kangani uyagaktakvighap natkanga emaitniaktok 200 m atani haffuma nunaap kangata. Unainak Umwelt-mi uyagaghiokvikhak kiklighata avatkutjutigha naonaiyaktaohimaliktok maniliokutaoloakniaktok uvalu iloagut nunaap uyagaghioknik aolagotiniaktat tatvanga 175 m tatvunga 650 m atagut nunaap.

Uyagaktaktait tatvanga Goose-mi uyagaghiokvianin kingighiyaolotik totkoktaoniaktot ematot kiklikaklugit 1 million tonnes-nik hapkuninga nakunighaoyonik uyakanik uvalu kiklikaklugit hapkuninga 3 million tonnes-nik nakuvaktonik uyakanik. Uyagaktaktait tatvanga George-mi uyagaktaktaitnin totkoktaoniaktot tatvani George-mi totkomaviatni. Una akyaktaokatakot uyakanik hikoptigotaat mighiyakniaktait hapkua uyagaktakhimayait tatvanga totkoktaoniaktot (kiklikaklotik 500,000 tonnes-nik) tatvaniniaktot ohiyaoyoghat tatvunga transport Goose-mi Havagiyaoyomut okiomi apkutikalikat akyaktaoyangita.

Tatva naonyaiyaimagamik nalvaghimaliktot kaffinik atkonaknahugivlugit hapkua kinnikvigiyatik tahamani kaningani haffuma Havagiyaoyop. Sabina-kut huli naonaiyaimaakniaktot hapkunani kinniktamingni tatvani uyagaghiokvighak hannayaohimaaktitlugo uvalu aolavalianiaktitlugo emakak haffuma uyagaghiovighap kikligha avatkunnaoaklugo tatja ihomagiyat. Hapkua nalvaghimayait uyagaghioktaoniagungnakhiyot kaningani iglukpakakvilioktaolotik ikkitonik kaningani haffuma uyagaktakviloakniaktatnit tatvani Goose-mi taimatot atoktaoloakniakmata hapkua aolatjutait ihoakutaitlo.

Uyagaktaktainik Ehoaghaotait

Hamna havagiyaohimaaktitlugo, tamaita uyagaktatait ehoaghaktaoniaktot atoklugit hapkua piyominakningit uvalu ihivgiotiaklugit. Haffuma uyagaktaktaita hannavit kiklighait tatva 5,000 tonnes-nik ataohikmi obluani. Pingahuniaktot hapkua illikoaktot hannavighait uyakanik: uyakanik hikoplikviat; namagiyaoyot uyakat totkovighat uvalu ajikotanik mikitkiyanik hikoplighimayonik uyakanik illiogakvighat; uvalu una atoktaoloakniaktok hannavighak uyakanik hikoplikvighak. Hamna hannavighak hikoptikvighak (tamaniknitanik uyakanik) hikoptikakvik, natkanit uyagaktaknik, uyakanik onaktomik hoangayomik atokloni hikoptiknik uvalu gold-nik hikoplikhimayonik kataghimayonik katighoinik. Gold-nik aoktokhimayonik kaimalogiktonik hannaniaktot tatvani hannavikmi aolagakat hamna 300,000 ounces-nik pikatakiaktot ataohikmi okiomi. Tatva enekata tatvanga hannavikmin tingiakut aolaktitaokatakniaktot huli havagiyaoffaktughat ahini.

Avatilikinikut Monagitjutighait

Sabina-kut Avatilikinikut Monagitjutighait Aolatjutighait titigaghimayot tatvani Mapigak 10-mi, titigaghimayot hapkuninga havagiyaoyoghanik hapkuninga Avatilikinikut uvalu inulikinikut-pivalianikut kimilgokataotighaita havaghanik ehoaghaktaokatakniaktot hamna aolahimaaktitlugo Havagiyaoyok. Hamna Aolatjutighat pitjutaoyok hapkuninga parnaiyaotighanik havaktot monaghitjutighaitnik, Hapkua kayangaipkutighaita maligaghat uvalu pivaliatjutighaitnik. Hamna havaginahoaklugo, hapkua illikuaktot monagitjutighaita parnaiyaotait ehoaghaktaohimaliktot ihomagivlugit tamaita ukkua nanminikaktot havagiyait uvalu pitjutikaktotlo hapkuninga naonaitiaghimayonik malgalikinikut oktotighait uvalu kimilgokutighaitnik ehoaghaktaokataktoghanik hamna aolagaktitlugo Havagiyaoyok taimatot

ahivagahoakluget uvalunin hiamangitangita hapkua ihoilotaoniaktot. Hamna Aolatjutighat huli naonaipkutikakniaktot hapkuninga malikayaonginakniaktaitnik aolatjutighanik naonaiyatiaghimayonik maligalikinikut malikayaoyoghanik tatvani Havagiyaoyomi, uvalu hapkua malikayaoyoghat ehoaghaktaohimaliktot haffuma Havagiyaoniaktup ataniktotighainik uvalu hapkuninga malikayaoyughanik pitjutaoyonik hapkuninga malikanik, maligaghanik uvalu laisikhaktagotighait malikayaoyagiakaktitlugit. Tamaita tatvani Havagiyaoyomi havaktigiyait uvalu nanminikaktot malikatiagiakaktot hapkuninga ataniktoiyot parnaiyaotaitnik. Hapkua onipkalioktait uvalu titigaghimayait hapkua ataniktoiyot parnaiyaotaitni, manilikitjutaita ihivgiokutait, uvalu aolatjutait atanioyot ihivgiokutait uvalu ehoaghaotighait tamaita naonaiyaghimayot tatvani Avatilikinikut Atanioyot Aolatjutaitni. Una Avatilinikut Atanioyot Aolatjutat ehoakutaoniaktot kioyagiakakata hapkuninga kimilgokutaoyonik kilamioklotik taima hiamangitangita uvalunin piktaoyangita hapkua ihoilotaoniaktot manikami uvalu inulikinikut-pivalianighakut pitjutaoyot.

Emakmik Monaghinik

Hamna atoktaoloakniaktot emAAP aolatjutigha otiktaotikakloni halomaktikvikaklonilo tatvanga koviogakviovomit. Hamna otikaota papaotikakniaktot tatvani Koviogakviata nayogani una koviogakvikakniaktot uvalu onnaktokvikakloni uvalu oliktoghimayonik nunaap kangakuktonik tohoakakloni. Huli ilalioitakatakniaktat emakmik nakkit emagiktomik ammigakaikpat hamna otiktaktok.

Tatvalotaok, emakiktomik piyagiakakniaktot emiktotighaitnik hapkua emakakviovot inuit atogaghaitnik uvalu hannaviovot atogaghaitnik tatvani Goose-mi Havagiyaoyomi, George-mi Havagiyaoyomi, uvalu Tagiokmi Laydown Area-mi. Ukkua Goose-mi uvalu George-mi havakviatni emiktakatakniaktot tatvanga Goose-mi uvalu George-mi tattitnit, illikut. Huli amikakniaknikata emakmik tatvanga emiktainagiakaktot Propeller-mi Tahikmit tatvani Goose-mi Havagiyaoyomi uvalu tatvanga Fold-mi Tahikmit tatvani George-mi Havagiyaoyomi. Emmap papaotikaknighaitnin elikut emiktakvikakniaktot tamaitni havakviovoni. Ilalioitlugit, una emagikhaotighak papaotighak hannayaoniaktot tatvani Tagiokmi Laydown Area-mi.

Hamna manigak tamaitni hapkunani havakviovoni nakilokak emaihtihimayonik, hangunayonminik kukaoyakakhutik. kihiani, tamaita ihomaghutaoyok hamna havakviovonot emiktaotighaita monagitjutighait emaiyaklogit hapkunani uyagaghiokviovoni ihoiyaotaongitangani. Tatvani Goose-mi uyagaghiokvioloaktomi piyagiakakniaktot mikiyoni kukaoyani emaiyaklogit uvalu parnaiyaghimayayot tatvani Goose-mi mitakvighata ilalioiyaoyughami emaiyagomayat una kukaoyak kokloaktok tatvani ilalioitiniaktatni. Tamakmik ukkua kukaoyak kukloaktok tatvunga Goose-mi Tattimot uvalu hamna emmanga aolalaitok, kihiani hamna aolaninga haffuma kukloakviata tatvunga tatimot alangukungnaktok.

Havagiyaoyagiakaktitlugit hapkua uyagaktakvighait, ilanga uvalunin tammat emaiyagiakakniaktot hapkua tattit. Tatvani Goose-mi Havagiyaoyomi, Llama-mi Tatimi emaiyaktaoyagiakakniaktot pinahoaklugit tatvani Llama-mi uyagaktakvighait. Tatvani George-mi Havagiyaoyomi, ilanga emaiyaktaoyagiakaktok hanalotik kokloakvighanik tatvani malgokni ikkatoni tattini, Lytle-mi Tahikmi uvalu Occurrence Tahikmi, piyagiakakniaktot emaiyaklogik hannayaoyangani ukkua nunaap kangani uyagaghiokvighak tatvani Locale 1-mi Locale 2-mi illikut. Hapkua kokloakvighat hannayaoniaktot himmiktoklogit hiamangitangita tatvunga tattinot. Hamna emaiyaotighak parnaiyaotighat ehoaghaktaoniaktot malikani angiktaohimalikat hanaliktinagit hapkuninga himmiktotighaitnik tapkunani Lytle-mi uvalu Occurrence-mi tattini.

Tamaitni 6-sini nunaap kangani uyagaktakvioniaktot nunaap attain kikkomainakniakmat taimatot nunaap attagot emak annialaitnahogiyaoyok. Emaokangninga aoktungninganit apputip uvalu aoyami nipaligangat papaktaoniaktot tahikaknot. Emaiyaknik nunaap iloagut uyagaktakviovonit piyaoniaktot atoklotik hapkuninga emakmi kivihiimayonik uvalu kangakuktonik papaotinik nanilikak havakviovoni, papakataklogit tohoanik atoklotik. Tatvani Goose-mi Havagiyaoyomi, tamaat hamna emak

hiamaghimayok papaktaoniaktok tatvunga Koviogakviovomot uval tatvani George-mi Havagiyaoyomi, hiamaghimayok emak tohaktutjutaoniaktok hapkununga emalikiyunot tatvani havakviovomi.

Ikakokviovot

Hapua ikaktaohimayot havagiyaoniaktot tatvani ikakokviovoni tamaitni uyagaktakvitni. Hapkua ikaktaohimayot mighilaktaoniaktot, atoktaoffakniaktot uvalunin halomaktiktaoniaktot atoktaoffaktoghat. Tapkunani Goose-mi uvalu George-mi Nanminigiyaitni atokniaktait hapkua ikaktokviovot kayangaitonik ikakatakvigiligit. Hapkua allat ikaktaohimayot kayangaitonik totkokaoniaktot akyaktaokataktoghat ahinot namagiyaoyonot halomaktaokataktoghat atoktaoffakniakata uvalunin ikaktaoyoghat. Tamaitni iglukpakakvikni pikakniaktot ikolativighanik hapkuninga kayangaitonik uvalu ikolayungnaktonik ikaktaohimayonik uvalu totkomavikaklotik kayangnaktonik ikaktaohimayonik. Hapkua annakviknit uvalu halomailgok emmak tatvunga iglukpakakviovonit uvalu hannaviovonit halomaktaoniaktot hapkunani halomailgonik emaknik halomaktikviovoni (Ingilgayomik kaivitomik ihoakut). Halumaktaohimayot annakviitnin milokakhimayot koviogaktaoniaktot nammot ihoaghaktaohimayomot manikamot koviogakvighaitnon, tatvunga Koviokakvikhamot, uvalunin halomailgonik emmaknik koviogakviatnun. Hamna halomailgok koviogaktaotitlugo toghoakut ingilganiaktok hapkua katingalaitotik ihoiyaotaolaitot nunaap iloanitaknik hikmiknik kikomayonik.

Omiktiginik uvalu Halligaknik

Sabina-kut havagiloakniaktat hamna haligaklotik halumaktiginikut havaghat hamani uyagaghiokviovok aolahimaaktitlugo. Hapkua iglulioghimayait ittuptiktaolotik ahivaktaoniaktot atoktaohiakata. Havagitiakahoaklugit hapkua hoangayunik tokunaktonik pitakangitangani omiktiktaotitlugit hapkua uyagaghiokviovohimayot ihomagiloaktait havaginahoaklugit. Hapkua ilalioitlugit havagiyaoyonot poktoklugit uyagaghiokvikmit ikakoktaohimayot (kayangaktonik tokunaktonik pikaktot uyakat ikkaktaoyot uvalu koviogaktaohimayot) hapkualo kayangnangitot uyakat pikahiotilugit uvalu emakmik emiktoklogit hapkua nunaap kangani uyagaghiokviovohimayot. Tatva emiktokpalangitangita hapkua angmaomayot nunaap kangani uyagaghiokviovohimayot tatatitaokatakniaktot tattiniit emakmik pikangitanani hapkuninga huangayunik kayangnaktonik tokunaktonik uvalu anniangitangita havivaloit. Hamna uyagaghiokviop omiktigotigha nigigiyaoyok havagiyaoloni 10-nik okionik uvalu havagiyaoloni pingnahonik havagilugit malikalugit talimat okionik avatkulogitlonit omikhimalikat kimilgokataklugo.

- Havaghak 1 - Nalogik malgok okiok havagihimaaklugit hamna haligaklugit pinnighaotighat uvalu emmiktoghimaklugit hapkua nunaap kangani uyagaghiokviovohimayot emmiktoghimaklugit tatiit emaotaitnik.
- Havaghak 2 - Tikitiklugit 7-nik okionik huli emiktoghimaaklugit hapkua nunaap kangani uyagaghiokviovohimayot Goose-mi havakviovomi.
- Havaghak 3 - Tatva kingolipakmik emaiyaktaoniaktot atoligiakat okiongani 10.

Hannaoyot-maligagiyait atoklugit notangoktikutait nunamik havagiyaoniaktot omiktiklugit hapkua kihingoktaohimayot pingahot Havakviovot. Kayangaktot tamayaotait katighoktaoniaktot ahini ikaktaoyoghat ilalioitlugit hapkua kayangnaktot ahalotit ihoakutait uvalu hannatjutaoyot, hapkua ohokyoakakviit, angutikakviit uvalu kinniktotait. Tamayaotait kayangnaktokangitot ikkaktaoniaktot tatvani nunaap kangani angmaomayomi uvalunin ikkakokviovomi haoyaolotik uyakat ikkakhimayot totkomaviatni. Hapkua iglutait itoptiktaolotik ikkaktaoniaktot tatvunga haoyaoyoghamot ikkakokvikmot. Emmak kokloakviit ahivaktaoniaktot apkotinit uvalu hapkua kukkat ingilgayangit otiktitaolotik, Kihiani hapkua apkutait aolayaolaitot. Hannatjutait uvalu tammayait tatvani Tagiokmi Laydown Area-mi ikkaktaoniaktot tatvani havakviovomi malikalugit hapkua haligaktigotaita maligait. Uyakat katikhoktaohimayot hannatjutait hapkuninga totkoviliokutaitnik atoktaoniaktot hannatjutigilugit ikakokvighamik tatvani Tagiokmi Laydown Area-mi.

Inuit Nalaktitlugit Katimapkainik

Inuit nalaktitlugit katimapkainik uvalu ilaovaliatitinik maligaotitlugo piyagiakakmata ilaoni Nunavumi, una hannayioyot malikatiakmatjuklo, tatvalo pionighaotitlugo ukkua timioyot tonighimatjutigiyat. Hamna aolagotigitiagiakakmat angmaomatiaknik, pitiakutitik, uvalu ikkayokatigitiakutighait pikatigitiakloget hapkua nunaliit uvalu nanminikaktot pihimainaktat, uvalu huli pihimaganginakniaktat hivoliotjukahoakhuget ukkua Sabina-kut. Sabina-kut huli iliitagihimayaat hapkua alanganingit Inuit iliitkohitokait uvalu taimatot aghukutiginakniaktat hapkua pikatigikatagahoagomavlugit nunaliit iliitkohiktotaitnik uvalu pitiakatiginahoakloget. Ukkua Nanminikaktot huli tonighihimayot okakatigihimagomavlugit hapkua nunaliit uvalu angmaomainaktot kanok oktotaoyomayonik kanok hamna Inuit nalaktitlugit katimanighat uvalu ilaovaliatjutighait ihoaghivaligungnakatjuk.

Sabina-kut hamna Inuit nalaktitlugit katimanighat uvalu ilaovaliatjutighait ammihiyot hapkua havagiyomayait. Elaliothimayot hapkua tonighimatjutighait iliitkohiktotaitnun uvalu pitkohinnot, uvalu atokpagaiknik nunaliit hapkuninga oktokpagaitnik uvalu ehoaghaotigivagaiknik. Hapkua ilaliothimayot inuit nalaktitlugit katimanik, katimanik pikatigivlugit hapkua ilaliothimayot katimayit uvalu nanminikaktot (oktotigilugit, Hamalatkut, HTO-kut, inolgamiit), katimakatigilugit hapkua nunaliitni katimayit Ekaluktutiami uvalu Kugluktumi, Havagiyaoyonot manikami polagiakataknik, kitonot tohaktitjutaokataktot (oktotigilugit, kagitaoyakut naonaipkutaoyot uvalu Twitter/kagitaoyakut titigaknik/kagitaoyakukutit), una Havakviyoyomi tohaktitjutighak, allat makpigat tohaktitjutit, aolakutiluni Ekaluktutiami havakvighamik, nunaliitnin havaktikakloni uvalu nanminikaktoniklo ilaliothilugit una Ekaluktutiami Nunaliitni Tohaktitilikiyoyok, aghokutigilugit hamna Inuit Kaoyimayaktokangitnik naonaiyainik pikatigilugit ukkua Kitikmeot Inuit Katuyikatigit, aghokutigilugit hapkua allatkit inulikinikut/ avatilikinikut naonaiyaotighat, hamna hivonighami aivatjutighat haffuminga Inuit Kanogilyokaknikat Ikkayohiakutighait Angekutighat pikatigilugit ukkua Kitikmeot Inuit Katuyikatigit, allat pitjutaovaktot nunaliit ilaovaliatjutait (oktotigilugit, nalaotikunik, hannayioyot havaghanik kungiaktititik, allatkinik- iliitkohioyoyonik ilihainik, uvalu nunaliitni tohaktitjutitunik), uvalu nunaliitnik aittoktoinnik.

Sabina-kut aolakutihimayaat hamna hamna Inuit nalaktitlugit katimanighat uvalu ilaovaliatjutighat havagivlugo tatvani June 2012-mi. tatvanganin, amihoiktaghutik katimakataghimayot pikatigivlugit hapkua Havagiyaoyomi illaliothimayot pikatigivlugit. Hapkua katimatitlugit katimatjutait titigaghimayot ammihoiktaktitlugit katimapkaititlugit Sabina-kut hamna Inuit nalaktitlugit katimanighat uvalu ilaovaliatjutighat havagiyaoitlugit, uvalu hamna pitjutaohimaliktok ematot hamna Inuit nalaktitlugit katimatjutait katighoktaohimaliktok kagitaoyakut pihimalighotik ematot 150 avatkuget allatkit okaotaohimayot. Hamna kagiyaoyakut katighoktaohimayok naonaiyaktaohimaliktok naonaikhuget hapkua okaotaoloaktot uvalu ihomalotigiloaktait hapkua nunaliit uvalu katimayioyot. Hapkua naonaipkutikagungnaktot ematot pingahunik ihomaghutaoloaktonik: nunaliit ikkayohiakutighait uvalu ilaovaliatjutighait, havaghakhioknik uvalu ilihaknik, uvalu avatilikinikut monaghinik uvalu kimilgokataknik.

Sabina-kut pihimayot uvalu huli pihimakatiginiaktait havakatigilugit ukkua Kitikmeot Inuit Katuyikatigit, ukkua monaghiyioaktot Inuit Timigiyaovlotik piyungnaotikaghutik uvalu monagiyakakhotik haffuminga Havagiyaoyop ilanganik. Kitikmeotni Aviktoghimayuni nunaliit huli ihomagiloaktait ukkua Sabina-kut hamna Inuit nalaktitlugit katimanighat uvalu ilaovaliatjutighat. Hapkua nunaliit naonaiyaktaohimaliktot atoghugit hapkua allatkiit katimatjutait uvalu ilaovaliatjutait havagiyaoitlugit hapkunanga Sabina-kut tamaitni nunaliitni. Hapkua naonaiyaotait ihomaghutaohimayot atoghugit kanok kannitkiyaonginga naliak nunaliit tatvunga Havagiyaoyomot, Kanoklo emakak ikpigiyakakniakmangata haffumanga Havagiyaoyomit-pitjutikaktitlugit inulikinikut-pivalianikut uvalu avatilikinikut ikpigiyaitnik, uvalu kanok ahiagot pitjutikakata tatvunga Havagiyaoyomot. Tatva kaffioyot hapkua Nunatiemi Nunakakakhimayot timigiyaait pihimaliktot (uvalunin pikataoniaktot) illaokataolotik tatvunga Havagiyaoyomot. Hapkua ilaokataokataliktot tohaktitaokataghutik katimakataovlotik hivolikigiyait uvalu kivgaktioyot hapkuninga timigiyaoyot.

Hapkua tohaktitjutait atoghugit hapkua Inuit nalaktitluget katimaningit uvalu ilaovaliatjutighait ihomaghutaohimayot hapkuninga parnaiyainikut uvalu titigaoyaknikut haffuminga Havagiyaoyop kaffinik havaghanik ihomaghutaovlotik ilaliotivlugit hapkua naonaipkutighani kagitaoyakut katighoghutik, kanogiliyokaktinago etokhainik, naonaiyatiakutighanik, uvalu pivaliatjutighaitnik hapkua maligalikinikut uvalu kimilgokutighaitnik. Pionighaoyok hamna, tamaita ihomagiyaoloaktot uvalu ihomalotaoyotlo naonaiyaghimayagiakaktait hapkua nunaliit okaotaotakhimaliktitlugit havagihimaliktait ukkua Sabina-kut tatvani DEIS-mi atoghugit hapkua allatkit parnaiyaotaohimayot, maligait, uvalu tonighimatjutait. Hamna Inuit nalaktitluget katimanighat uvalu ilaovaliatjutighat hatkiktiniakmingmata notanik tohaktitjutighanik ihomaghutaoyughanik hamna Havagiyaoyok hivumovaliatitlugo. Oktotigilugo, Sabina-kut Nunaliitnun Elaovaliatjutighaita Parnaiyaotait (takulugo Makpigak 10) tonighimatjutigiyaait ukkua nanminikaktot katimakatigikatakavmavlogit uvalu ilaovaliatjutighaitnik nunaliitnun hamna Havagiyaoyop pivaliatjutighaitnik uvalu aolatjutighaitnik. Taimataok, tonighihimayot titigakumavlugit hapkua kioyomavlogit hapkua nunaliit kiotjutait, oktokuyait uvalu ihomalotikagiaknikata. Sabina-kut taima huli ehoaghagungnaktat hamna Nunaliitni Elaovaliatjutighaita Parnaiyaotat piyagiakakat taimatot aolangitangita ihomagiyaait uvalu ehoakutighait.

Kavamatkut Elaovaliatjutighait

Hamna pitjutaoyot ukkua Sabina-kut kavamatkunik ilaovaliatkovlugit tohaktitikatagomavloget hapkua kavamatkuni havaktigiyaait ehoaghaotighaita parnaiyaotighaitnik naonaitiaghimayonik Hehoaghaotighaita parnaiyaotighaitnik ikkayotaoniaktonik hapkuninga havagiyaoniaktonik. Sabina-kut huli tohaktitaihimakpaktot hapkuninga Havagiyaoyop kiklikhaitnik uvalu atkonaotigiyamingnik kavamatkunot, taimatot naonaitomik parnaighimatiangiangita havagiyaghamingnik uvalu opalungaighimayangita ilaovaliatjutighamingnik hapkuninga avatilikinikut naonaiyaotighanik. Ublumimut, hapkua piyomayait ukkua Sabina-kut kavamatkut ilaovaliatjutighait pitjutigivalugit hapkua:

- Ehoaghailoni avatingnot tohaktitaitjutighanik taima okpigitjutilotik uvalu havakatigitiagahoaklotik;
- Tohaktitikataklonik kavamatkut havaktigiyaaitnik hapkuninga Havagiyaoyonik kingovaghimaitomik, iggaktoghimaitomik, uvalu angmaomaloni ikayogahoakloget hapkua kavamatkut havaktigiyaait hapkuninga ihivgiokutighaitnik; uvalu
- Tohavigikatakloget uvalu kangikhigivigiloget hapkua kavamatkuni havaktiit taimatot ikayotaoniakmata Sabina-kunik kiotjutighaitnik uvalu ehoaghaotighaitnik parnaiyagahoaklotik.

Sabina-kut pikatigekataghimaliktot hapkuninga kavamatokakunik kaffiktaghutik haffuminga Havagiyaoyop mighakut, ilaliotivlugit hapkua Kanatami Okioktantomilo Pivalianikut Katimayit (okoavalaat, Okioktaktomi Havagiyaoyonik Monaghiyoyot Havakviolet), Takiokmiotalikiyiit Katatami, Nunakakaktolikiyiit uvalu Okioktaktomi Pivalialikiyoyot Kanatami, Avatilikiyiit Kanatami, Ohokyoalikiyiyit Kanatami, uvalu Ingilgayolikiyiyit Kanatami. Sabina-kut nigigikataktait ukkua Okioktaktomi Havagiyaoyonik Monaghiyoyot Havakviolet ikayoktigiymavlugit tohaktitaitjutighanik, ehoaghaikatiginahoakluget naliaknik kavamatokatkuniit havaktitnik ilaokataktoghanik katimanikut uvalu ahianik pitjutaoyonik havakvioletoniklo opaotikataktughanik.

Ukkua Nunavut Katamatkut ilaokataktot hapkuninga, uvalu ayungitamingnik okaotjikataghutik pikataovlotik, hapkuninga avatilikinikut naonaiyaititlugit uvalu ihivgiokhititlugit toghioktaoyonik uyagaghiokvighanik Nunavumi. Sabina-kut huli havakatigihimakniaktait ukkua Nunavut Kavamatkut havaktigiyaait hapkuninga kavamatkut ilaovaliatjutighaita havagiyaitnik kihiani huli pikatigilugit naonaitiaghimayonik havakvioletonik piyagiakakata (oktotigilugit, hapkua pikataoyomayot inulikinikut-pivalianikut uvalu angotighalikinikut). Ukkua Nunatiimi Kavamatkut ilaokatakniaktot pitjutigiloakluget naonaiyainikut tittiknilioktaohimayonik uvalu hamna halomaigok hiamakpalialitjutaitnik haffuma Havagiyaoyop.

Sabina-kut atoghimaliktot hapkuninga alatkinik kavamatkut ilaovaliatjutighanik uvalu akhukutigiyaait ehoaktunik okpiknaktonik pikataovaliyomavlutik ihomagitiagomavluget. Hivonighitjutighat uvalu katimakatigiikatakhtutik pikatigikataktait hapkua aviktoghimayoni uvalu atanikakvionyoni havaktot alatkiit kavamatkuni havakvionyot. Hapkua katimatjutait ilaliotikataktait alatkiik amiyot inuit pikataoyomayot (ihoaghitinahoakhuget), alatkiit pikataoyomayonik.

Sabina-kut ilitagihimayaat hapkua ihagiagiyaoyot katimakatigiyaomavloget kavamatkut ilaovaliatjutighaita havagiyaitnik. Hapkua naonaitiaghimayot Havagiyaoyomayop pitjutaitnik titigaghakviokataktait togaktitaokatakniaktot tatvuna Nunavumi Kanogiliyokaknikat Ihivgioghiyiovlotik Katimayiitnun uvalu hapkua ilaliotiniaktot kitonot inuknun takuyomayunot takopkaktinagiakakniaktait, taima malikalogit hapkua aolatjutait.

Inuit Kaoyimayatokangit

Inuit Kaoyimayatokangit (TK) naonaipkutaoyok hamna ematot “katighokhimayot hapkua kaoyimayangit, atokpagait, okpigiyaaitlo, alangukpalianingit iliitkohitokait uvalu atoktaonginaghotik taimangakalok katangotimingnit iliitkataghotik iliitkohitokaknik” (NIRB 2007). TK naonaiyaotait pitjutaoyot naonaiyaotaovlotik onipkaktot titigaghimavloget hapkua alatkiit onipkangit angoniaknikut, ekaloghioknikut, angoniakviit uvalu aolapakviit nanilikak. Tatvalo pitjutaovaktot naonaitonik tohaktitjutinik hapkuninga nunaliitni avatilikitjutaitnik, inulikinikut-pivalianikut aolatjutait, inulikinikut-iliitkohilikinikut aolatjutait uvalu hannatjutait, okpiomatjutaitnik, piyonaotaitnik uvalu ahiagot pitjutigiyaaitnik. Sabina-kut ilitagihimayaait hapkua iliitkohitokaitnik Inuit Kaoyimayatokaitnik uvalu ihomagitiaktaitnik nunaliitni atotaitnik avatilikinikut naonaiyaotaitnik hapkuninga toghiotaoyonik havagiyaoyomayonik. Taimaitmat, Sabina-kut aghokutigiyaat ilaliotiyomavloget hapkua nunaliit hapkuninga Inuit Kaoyimayatokangit tatvunga Havagiyaoyop parnaiyaotaitnun uvalu titigaoyaktaitnun. Hapkua naonaitiaghimayot kanok hamna Inuit Kaoyimayatokangit ilaliothimangiakmangat tatvunga DEIS-mut onipkagiyaohimayot hapkunani Naonaipkut 3.1-1 (Makpigak 3) - Atohiit hapkua Inuit Kaoyimayatokangit tatvani Sabina-kut Enekhimaitot Avatilikinikut Kanogiliyokaknikat Onipkangitni pitjutigivlugo una Hanningayomi Havagiyaoyok, tatvalo titigaghimayot naonaitiaghimavloget hapkunani makpigangitni haffuma DEIS-gita.

Sabina-kut pihimaliktot, uvalunin pinahoaktat, atokloget talimat ihomagiloaktait Inuit Kaoyimayatokangit: una Naonaiyaotit Inuit Kaoyimayatokangitnik Havagiyaoyok (NTKP) katighokhimayot kagiyaoyamot onipkangit pitjutigivlugo una Havagiyaoyok, alatkinik-onipkanik Inuit Kaoyimayatokangitigot katimatjutait, una onipkangat hapkuninga aolahimaktonik uvalu inuknun takuyaghaoyonik Nunatiimi Inuit Kaoyimayatokangita mighakut, hapkua enekhimayot inuit nalaktitloget katimatjutait uvalu ilaovaliatjutaita havagiyait, uvalu ahiagot pitjutaoyot (oktotigilugo, nunalikinikut katimatjutait). Taimatotaok, Inuit Kaoyimayatokangit iliitohiit ikkayotaoloaktot hapkuninga Sabina-kut ihomaliokutaitnik hamna Havagiyaoyok pitjutigivluget uvalu ilaliothimaliktat hapkuninga titigaoyaktainun ukkua Nanminikaktot tamaitnik Havagiyaoyop ataniktotait ihomagivlugit. Sabina-kut ikayokatigilikat ukkua Kitikmeot Inuit Katuyikatigit ukkua malgok ihomagiyaoitiaktot pitjutigivluget Inuit Kaoyimayatokangit naonaiyaotigivluget - parnaiyaotait hapkuninga NTKP kagitaoyakut katighoktaohimayot onipkangit uvalu aolatjutighait hapkua alatkiit onipkangit Inuit Kaoyimayatokangitnik katimatjutait. Hamna ikkayokatigeknik pitjutigivlugo hamna Inuit Kaoyimayatokangitnik Angekutat attilioktaohimaliktat ukkua Sabina-kut uvalu Kitikmeot Inuit Katuyikatigit tatvani May 2012-mi. Tatva hamna attilioghimalikmatjuk ukkua Sabina-kut pinagialakiyaat hapkua Inuit Kaoyimayatokangit nanminigiyat ukkua Kitikmeot Inuit Katuyikatigit NTKP-tikut kagiyaoyami katighokhimayot. Una angikutaohimayok huli naonaipkutaoyok hapkuninga malikayaghaitnik pitjutigivlugit ukkua Sabina-kut atotighait hapkuning Inuit Kaoyimayatokangitnik.

Sabina-kut ihomagiyait hapkua Inuit Kaoyimayatokangit ajikutaknigaivlogit hapkununga tamaitnun kaplunaat naonaiyaotaita tohaktitjutaitnik katikhoktaohimayonik atoktaghait haffuma Havagiyaoyop. Oktotigilugo, hamna Inuit Kaoyimayatokangit ilaliothimayot hapkununga allatkinot avatilikinikut uvalu inulikinikut-pivalianikut naonaiyaotaitnun katighoktaohimayonot hamna Havagiyaoyok pitjutigivlugo. Hamna tohaktitjutaoyok ikkayotaoloaktok ilaliothinahoakluget hapkua kaplonat naonaipkutait uvalu inulikinikut-pivalianikut tohaktitjutaitnik, pitjutaovlonilo notanik uvalu hapkuninga nipiliokhimaitonik huli tohaktitjutighanik, uvalu/uvalunin pitjutaoloni himaotighanik ihomakhutighanik uvalu/uvalunin tohaktitjutighanik ihomakhutaonginagiakaktonik. Hapua pitjutait hapkuninga NTKP-mi onipkami (oktotigilugo, KIA-kut 2012) ilaliothimavloget atoktaohimayot ihomagivluget uvalu ehoaghakhugo hamna hivolik VEC/VSEC titigak pitjutaoyok haffuminga Havagiyaoyomik. Hamna enekhimaitok titigak hapkuninga VECs/VSECs okaotaohimayot tamaitnun Nunaliitni okaotjiyioyot katimayioyonot tatvani Novaipa 2012 tatvanilo inuit nalaktitluget katimatitluget tamaitni Kitikmeot nunaliitni tatvani Appu 2013-mi ihivgioktagait uvalu kioyaghait. Taimaitmat hamna Inuit Kaoyimayatokangit ilaliothivalialikmat tatvunga Sabina-kut hivulitnun kagiyaoyakut katighotaitnun uvalu kanogilyokaktingnago etokniakutaitnun/ihoiyaotaonikata naonaiyaotaita havagiyaitnun, Sabina-kut kingolikpak naonaitiaghimayot ihomaghotait tatva atoghogit hapkua Inuit Kaoyimayatokangit. Naonaiyatiaghimayot hapkua naonaipkutait uvalu ihomaghotait ilaliothimayot tohaktitjutighaitnun hapkununga Kitikmeotni nunaliitnun uvalu tamaitnun nunaliini okaotjiyiovloket katimayitnun tatvani Novaipa 2013-mi ihivgioktaghait uvalu kioyaghait.

Kingolikpamik, hamna Inuit Kaoyimayatokangit ikkayotaoloaktot tohaktitjutigivluget hapkuninga havagiyaoyonik ehoaghaotighaitnik uvalu kimilgokutighaitnik haffuma Havagiyaoyop. Inuit ihomalotigiyait okaotaohimayot (oktotigilugo, Inuit nalaktitlugit katimangmata uvalu ilaokataovaliatitluget) okaotaovaliatitluget hamna kanogilyokaknikat ihoiyaotaoniaknikata angotighanot (ihomalotaoloakhutek tuktut) uvalu allat avatilikinikut uvalu inulikinikut-pivalianikut havagiaghait. Ehoaghaotighait uvalu monagetjutighaita parnaiyaotighait taima ihoaghaktaohimaliktot hapkua kaffioyot VECs uvalu VSECs pitjutaoniaknahugiyaovloket hapkuninga kayogilyokaknikat ihoakutighait haffuma Havagiyaoyop hapkununga Inuit ihomalotigiyaitnun. Hamna Inuit Kaoyimayatokangit atoktaoniakmiyok kimilgokutaitnun hapkuninga Havagiyaoyomi ihoilotaoniaktonik. Tatvainaongitok hamna Inuit Kaoyimayatokangit ikkayotaovloni naonaiyaotaoyonot hapkuninga hivunighami kangogilyokaknikat naonaiyaotaitnun, kihianilo nunaliitni hamna Inuit Kaoyimayatokangit ikkyotaoniaktok notanot kimilgokutaoniaktonot uvalu tohaktitjutighanot hamna Havagiyaotok hivomovalialikat. Hamna hivunighami katighionik uvalu atoknik hapkuninga Inuit Kaoyimayatokangitnik ilaliothimaliktat kaffioyonot atanguyat parnaiyaotighaitnun haffuminga Havagiyaoniaktok. Oktotigilugo, Sabina-kut Nunaliitni Ilaovaliatjutighaita Parnaiyaotigait tonighihimayot hapkuninga inuit nalaktitluget katimatjutighaitnik uvalu ilaovaliatjutighaitnik hamna Havagiyaoyok havagiyaohimaktitlugo. Taimataok, Hapkua aolatjutighait ehoaghaktaoniaktot titigaktaoyoghat uvalu kiotjutighait hapkununga nunaliit kiotjutighaitnun, oktokuyaitnun uvalu kanok ihomalotigiyaitnun.

Ihomagiyaotiaktot Ihoakutighait

Hapkua ihomakhutaoyot atogaghat Ihomagiyaotiaktot Avatilikinikut Ehoakutighait (VECs) uvalu Ihomagiyaotiaktot Inulikinikut-pivalianikut Ehoakutighait (VSECs) ilaliothimayot Sabina-kut hivonikhotik inuit nalaktitlugit katimatjutighanik, hapkua atotait Inuit Kaoyimayatokangitnik (TK), maligalikinikut katimatjutighait uvalu maligalikinikut ihomakhotaoyoghat, uvalu pigiaaktitaohimayot tatvai NIRB-kut EIS-gata maligaitni (NIRB 2013). Una *Inuit Kaoyimayatokangitnik havagiyait ukkua Sabina-kut Gold & Silver Corp., Hannigayok, Havagiyaoyok, Naonaiyaotit Inuit Kaoyimayatokangitnik Havagiyaoyop Onipkangit* (KIA 2012) aghokutaovloni katimatjutaohimayok hapkuninga Inuit Kaoyimayatokangitnik tohaktitjomavlotik. Atoghugit hapkua naonaipkutit, hapkua VEC-nit uvalu VSEC-git hapkualo Ihomagiyaohimayot Titigaghimayot naonaiyaktaohimayot:

Hilami Avatilikitjutit (Makpigak 4)

- VECs: Hilap Kanogininga, Koinginakninga uvalu Hayokninga
- Ihomagiyaoyot Titigaghimayot: Hilap Kanogininga uvalu Hilalikitjutait

Mannikap Avatilikininga (Makpigak 5)

- VECs: Naotiangit uvalu Nunaap Kanokininga, Tuktuit, Aghait, Omingmait, Kalviit uvalu Mitkolgiit, Tingmiat Huugatjat, Kilgaviit
- Ihomagiyaoyot Titigaghimayot: Nunalikinik, Hikmiit, manikak uvalu nunaap atanniitot

Emmagiktot Avatilikininga (Makpigak 6)

- VECs: Emak Kolikotighak, Emmap Halomaninga, Hunavaluit Halomaninga, Ekaluit/Emmakmiotaat, Ekalukakningit
- Ihomagiyaoyot Titigaghimayot: Manikami Emmak, Limnology uvalu Bathymetry

Tagiokmiotat Avatilikinik Environment (Makpigak 7)

- VECs: Emmap Halummaninga, Hunavaluit Halomaninga, Ekaluit/Emmakmiotat Nayogait, Ekalukakningat, Tagiokmiotat Tingmiat/Mitkiit, Nattiit
- Ihomagiyaoyot Titigaghimayot: Tagiop Kanokinninga

Inulikinikut Avatilikinik (Makpigak 8)

- VECs: Inniitoliit, Inulikinikut-Pivalianikut, Nunalikinik, Nikainaktoknik
- Ihomagiyaoyot Titigaghimayot: Ingilgaknitalikinik, Inulikinikut Anniaktailinik uvalu Avatilikinikut Kayangnaitolikinikut Naonaiyainik.

Tamaita VECs-git uvalu VSECs-git naonaiyaktaohimayot atoghugit hapua initoningit uvalu nunalikinikut naonaiykutait. Initoningit, hapkua ihoilotaoniaghugiyait naonaiyaktaohimayot iloani haffuma Nunaliit Naonaiyakviata kanningani (LSA) unalo angitkiya Aviktoghimayoni Naonaiyakviata kanningani (RSA). Nunalikinikut ihoilotaoniaghugiyaoyot hapkua ihomaghotaovlotik havagiyaotitlugit Havakvighami Parnaiyainik, Iglioknik, Aolatjutait, Haligaklotik Pinnighainik uvalu Omiktiginek, uvalu Enekhimalikat-Omiktaohimalikat Havagiyaoyok havagiyaghait. Naonaitot maligaghak ihomagiyaoyogaloak hamna naonaiyaktaotitlugo, ilalioitilogeet naliak ihoaktut kavamatokakut uvalu aviktoghimayoni piyomayait/maligait.

Hapkua okaotaoniaktot onipkat nainaghimayot aolayonik avatilikitjutit, hivoliit Havagiyaoyomi havagiyaoyot hapkua nigigiyaoyot ilalioitiyungnaktot hapkununga VECs-gitnot uvalu VSEC-gitnot, ehoaghaotighaita oktaotait, ihoilotaoyonik naonaiyaotit, tatvalo oktotaoyungnakata, hiamaghimayonik halumailgonik naonaiyaotait tamaitni hapkunani VEC uvalu VSEC. Tohaktitjutighat piyagiakakata EIS Avatilikinikut maligaitnit hapkua Ihomagiyaoyot Titigaghimayot pakitaoyungnaktot tatvani naonaiyatiaghimayoni Makpigakni.

Hilalikinikut Avatilikinik*Hilap Kanogilinga*

Hamna hilap kanogilinga tavani RSA-gani akoktaohimangitiaktok pitjutigivlugo haffuma Havagiyaoyop nayoga inukangititlugo uvalu pikangitmat, uvalu hamna iliitkohia, hapkualo inukakningita hilap naonaiyaotait. Hapkua huliyoakakutait tatvani Havagiyaoyomi pitjutaoyungnaktot naovaliatjutaolotek hapkuninga hiamatjapaliayonik hilami halomaiyaotaolotek (CACs) uvalu pitjutaoyungnaktot hiogamik

tingilgalaktonik uvalu hapkuninga hoangayonik hiamativalialotik. Ehoaghainik uvalu monaghinikut havagiyaoyot parnaikutaohimayot ikkilivaligahoakloget uvalu ahivakpalianahoakloget pitjutaoyungnaktot ihoilotaovalialotek hilap kanogilinganianik hapkua ilaliothimayot: kolikutit oktaotait, oktaotait ikkililakutighait ohokyoaktokpalangitangita, hamna atokninga emmaknik uvalunin hiokat tingilgalakpalangitangita aktokpagait naptohitjutait apkutaita hitingitonik hiogaogitot uvalunin hapkuninga akyaktaohimayot tammyaotait uvalu hannatjutait tatvani uyakanik hikoptikutaitnit uvalu atokpagait hapkua annianingit aolatjutaitnit hapkuninga kinnipayunik halomaktigotit, poktoktoivioyot, uvalu himiktailitjutit. Hamna nigigiyaotitlugo havagiyaovalianiaktok, hamna naonaipkutit naonaiyaotaita etoghimayaat hapkua anniatjutait tatva SO₂, CO, uvalu hiokap hiamakpaliatjutighait avatkulaitnahugiyaoyot hapkua piyomayait/maligaitlo tamaitni havakvionyoni uvalu hamna NO₂, PM_{2.5} uvalu hamna hoangayonik annianinga ammigiyayot ilaoni haffuma Havagiyaoyomi Hannavioyoni (PDAs). Ukkua kihingoktaoyok malgok hilamik kanogininganik kimilgokutaoyok (TSP uvalu PM₁₀) naonaipkutikaktok avatkohimayok hilatanik haffuma PDA, uvalu taimatot aolalaitot hapkua kihingoghimayot ihoilotaovalangitot hamna ehoaghaktaohimalikat. Kihiani, kanoginiakat hamna nigigiyaoyok ehoaghaotighait hapkua oktaotaita tatvani Hilap Kanogininganik Kimilgokutait uvalu Monagitjutaita Parnaiyaotaitni (Makpigak 10, Titigak 17), Hamna naonaiyatiaghimataat hapkuninga tingilgakahimayonik ihoilotaoyonik hilap kanogininganik etoktaohimayok ematot **Ihomalotaongitok**. Pihimayakangitot nigigiyaoyonik katighoghimayonik halumailgonik uvalunin tittiknilioghimayoni ihoilotaoyonik haffuma hilap kanogininganik.

Koinginakningit uvalu Hayuninganik

Hamna aolayok koinginakninga uvalu hayokningata avatilikinik atoktaohimangitok ihoilotaongitot hapkua kanningani havakvionyot koinginakningit uvalu hayoktitinnik. Iglulioknik uvalu aolakutivalianik tatvani Havagiyaoyomi naonaitok tohaknakniaktot hapkua koinginakningit uvalu hayoktitinik hapkuninga igluliokutinik hannatjutaitnit, akyaktaktonik ahalotinik, kagaktaotinik uvalu ahalotik uvalu tingmiat ingilgainaktitluget. Ehoaghaotighait uvalu monagitjutighaita oktaotaita parnaiyaotait mighilakutighait uvalunin ahivakpaliatjutighait ihoilotaoniaknahugiyaoyot hapkua koinginakningit uvalu hayokninga ilaliothimayot hapkua: Nalunaipkaklugit hapkua ahalotik ihoaktonik huppoktaotikagiaktot koinginaitonik, pipkaktailinahoaklogit hapkua koinginaktonik havagiyaoyot hapkuninga kaggaktaotinik uvalu tingmitjat kangataktaililogit uvalu mikatakunagit humungagaikpat ublukhiotait, uvalu iglutaitni koinginaktot kokukutait uvalunin nivyakataktot. Tatva hapkua koinginakningit havaktot havaloolikangata tatvani havakvikmi ataotikut naonaipkutikaktot koinginaitkiyaoyot hapkuninga amigaitonit inuknit okamayonik (inuknit), okamiluktot (inuknit), avilokhitigiyut (inuknit) koinginakhivalagangata tohagoikningit (inuknit). Ajikutait, nigigiyaongitot hunanik pinighaotinik uvalu itoptiginik iglunik (inuknit) hapkuninga Havagiyaoyomi hunamit nivyaktitiyot uvalunin hayoktitiyot. Kihiani, hunanik nivyaktitiyot naonaitot koinginatkiaogamik koingitonaktot hapkuninga angotighakakvionyonik (angotighat) uvalu koingitkonakningit (angotighat) hapkunani allatkitni naonaiyaktaohimayoni nivyakvionyoni hapkunani igluliokvionyoni uvalu hannavioyoni, kakaktavioyoni, aghalotit hanguvigiyaitni uvalu tingmiat tikikataktot. Ilaliothilugit, koinginakningit uyagaghiokvionyomi igluhioktut uvalu havakhimaaktot koinginatkiaoyot hiniktitloget (inuknit) tatvani toghiotaohimayomi havagiyaoniaktomi Goose-mi iglukakvikmi. Taimaitmat, pingahut ihomagiyaoyot koingitkunaknahugiyaoyot halumaktitaotaghimalikata hiniknaitot (inuknit), angotikhakakvitnik tamainik (angotighat) koingitkonak (angotikhat). Ihoilotaoyot hapkuninga nivyaktonik tatvani Havagiyaoyomi angotighat pitjutigivlugit ilaliothimayot tatvani manikami angotighakakningitni titigaghimayoni (Makpigak 5, Titikat 5-10). Hamna itkoniaghimayat ihoilotaoyok tatvani Havagiyaoyomi koinginakningitnik uvalu hayokningitnik (hiniktitluget inuit koingitkonakningit) kihingoktaohimayot tatvani Havagiyaoyomi, koingitkunaktot itkokaohimayot emaotot hinningnaitonik ikitkiyanik 5 dBA, hamna otikungnaktok hamna havagiyaohimaaktitlugo tatvani Havagiyaoyomi. Katimatjutaohimayot hapkua ehoghaotigaita naonaipkutighait titigaghimayot tatvanu Koingitnaknikut Mighivaliotighaita Parnaiyaotaitni (Makpigak 10, Titigak 18), hamna naonaipkutigiyat haffuminga koinginaknikut ihoilolat

etkokaohimayok ematot lhoilotaongitiaktok koinginakninga uvalu hayokninganin tatvanga havakvioyomit ahinungaoyonik titikniata hilatanotlonit.

Manikami Avatilikitjutait

Naotiat uvalu Piniktonik Nunamiotat

Manikami avatilikinikut nunaotanik uvalu takunaitonik naotianik naonaiyaihimayot uvani 2012-mi eloani haffuma 134,370 ha naotianik uvalu manikami anotighanik LSA. Kititaohimayot hapkua 890-nik naotianik naonaiyaihimayot hamna manikami avatilikinikut nunaoyaliokhimangmata uvalu alangayunik naotianik naonaiyaihimangmata eloani haffuna LSA uvalu RSA. Hapkua naonaiyaghimayot naotiat hiamaghimayot amigaitot tahamani kangingani. Igluliolikata tatvani Havagiyaoyomi tamainiagahugiyaoyot hapkuninga naotianik uvalu piniktonik nunamiotanik. Hamna ehoaghainik uvaHamna ehoaghainik uvalu ihoiyaotaovalangitangita uvalu monagitjutighaita ehoaghaotighait hapkua mighilakutighait ihoilotaoniaktot Havagiyaoyomi ilaliothimayot: mighilagahoaklugo hamna the Havagiyaoyomi havagiyomayait, atokataklotik okiomi apkuhioktaoyonik, uvalu ikiliyagahoaklugo hamna tingilgalaktok hiogak ayungnangitpat. Tahamna ihoilotaoniakat naonaiyaktaongmat, ihomagiyaoyok tatva hamna tamaat PDA tamaiyaoniagahugitaoyok. Kihianioyok taotughugo, hamna nuna naotiakakninga/pinniktonik nunaotikaktok tamaivalianinga taimaitpalahimaitok hamna kingolikipak havagiloakniaktat tatvungainak ataniakmat Havagiyaoyomot. Katimatjutigihimayait hapkua ihoaghaotihat titigaghimayot tatvani Hilap Nakuningata Kimilgokutaitnik uvalu Monagitjutighaitnik Parnaiyaotait (Makpigak 10, Titigak 17) uvalu una Havakvioyop Emakakvitnik Kimilgokutait uvalu Monagitjutighaita Parnaiyaotait (Makpigak 10, Titigak 7), Hamna naonaiyaotat hapkuninga ihoilotiginiaktaitnik haffuma naotiat uvalu piniktot nunamiotat ihomagiyaoyok tatva **Ihoilotaolaitot**. Una halomailgonik naonaiyainik havagiyaohimangmat hapkunani manikami RSA, tatva hamna naonaipkuta halomailgok ihoiyaotaoniakninga (naotianik tamainik) etkoktaoyok tatva **Ihoilotaolaitot**. Tatva titiknilioktaohimayonik pitjutikangitot hapkua ihoilotaoniagahugiyaoyot.

Tuktuit

Pingahuyot hapkua alatkingoyot tuktuit tikikataktot uvalu tahamunakataktot kanilgoakut haffuma RSA. Kangataktatkitut kunguhiaktaotilighugit naonaiyainik naonaiyaktaohimayot ukkua Kilohiktomiotak tuktut nayogakaktot oatani haffuma manikap RSA kihiani nogioktagangata, uvalu ukkua Kamanikyoomi tuktutait(hapkua taiyaokataghimayugaloit Ahiak-miotat) tikikataktot tahamunga manikamot RSA, takunaghilikipaktot aoyaoholikangat okioghalihaliktitlugo. Naonaiyaotait tingmiakut naonaiyaktaohimangmata tatvani akungani 2001-mi uvalu 2010-milo uvalu atokataghugit hapkua inuitoghiokutait piksalitot tatvani RSA-gani uvalu kaningani uvalu oatani haffuma RSA-gani naonaipkutagiyait kungohiaktuliktoghugit hapkua ikkitot ilangit tuktut. Hamna okiomi nayogaat Kiklingoyakmiotat Tuktuit naonaitot avatkutpagat hamna tagiokmi RSA-ga titiknia okiotoagangat. Ukkua Kiklingoyakmiotat tuktuit tatvani *SARA-kuni titigaktaohimalikait ihomalotaoloaghutik ikkilivalianigaktaovlotik* hapkuataok Kilgohiktokmiotat tuktutait uvalu ukkua Kamanikyookmiotat tuktutait naonaiyaghimangitait ukkua COSEWIC-kut. Imakak Havagiyaoyomi ihoilotaoyungnaktot hapkua havagiyait hapkuninga: angutighakakningit tamaivalianingit, havagiyaoyop koinginakninga, ihoilotat haffuminga ingilgayangitnik, kanok tokutjutigihimayait uvalu annikvigihimayait, kanoklikak tokutaoningit, nagiakningit, akoakningit tokunaktunik, uvalu ikkilivalianingit eknioktot.Ihoaghivaliatjutighait uvalu monaghitjutighaita ihoaghaotighait ahivakpaliatjutighait uvalunin mighivaliatjutighait hapkuninga ihoilotaoniaktonik ilaliothilugo hamna Havagiyaoyop havagiyait, koinginaktonik kimilgokataknik, kayomiktonik kimilgokutait, hamna atokninga okiomi apkuhiokhimayot, kovioknik monaghinik uvalu kayangnaktonik kimilgokatanik taima angotighat nagiakatangitangita koviknik taima aktotingitangita hoangayonik kayangnaktonik, uvalu ihoaghaotighaitnik hapkua Angutighanik Ihoaghaotighat uvalu Monagitjutighaita Parnaiyaoyait (Makpigak 10, Titigak 20). Elaliothimayot hapkua ihoaghaotighat titigaghimayot tatvani Angotighat Ehoaghaotighait uvalu Kimilgokataotighaita Parnaiyaotaitni

(Makpigak 10, Titigak 20), Hamna naonaiyaotat hapkuninga ihoilotaoniaktonik hapkuninga tuktunik etkoktaohimayok tatva **Ihoilotaolaitot**.

Hamna ihoilotaoniaktonik naonaiyaotaohimayok pitjutigivluget hapkua tuktut nogioktagangata uvalu aoyami nayokpagaitni hapkua killohiktomi tuktut tatvalo auyami okiomilo nayokpagait hapkua Kamanikyoakmiot tuktutaita, uvalu ilaliothimayait nunnat Nunavumi uvalu Nunatiemi. Tatva titigaghimayok tatvani EIS maligaitni (NIRB 2013), Uma Ministaoyup Nunakakaktolikiyiit uvalu Okiokaktomi Pivalialilikiyiita Kanatami ihomagitiaktait hapkua Killohiktomi tuktutait pionighaoyot tahamani aviktoghimayoni uvalu naonaiyaikoihimayok ihoilotiginiaktaitnik hapkua tuktut (titigakhimaya ubluani Desaipa 17, 2012). Taima ikayoktaoniakniakat hamna ihoilotaoyonik naonaiyaotaoniaktok tuktunik, tatva tamatkikahoakloget (RSF) naonaiyaotighat hapkuninga Killohiktomi tuktut nogioktagangata uvalu aoyami nayugaitnik. Katimayioyot hapkuninga ihoaghaotighaitnik ihoilotaoyonik titigaghimayoni tatvani Angotighanik Ihoaghaotighait uvalu Kimilgokutighaita Parnaiyaotaitni (Makpigak 10, Titigak 20) tatvalo etkogahoakhuget ajikutaitnik ihoaghaotighaitnik hivonighami Havagiyaoniaktoni, hamna naonaiyaotaohimayok hapkuninga ihoilotaoniaktaitnik hapkua tuktut tatva **Ihoilotaolaitot**. Hamna ihoilotaoyonik naonaiyaotaoyot takiyonik titikniliokhimayonik ilaliothilugo ilanga haffuma Nunatiap tamakmik ukkua ihomagivlugek Killohiktomi uvalu Kamanikyoami tuktutait. Taimaitmat, hamna immakak titiniliokhimayonik ihoilotaoniaktonik naonaipkutait etkomayaoyot **Ihoilotaolaitot**.

Ahait

Napaktoilgomi-manikami amigaitilangit hapkua aghait tatva kanatap kavamaita titigaghimaliktait hapkua angotighat ematot “Ihomalotaoloaktot Ikilivaliangmata ” (SARA; COSEWIC 2012) uvalu titigaktaohimaliktot ematot Ikilivaliyot Nunavumi (CESCC 2010). Hininakhoget-napaliokhoget titigakhoget aoktakhogetlo DNA-nik naonaiyaktahimangmata tatvani 2012-mi naonaiyaihimayot ematot 61-nik aghanik tahamani RSA-gani uvalu huli ilaliothimayait 62-nik aghaitnik iliitogiyaohimayot tahamani ajikutani angitigiyani naonaiyakvohimayop oatani haffuma naonaiyakvohiyop RSA. Immakak Havagiyaoyomi-ihoilotiginiagahogiyayot ilaliothilugit hapkua Havagiyaoyomi havangit ihoilotaoyunngaktot naonaipkutit: Angotikakvitnik tamainik, ihoilotaoyot koinginakningit (oktotigilugit, ahivaivalianingit hapkunanga nayugaitnit), ihoiyaotinatjuk ingilgayangitnit, Kanok tokotaohimangmangat uvalu anniktaohimangmangat, pinahoangitoget tokutaohimayot, nagiakhimayot, akoaghihimayot tokunaktonik, uvalu ikilivalianingit eknioktot. Okiomi apkuhiokhimayot pitjutaongitot naonaiyaotaitnun hapkua aghait appitanilikpangmata hinnikhutik hapkua apkuhioligangata uvalu atoktaoligangata. Ihoaghaotighait uvalu monagitjutighaita oktotighait ihoaghaktaoniaktot ahivagahoakloget uvalunin ikililagahuakluget hapkua ihoilotaoniaktot ilaliothilugo hamna Havagiyaoyomi havagiyait, nipikpalat koinginaktot, atokataktait okiomi apkotit, ikkakokvohiyot uvalu tokonaktot hiamangitangita angotighanot, uvalu hamna ihoaghaotighait hapkuninga Angotighanik Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotait (Makpigak 10, Titigak 20). Katimayioyot hapkuninga ihoaghaotighaitnik hapkua ihoilotaoyot titigaghimayot tatvani Angotighat Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotaitni (Makpigak 10, Titigak 20), hamna naotaipkutait hapkuninga ihoilotaoyonik aghaitnik etkomayaoyot ematot **Ihoilotaongitot**.

Una ihoilotaoyonik naonaiyaotaohimayok pitjutigivlugo una Haputiliokhimavlugit hamna Havagiyaoyop tamayaotata hilatani atokhotik haffuminga anginighaoyomik hangovikhaitnik hapkua aghait tahamani hilatani haffuma Hanningayomi Havagiyaoyomi. Katimayioyot hapkuninga ihoaghaotighaitnik hapkua ihoilotaoyot titigaghimayot tatvani angotighanik Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotaitnik (Makpigak 10, Titigak 20) uvalu ihomagivluget ajikutaitnik oktaotighaitnik hivonighami Havagiyaoyoghat, hamna naonaiyaotaohimayok ihoilotaoniaktonik hapkununga aghaitnik emaitok **Ihomalotaongitok**. Hapkua ihoilotaoniaktonik naonaiyaotit takitigiyot titikniit ilaliothimayot ilanga Nunatiemi aghait nayogait anginighaonahogiyayok hamna aghait hanguvigiyait tahamani eloani Havagiyaoyomi. Taimaitmat, hamna emakak titiknilioktaohimayomi ihoilotaoyot havagiyaoyot uvalu **Ihoilotaolaitot**.

Umingmait

Tingmiakut naonaiyaihimayot akkungani 2001-min 2010-mut eliitogihimayat tatva umingmait takunakataktot nakilgokni haffuma havagiyaoyop RSA. Umingmait takughaokataktot attinuangitni hapkua mayokat, oatani Kingaop uvalu malgoktaok ammihoakyoit kanilgoanikataktot Havagiyaoyop, ataohiktaok hivgogata kivatani haffuma George-mi Havagiyaoyop kaniloani tatvataok huli kanilgoani haffuma Goose-mi Havagiyaoyop Kanilgoani. Immakak Havagiyaoyomi-ihoilotiginiagahogiyayot ilalioitiloget hapkua Havagiyaoyomi havangit ihoilotaoyungnaktot naonaipkutit: Nigginiakvitnik tamainik, ihoilotaoyot koinginakningit (oktotigilugit, ahivaivalianingit hapkunanga nayugaitnit), ihoiyaotinikajuk ingilgayangitnit, Kanok tokotaohimangmangat uvalu anniktaohimangmangat, pinahoangitoget tokutaohimayot, nagiakhimayot, akoaghihimayot tokunaktonik, uvalu ikilivalianingit eknioktot. Ihoaghaotighait uvalu monagitjutighaita oktotighait ihoaghaktaoniaktot ahivagahoakloget uvalunin ikililagahuakluget hapkua ihoilotaoniaktot ilalioitilugo hamna Havagiyaoyomi havagiyait, nipikpalat koinginaktot, kayomiktomik ingilgayot, atokataktait okiomi apkotit, ikkakokviolet uvalu tokonaktot hiamangitangita angotighanot, uvalu hamna ihoaghaotighait hapkuninga Angotighait Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotait (Makpigak 10, Titigak 20). Katimayoyot hapkuninga ihoaghaotighaitnik hapkua ihoilotaoyot titigaghimayot tatvani Angotighait Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotaitni (Makpigak 10, Titigak 20), hamna naotaipkutit hapkuninga ihoilotaoyonik hapkuninga umingmaitnik etkomayaoyot **Ihoilotaongitot**.

Taima ikayoktaoniaknikat hamna ihoilotaoyonik naonaiyaotaoniaktot umingmaknik, tatva tamatkikahoakloget (RSF) naonaiyaotighait hapkuninga Killohiktomi tuktut nogioktagangata uvalu aoyami nayugaitnik. Katimayoyot hapkuninga ihoaghaotighaitnik ihoilotaoyonik titigaghimayoni tatvani Angotighait Ihoaghaotighait uvalu Kimilgokutighaita Parnaiyaotaitni (Makpigak 10, Titigak 20) tatvalo etkogahoakhuget ajikutaitnik ihoaghaotighaitnik hivonighami Havagiyaoniaktot, hamna naonaiyaotaohimayot hapkuninga ihoilotaoniaktaitnik hapkua umingmait tatva **Ihoilotaolaitot**. Hamna ihoilotaoyonik naonaiyaotaoyot takiyonik titikniliokhimayonik ilalioitilugo ilanga haffuma Nunatiap tamakmik ukkua ihomagivlugek Killohiktomi uvalu Kamanikyoami tuktutait. Taimaitmat, hamna immakak titiniliokhimayonik ihoilotaoniaktot naonaipkutit etkomayaoyot **Ihoilotaolaitot**.

Una ihoilotaoniaknahogiyayonik naonaiyaotaoyot umingmaknik atoghugo hamna kaimalokektok hanguvighait ihatani haffuma Havagiyaoyop naonaiyaotigiyat una takinighaoyot titikniliokhimaya kungohiaktaolighimayop umingmaop tahamani oatani Kitikmeotni aviktoghimayoni. Katimayoyot hapkuninga ihoaghaotighaitnik hapkua ihoilotaoniaktot titigaghimayot tatvani Angotighait Ihoaghaotighait uvalu Kimilgokutaita Parnaiyaotaitni (Makpigak 10, Titigak 20) uvalu ihomagivlugek hapkua oktotighait hivonighami Havagiyaoniaktot, hamna naonaiyaotigiyat hapkuninga ihoilotaoyonik umingmaknik ihomagiyat **Ihoilotaolaitot**. Hapkua ihoilotaoniaktot naonaiyaotaoyot takiyonik titikniliokhimayonik ilalioitilugo hamna ilanga Nunatiap umingmaotait tatva nigiyogiyayot ilalioitiniaktot hamna takinighaoyot titiknilioktaohimayot ongahiktomot umingmait ingilgayungnaktot tahamani Havagiyaoyomi. Taimaitmat, hamna ihomagiyayot titiknilioktaohimayot avatani naonaiyaktaohimayot tatvani ihoilotaoyot naonaiyaotaitni tatva ihomagiyayot **Ihomalotaongitot**.

Kalviit uvalu Mitkolgit Angotighait

Kalviit uvalu hapkua amakot tiliyaohimayot naonaiyaktaoyugait milkolgit angotighait DEIS-gani. Kalviit uvalu amakot Nunavumi nanilikak naonaiyaktaohimayot ematot "Ikkilohimangitot (CESCC 2010), Kihiani hapkua kalviit kavamatokatkut titigaghimaliktat ematot hapkuagok "Ihomalotaolaitot" (COSEWIC 2003). Hinningnaghuget-ihivgiokhuget napaliokhuget DNA naonaiyaktaohimayot hapkua kalviit tatvani 2012-mi naonaiyaihimayot kititoget hapkua 12-guyot kalviit eloani 1,692 km² kaningani akkunani ukkua Goose-mi uvalu George-mi Nanminigiyaita. Naonaiyakviahimayot hamna elanga nayogait hapkua kalviit ema ongahiktigikataktot tatvanga recorded 89 km² tatvanga 264 km², ingilganingit ema 162 km². Hapkua amakut mighakut, tingmiakut naonaiyaivlutik hittinik akungani 2007-min tatvanga 2013-mut

iliitogihimayait 8-guyot atoktaohimaaktot amakut hittiit kangilgoani haffuma havagiyaoyop RSA, tatva talimat hapkua hittiit atoktaohimakhotik ivvaviokataktot. Immakak Havagiyaoyomi-ihoilotiginiagahogiyayot ilaliothoget hapkua Havagiyaoyomi havangit ihoilotaoyungnaktot naonaipkutit: Angotikakvitni niginiakviit tamainik, ihoilotaoyot koinginakningit, ahivaivalianingit hapkunanga nayugaitnit, ihoiyaotinikajuk ingilgayangitnit, Kanok tokotaohimangmangat uvalu anniktaohimangmangat, pinahoangitoget tokutaohimayot, nagiakhimayot, akoaghihimayot tokunaktonik, uvalu ikilivalianingit eknioktot. Ihoaghaotighait uvalu monagitjutighaita oktotighait ihoaghaktaoniaktot ahivagahoakloget uvalunin ikililagahuakluget hapkua ihoilotaoniaktot ilaliothilugo hamna Havagiyaoyomi havagiyaait, nipikpalat koinginaktot, atokataktait okiomi apkotit, ikkakokviovot uvalu tokonaktot hiamangitangita angotighanot, uvalu hamna ihoaghaotighait hapkuninga Angotighanik Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotait (Makpigak 10, Titigak 20). Katimayiovot hapkuninga ihoaghaotighaitnik hapkua ihoilotaoyot titigaghimayot tatvani Angotighat Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotaitni (Makpigak 10, Titigak 20), hamna naotaipkutat hapkuninga ihoilotaoyonik ammakut etkomayaoyok ematot **Ihoilotaongitot**.

Ihomagiyaoyot hapkua ihoilotaoniaktonik naonaiyaotait atoghugit ingilganingit ongahiktonot hapkua kalviit uvalu amakut kanilgomikataktot tatvanga havakviovomit. Hapkua kalviit tahamani ajikutagiyait hapkuninga RSA, kihiani una ilaliothihimayot emnak tatvangakniaknahogitaoyok Tibbitt-mit tatvunga Tahikyoamot Okiomi Apkohioktaohimayomot. Hapku ammakut, hamna kanilgoa atogaonginaktok aoyami tuktuinik tikikataktonit Killohoktomit uvalu Kamanitoamit hapkua ammakut malikatagingmagit hapkua tuktuinik, nikigigamiko kanitagangata tatvanga Havakviovomit. Katimayiovot ihoaghaikataktot hapkuninga ihoilotaoyonik titigaghimayonik hapkuninga Angotighanik Ihoaghaotighaitnik uvalu Kimilgokataotighaita Parnaiyaotaitnik (Makpigak 10, Titigak 20) ihomagivlugit ajikutait oktotighait hivonighami Havagiyaoniaktoni, hapkua naonaiyaotaohimayot ihoilotaoyonik naonaipkutait kalviitnik uvalu angotighanik mitkuliknik ihomagiyaoyot **Ihoilotaolaitot**. Kalviit hapkua kanilgomiovot tatvanga Havagiyaoyomit pillainahogiyayot opaotilotik tatvunga Nunatiap elanganot, taima hamna titikniliokhimayot naonaipkutait kalviit atoktaongitot. Hamna ihoilotaoyonik naonaiyaotaoyot takiyonik titikniliokhimayonik nayogait hapkua amakut ilaliothilugo ilanga haffuma Nunatiap. Hapkua ihoilotaoniaktonik naonaiyaotit takitigiyot titikniit ilaliothihimayot ilanga Nunatiami amakut nayogait anginighaonahogiyayot hamna amakut hanguvigiyait tahamani eloani Havagiyaoyomi. Taimaitmat, hamna emakak titiknilioktaohimayomi ihoilotaoyot havagiyaoyot uvalu ihomagiyaoyot **Ihoilotaolaitot**.

Otikataktot Tingmitjat Hogaat

Otikataktot tingmiat hogaat oploitlo monagiyaoyot hapkunanga kavamatokatot Oktikataktot Tingmitjat *Hogaat Maligaitnik* (1994) tatvanilo *Nunavumi Angotighat Maligaitnik* (2003), pitailiyaoyot ahikoktigilogit tingmitjat oploaitnik mannikaktitloget, uvalu pitailiyaoyot eghitagilogit hapkua ammihoakjuut oktikataktot tingmitjat hogatjat. Hapkua oktikataktot tingmitjat hogaat alatkiit titigaghimangitot tatvani RSA-mi hapkua hogaatjat ihomalotaongitot tatvani kanatami Hogatjat Ikilivaliayoni Malikakmi (SARA 2002). Kihiani, hapkua pingahot emakmiotat hogaat uvalu 10-guyot nunamiotat hogaat otikataktot tatvunga RSA-mut titigaghimaliktot ematot 'Ammiknaghiyot' titigaktaohimalikhotik tatvani CESSC-mi naonaipkutaovlotik Nunavumi (CESSC 2010). Immakak Havagiyaoyomi-ihoilotiginiagahogiyayot ilaliothoget hapkua Havagiyaoyomi havangit ihoilotaoyungnaktot naonaipkutit: Angotikakvitni niginiakviit tamainik, ihoilotaoyot koinginakningit, ihoiyaotiniakajuk ingilgayangitnit, Kanok tokotaohimangmangat uvalu anniktaohimangmangat, pinahoangitoget tokutaohimayot, nagiakhimayot, akoaghihimayot tokunaktonik, uvalu ikilivalianingit eknioktot. Ihoaghaotighait uvalu monagitjutighaita oktotighait ihoaghaktaoniaktot ahivagahoakloget uvalunin ikililagahuakluget hapkua ihoilotaoniaktot ilaliothilugo hamna Havagiyaoyomi havagiyaait, nipikpalat koinginaktot, kayomiktonik ingilgatjutinik hokaighimaloget, atokataktait okiomi apkotit, ikkakokviovot uvalu tokonaktot hiamangitangita angotighanot, uvalu hamna ihoaghaotighait hapkuninga Angotighanik Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotait (Makpigak 10, Titigak 20). Katimayiovot

hapkuninga ihoaghaotighaitnik hapkua ihoilotaoyot titigaghimayot tatvani Angotighat Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotaitni (Makpigak 10, Titigak 20), hamna naotaipkutat hapkuninga ihoilotaoyonik Tikikataktonik Tingmitjanik Hogaanik etkomayaoyok ematot **Ihoilotaongitot**. Hapkua nigigiyaongitot ihoilotaolotik uvalunin titikniliokhimayot pitjutaongitot hapkununga tikikataktonot tingmitjanot hogaatnot.

Kivgaviit

Talimat hapkununga 8-goyonit allatkiktonit kivgaviitnin titigakhimayot tatvani omayot of the eight RSA-gani hogatjat hapkua ihomalotaovlotik. Hapkua emnaitni invakataktot kivgaviit uvalu hapkua manikami invakataktot okpiit titigaghimayot tatvani Ihomalotaoyoni uvani Naonaipkutani 1-mi tatvani kavamatokatkut Omayonik Kayagiyaoliktunik Malikami (Kanatami Kavamatkut 2013). Pingahot huli Emnaitni invakataktot hogatjat - Tingmiakpait, mikitkiyat kivgaviit, hapkualo kalaat - titigaktaohimaliktot ematot “Ihomalotaoloaktot” Nunavumi hapkununga Kanatami Nungotpalaiayonik Omayonik Ammighiyovlotik Katimayitnin SARA (CESCC 2010). Manikami naonaiyaitjutait hapkuninga nunamiotanik kivgaviitnik tahamanighiokatangitot eloani hapkua angotighat RSA-gani. Immakak Havagiyaoyomi-ihoilotiginiagahogiyayot ilaliotiloget hapkua Havagiyaoyomi havangit ihoilotaoyungnaktot naonaipkutit: Angotikakvitni niginiakviit tamainik, ihoilotaoyot koinginakningit, ihoiyaotinatjuk ingilgayangitnit, Kanok tokotaohimangmangat uvalu anniktaohimangmangat, pinahoangitoget tokutaohimayot, nagiakhimayot, akoaghihimayot tokunaktonik, uvalu ikilivalianingit eknioktot. Ihoaghaotighait uvalu monagitjutighaita oktotighait ihoaghaktaoniaktot ahivagahoakloget uvalunin ikililagahuakluget hapkua ihoilotaoniaktot ilaliotilugo hamna Havagiyaoyomi havagiyait, nipikpalat koinginaktot, atokataktait okiomi apkotit, ikkakokviovot uvalu tokonaktot hiamangitangita angotighanot, uvalu hamna ihoaghaotighait hapkuninga Angotighanik Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotait (Makpigak 10, Titigak 20). Katimayioyot hapkuninga ihoaghaotighaitnik hapkua ihoilotaoyot titigaghimayot tatvani Angotighat Ihoaghaotighaitnik uvalu Kimilgokutighaita Parnaiyaotaitni (Makpigak 10, Titigak 20), hamna naotaipkutat hapkuninga ihoilotaoyonik Kivgaviitnik etkomayaoyok ematot **Ihoilotaongitot**. Hapkua nigigiyaongitot ihoilotaolotik uvalunin titikniliokhimayot pitjutaongitot hapkununga tikikataktonot kivgaviit hogaatnot.

Emmagiktoni Avatilikinikut

Kanani Emmakmik Kullikutit

Naonaipkutait emmakmik Kullikutit katitaohimayot kagitaoyamot hatkiomaliktot haffuma Goose-mi Havagiyaoyomi LSA tatvanga 2010-mit 2013-mut uvalu tatvanga George-mit Havagiyaoyomi LSA tatvanga 2012-min 2013-mut. Emakak Havagiyaoyomi ihoilotaoniaktot ilaliotiloget hapkua emmap atokninga, iglukupakakvitni emmak monagivlugo havagiyaoninga, uvalu okiomi apkohioknik. Ehoaghaotigait uvalu monagitjutighaita oktotighait ehoaghaktaoniaktot ahivagahoakloget uvalunin ekilivaligahoakloget hapkua ihoilotaoniaktot ilaliotiloget: Titigaoyanik illavikniaknikata emmakmik atokningita Makpiganit hapkununga atogaoyot emmap ingilganinganik monaginahoakloget hapkua ekalukakningit, malikaloget ukkua DFO-kut maligaitnik okkiomi emmap atokningitnik, emmap ingilganinga toghoakut hapkununga emmakakviovonot, uvalu malikaloget hapkua okiomi apkohiokutait uvalu monagitjutaita DFO-kut aolatjutita naonaipkutait. Katimayioyot hapkuninga ihoaghaotighaitnik hapkua ihoilotaoyot titigaghimayot tatvani Iglukupakakviatni Emmaotaita Kimilgokutighaita uvalu Monagitjutighaita Parnaiyaotaitni (Makpigak 10, Titigak 7), hamna naotaipkutat hapkuninga ihoilotaoyonik Emmakmik Kulliktotaitnik etkomayaoyok ematot **Ihoilotaongitot**. Hapkua nigigiyaongitot ihoilotaolotik uvalunin titikniliokhimayot pitjutaongitot hapkununga tikikataktonot emmap Kullikutighaitnik.

Emmagiktoni Kanogininga

Naonaipkutait emmakmik Kullikutit katitaohimayot tatvanga George-min Goose-minlo LSAs tatvanganin 1994-min, havagiyaohimakhotik emmakmik kimilgokivlutek tatvanganin extensive 2010-min 2013-mut.

Ihomagiyaoyot hapkua Havagiyaoyomi- ihoilotaoniaktot ilaliothilugot opingami aoktokpalianinga, emaikpalianingit pannikpialialigangat, halomailgok emak kokloakninga, and hilap kanogivalianinga: pH, TSS, niginiakutit, havivaloit, hydrocarbons BOD, chorine, uvalu cyanide. Hapkua ihoaghaotighait uvalu monagetjutighaita oktotighait piyaktaotighait uvalunin ikivaliotighaita hapkua ihoilotaoniaktot ilaliothilugot hapkua: Havagiyaoyomi titigaoyakhimayonik hapkua ihoakutighat apkohioktonot uvalu tunngavighaitnik, uvalu ihoaghaotighait ilaliothihimayot tatvani EMS. Katimayioyot hapkuninga ihoaghaotighait oktotighait tatvani Iglukpakakviyoyomi Emmaotaita Kimilgokutaitnik uvalu Monagitjutighaita Parnaiyaoyaitnik (Makpigak 10, Titigak 7) uvalu hamna Emmalikinikut Ihoaghaotingita Monagitjutighaita Parnaiyaotait (AEMP; Makpigak 10, Titigak 19), Haffuma naonaipkuta halomailgonik haffuma Emmagiktoni naonaiyaotaitnit ihomagiyaoyok tatva **Ihomalotaongitok**. Hapkua nigioyongitot ihoilotaolotik uvalunin titikniliokhimayot pitjutaongitot hapkununga Emmagiktoni kanogininganik.

Emmagiktoni Hunnavaloit Ilaliothihimayot

Naonaiyaktaohimayot Emmagiktoni hunnavaloit ilaliothihimayot katighoktaohimayot kagitaoyakut tatvanga George-mit uvalu Goose-mitlo LSA-gitnit tatvanganin 2007-min, havagiyaoloaghimavlotek tatvanganin 2010-min 2013-mut. Ihomagiyaoyot Havagiyaoyomit-ihoilotaoniaknahogeyaoyot ilaliothilugot hapkua Havagiyaoyomi havagiyaoyot naonaiyaktaohimayot hapkua aoktokpaliatitlugo kokloakninga, emmaiktitalianingit, halomailgop emmap koviogakninga, uvalu hilap kanogininganik: halumailgot hunnavaloit, niginiakutaoyot uvalu omayovaluit mikiyot, havivaloit, himikhimayaitnin halomailgot. Hapkua ihoaghaotighait uvalu monagetjutighaita oktotighait piyaktaotighait uvalunin ikivaliotighaita hapkua ihoilotaoniaktot ilaliothilugot hapkua: hugolaipkutikaklotik uvalu ehoaghaotighait hapkua iglukpakakviatni ihoakutait titigahimayot tatvani EMS-gitni. Katimayioyot hapkuninga ihoaghaotighait oktotighait tatvani Iglukpakakviyoyomi Emmaotaita Kimilgokutaitnik uvalu Monagitjutighaita Parnaiyaoyaitnik (Makpigak 10, Titigak 7) uvalu hamna Emmalikinikut Ihoaghaotingita Monagitjutighaita Parnaiyaotait (AEMP; Makpigak 10, Titigak 19), Haffuma naonaipkuta halomailgonik haffuma Emmagiktoni Hunnavaloit Ilaliothihimayot ihomagiyaoyok tatva **Ihomalotaongitok**, uvalu hamna Emmakmiotat Monagitjutighaita Parnaiyaoyait (AEMP; Makpigak 10, Titigak 19), Hapkua nigioyongitot ihoilotaolotik uvalunin titikniliokhimayot pitjutaongitot hapkununga Emmagiktoni Hunnavaloit ilaliothihimayot.

Emmagiktoni Ekaluit/Emmakmiotat Niginiakviit

Ayoknaktonik naonaiyaotait hapkuningaEmmagiktoni ekaluit/emmakmiotat niginiakviit havagiyaohimayot tatvani Goose-mi uvalu George-milo Havagiyaoyop LSA-gitni tatvanganin 201-min 2013-min. Avatkomayot hapkua 30-goyot kukaoyat naonaiyaktaohimayot tatvan Havagiyaoyomi LSA-gani, uvalu avatkomayot hapkua 20-goyot tatvani George-mi Havagiyaoyomi LSA-giti. Tatvani Goose-mi LSA-gani, tatva iliitkohigiyait hapkua ayoghaotait ekaluit ingilganingit tatvani kukaoyami akungani haffuma Pond A uvalu Giraffe Lake (tatvanitmat uvalu Koviokakviyoyop nayoga) tatvanilo kukaoyap akunanitomi uma Umwelt Lake uvalu Goose Lake. Ihomagiyaoyot hapkua ihoilotaoyungnaktot okaotaohimaliktot ilaliothilugot Emmagiktomingakhimayot uvalu hunnavaloitnik ilaliothihimayot naonaiyaktaohimangmata. Havagiyaoyomi havagiyaoyot ihomagiyaoyot ihoilotaoyungnaktot hapkuninga Emmagiktoni ekalutaitnik/emakmiotat niginiakviitnik ilaliothilugot hapkua tamaivalianik omayonik hamna tahik emaiyaktaovalialikat, hannayaovaliatitlugo hapkua angmaomayot nunaap kangani uyagaghiokvighat, emmiktakviyoyot inuknun uvaku hunanot atogaoyoghanik, uvalu okiomi apkuhioknik. Kukaoyani niginiakviyoyot tamaiyaoniagahogiyayot hamna uyagaghiokvighak hannayaolikait. Hamna ihomagiyaoloaktat ehoaghaotighak hiamaktailinahoakloget hapkua halumailgot hamunga Emmagiktomi ekalukaknigitnut/emakmiotat niginiakviitnot ukkua Havakviyoyop pitailiniaktat hannavigitaililugot hapkua ekalukakniget ayoknangitpat. Hapkua Koviogakvighait uvalu uyakat ikkatoghat aghini hannayaoniaktot hannikpani hapkua ekalukakniita emmakakniit. Tatvataok huli ihoaghaotighat aolagotiyomavlugot hamna angiyok emmakakvighait taima monagitiagiangita hapkua ekaluit nayugait hapkunani Goose-mi, Propeller-mi, uvalu George-mi tattini. Hamna kihiani tamaiyomangitkaloakhugo

ekaluit niginiakvigivagat (oktotigivlugo, tamaininga tatvani Llama-mi tahik una angmaomayok uyagaghiokvigihaniakmat tatvani Llama-mi) ehoaghivaliktaoniakmat havagilugo ekaloiyagomavlugo parnaiyaotigiyat. Taimaitmat tatva, hamna ihoiyaotaolaitnahugiyaoyok hapkunani VEC Emmagiktomi ekalukakniyuni/emmakmiotat niginiakviitni. Tatva Havagiyaoyomi halomailgonik hiamaktitaolainahugiyaongmata, ahinot hiamaktitaolaitot hapkununga allatnot Havagiyaoniaktunot. Taimatot hapkua ihoilotaoniaktot uvalunin tingilgalaktonik hiamajaktoghanik pikaknahugiyaongitot.

Emmagiktomi Ekalukakningit

Hapkua Emmagiktomi Ekalukakningit hapkunani Goose-mi uvalu George-mi Havagiyaoyokni LSAs-git naonaipkutaoyok hapkuninga Okiokaktomi Emmagiktomi iliitkohitokaitnik uvalu ilaliotihimayot hapkua Emmagiktomiit hitovaliyot uvalu mayokpaliyot ekaluit tagioganit haffuma Tagiokmi laydown Area. Hapkua hivolikpangit naonaiyaghimayait tatvanganin 2010-min tatvunga 2013-mut eloani haffuma LSAs-ganin. Hapkua Emmagiktomi ekalukakningit taimainginaktot ajikutagiyaitli ahini tahioyoni uvalu kukiktoni nunani tahamani Kanatap Okioktaktungani. Hapkua ekaluit ehuut amigaitkiyaoyot, amigaitotaok hapkua kapihiliit, Arctic Grayling, kanayoit, uvalu hapkua Ninespine Stickleback. Hapkua allatkit ekaluit nalvanguyaohimayot tatvanu eloani havagiyaoyop kangingani hiokjuktoit uvalu tahikmiotat anaghiit. Ekalukpiknik takungitot tapkunani Goose-mi uvaluin George-milunin LSAs, tahamanitokaghimayungnahiyogaloit kanilgoani Emmagiktomi RSAs.

Ihomagiyaoyot emakak hapkua Havagiyaoyoni-ihoiyaotaoyungnaktot hapkunani effects VEC Emmagiktomi ekalukakniyoni ukkua ihomagiyaoloaktat malgoknin ekalokakloaktonit Emmagiktomi uvalunin mayoktoto uvalunin hitoyot ekaluit tatvani havagiyaoyok kaningani LSAs, hapkua ehuut uvalu Arctic Grayling. Hamna ihomagiyaoloaktot tatvani havagiyaoyoni ihoilotaoniagahugiyaoyot tokokaknikata uvalunin ikkilivalianingit tattit emaiyaktaovaliatitlugit, apkuhioktitlugit okiokmi apkutighanik, igluliokpaliatitlugit tatvani iglukpakakvigihami, emmaiyaaktaovaliatitlugit inuit atoktaghaitnik uvalu atogaoyughanik okiomi apkohiokutighanik, uvalu atoktitlugit hapkuninga kakaktaotinik. Una ihomagiyaoloaktot ihoaghaotighaitnik oktotighaat tatva aktoktailinahoakloget hapkua nayogait ehuut uvalu Arctic Grayling tatva hamna Havagiyaoniakyop iglukpakakvigihami nayokvighait kanganiipkaktailinahoakluget hapkununga Emmagiktomi ekalukakniita niginiakvigiyaitni ayoknangitpat. Hamna koviogakvighat halomailgonik uvalu uyakat atungitot ekaktaoyoghat totkomaviit hannikpaniitot aktomangitangita ekalukakniyoniit. Tatvataok huli ihoaghaotighaita oktotighat aolagotinahoaktugo hamna ilavighimalogit attoktailinahoaklugo hamna emmiktakviyoyok hamna ihomagivlugo monaginahoakluget hapkua ekalukpiakjuut nayogagiyait aklivaliatitlugit hapkunani Goose-mi, Propeller-mi, uvalu George-mi tattini. Elani ayoknapakmat tamaivakhuni hapkunani Emmagiktomi ekaluknik (oktotigilugo, ekaluiyaknik tatvani Llama Lake-mi pitjutaoniakmat una Llama-mi angmaomayok nunaap kangani uyagaghiokvigihak) huli ihoaghaktaoyungnaktot atoklugo hamna Etkokahoakluget hapkua Ekalukakningita Parnaiyaotighat. Hamna naonaitok hapkuninga ihoilotaoniagahugiyaoyok ikkilivalianahugiyaolotik hapkuninga Arctic Grayling ekaluitnik tatva tamainiaktitlugit tatvanga Llama Lake-mit uvalu hapkua tahamani toghoat kokloakvioniaktot ihomagiyaoyot tatva **Ihomalotaongitot**. Hapkua katimayiit hapkuninga ihoakhaitjutighanik titigaghimayoni tatvani Iglukpakakviyoyoni Emmakakviita Kimilgokutaita uvalu Monagitjutighaita Parnaiyaotaitni (Makpigak 10, Titigak 7) uvalu tatvani Emmakmiotaknik Ihoilotaoniaktonik Monagitjutighaita Parnaiyaotaitni (AEMP; Makpigak 10, Titigak 19), tatva halomailgonik ihoilotigalaitnahugiyaoyot hapkua ehuut. Tatvalo ihoilotikalaitnahugiyaoyot hapkua Arctic Grayling uvalu Ehuutnik ekalukakniitnik.

Tagiokmi Avatilikinik

Tagiomi Emalikinikut Kanokininga

Hivoliit naonaiyaotait Tagiokmi emalikinikut kanokininga katighoktaohimayot tatvani Tagiokmi RSA-gani Killohiktomi tatvanganin 2001-mi uvalu eloani haffuma LSA-gangata tatvani 2013-mi. Ihomagiyaoyot

Havagiyaoyomit ihoilotaoniagahugiyaoyot ilalioitluget hapkua omitjat ingilganingit; halomailgot hiamakpalianingit uyagaghiokvighanik hanavaliatitluget, iglukpiokpaliatitluget, uvalu omiktaokpata havagivaliatjutighaitnik; havakvioniaktot emap kokloakningit; okiomi apkuhioktitluget; kakaktaotit atoktaotitluget; ohokyoat, kinniktoit, uvalu hapkua katighokhimayot kuuknik himiktikutit (PAHs); halomailgot annakviitnin koviokaktaohimayot; uvalu tingilgalaktot hiokkak. Ihoaghaotighait uvalu monagitjutighaita oktotighait havagiyaoniaktot ahivakahoakutighait uvalu ekilivaliotighait hapkua ihoilotaoniakahugiyaoyot hapkua ilalioitluget: hokkaikpaligahoakluget omitjat ingilganingit uvalu ingilgapkagahoakluget omitjat ingilganingit emmap ettinigt, happutuhiokhuget hapkua emmap kokloakningit kotilgonot tatvalo kokloakviliokloget tatvunga hannayaohimayonot kokloakvighaitnik tattinot tatvani Marine Laydown Area-mi, atoklotik hapkuninga avogivaktaitnik hiokamik apkohiolikangata uvalu tunngavilioligangata, malikalugit hapkua maligait hapkununga halomailgonik emmaknik koviogakvitnin, uvalu atogahoakluget hapkua nakunighaoyot atanguyat ihomagiyaait hapkununga totkokvighanik, aknaktatitot, ohokyoakakvighaitnun, kakaktaotitot, uvalu kayangnaktonik havagiyaaitnik uvalu hapkununga hiamaktaititjutighaitnik hiokat uvalu ikkolativighaitnik. Hapkua katimayit hapkuninga ihoakhaitjutighanik titigaghimayoni tatvani Emmakmiotatnik Ihoilotaoniaktonik Kimilgokutaita uvalu Monagitjutighaita Parnaiyaotaitni (Makpigak 10, Titigak 7) uvalu tatvani Emmakmiotatnik Ihoilotaoniaktonik Monagitjutighaita Parnaiyaotaitni (AEMP; Makpigak 10, Titigak 19), tatva halomailgonik ihoilotaligalaitnahugiyaoyot (AEMP; Makpigak 10, Titigak 19) uvalu tatvani Iglukpakakviyoyoni Emmakakviita Kimilgokutaitnik uvalu Monagitjutighaita Parnaiyaotaitni (Makpigak 10, Titigak 7), Tatva naonaiyaotaoyok hamna halomailgok Tagiokmi emmap kanokiningani **Ihomalotaongitok**. Nigiogiyaongitot hapkua ihoilotaolotik uvalunin tingilgalaklotik hiamakpalialotek tahamunga Tagiokmi emmap kanokilinganot.

Tagiokmi Halomailgokakningit

Halomailgokakningitnik naonaiyaotait katighoktaohimayot tatvani Tagiokmi RSA-gani Killohiktomi tatvanganin 2001 uvalu havagiloakhuget eloani haffuma LSA-gani uvani 2013-mi. Havagiyaoyomit ihoilotaoniagahugiyaoyot ilalioitluget hapkua omitjat ingilganingit; halomailgot hiamakpalianingit uyagaghiokvighanik hanavaliatitluget, iglukpiokpaliatitluget, uvalu omiktaokpata havagivaliatjutighaitnik; havakvioniaktot emap kokloakningit; okiomi apkuhioktitluget; kakaktaotit atoktaotitluget; ohokyoat, kinniktoit, uvalu hapkua katighokhimayot kuuknik himiktikutit (PAHs); halomailgot annakviitnin koviokaktaohimayot; uvalu tingilgalaktot hiokkak. Ihoaghaotighait uvalu monagitjutighaita oktotighait havagiyaoniaktot ahivakahoakutighait uvalu ekilivaliotighait hapkua ihoilotaoniakahugiyaoyot hapkua ilalioitluget: hokkaikpaligahoakluget omitjat ingilganingit uvalu ingilgapkagahoakluget omitjat ingilganingit emmap ettinigt, happutuhiokhuget hapkua emmap kokloakningit kotilgonot tatvalo kokloakviliokloget tatvunga hannayaohimayonot kokloakvighaitnik tattinot tatvani Marine Laydown Area-mi, atoklotik hapkuninga avogivaktaitnik hiokamik apkohiolikangata uvalu tunngavilioligangata, malikalugit hapkua maligait hapkununga halomailgonik emmaknik koviogakvitnin, uvalu atogahoakluget hapkua nakunighaoyot atanguyat ihomagiyaait hapkununga totkokvighanik, aknaktatitot, ohokyoakakvighaitnun, kakaktaotitot, uvalu kayangnaktonik havagiyaaitnik uvalu hapkununga hiamaktaititjutighaitnik hiokat uvalu ikkolativighaitnik. Hapkua katimayit hapkuninga ihoakhaitjutighanik titigaghimayoni tatvani Emmakmiotatnik Ihoilotaoniaktonik Kimilgokutaita uvalu Monagitjutighaita Parnaiyaotaitni (Makpigak 10, Titigak 7) uvalu tatvani Emmakmiotatnik Ihoilotaoniaktonik Monagitjutighaita Parnaiyaotaitni (AEMP; Makpigak 10, Titigak 19), tatva halomailgonik ihoilotaligalaitnahugiyaoyot (AEMP; Makpigak 10, Titigak 19) uvalu tatvani Iglukpakakviyoyoni Emmakakviita Kimilgokutaitnik uvalu Monagitjutighaita Parnaiyaotaitni (Makpigak 10, Titigak 7), Tatva naonaiyaotaoyok hamna halomailgok Tagiokmi halomailgokaningit **Ihomalotaongitok**. Nigiogiyaongitot hapkua ihoilotaolotik uvalunin tingilgalaklotik hiamakpalialotek tahamunga Tagiokmi halomailgokakningit.

Tagiokmi Ekaluit Fish/Emakmiotat Niginiakviit

Hivolikpat naonaiyaotait hapkunani Tagiokmi niginiakviitni katighoktaohimayot tatvani RSA-gani haffuma Killohiktomi tatvanganin 2001-mi uvalu tatvani LSA-gani uvani 2012-mi uvalu 2013-mi. Ihomagiyaoyot ihoilotaovalangitot ehoaghaktaohimayot ilaliothimavloget haffuma Tagiokmi emmap kanokilinani uvalu halomailgot kanokilinganingita naonaiyaotaitni. Havagiyaoyomi havagiyait ihoilotaoniaghugiyaoyot hapkununga Tagiokmi ekaluitnun/emakmiotat niginiakviitnik ilaliothimayot tatvani emmakakviita hannavighaitni una Marine Laydown Area-mi tammayakakviitni (emmakakviita hannaviatni haffuma omitjat tolaktakvighani uvalu nunamot tunmigakhani). Hapua ihoaghaotighat nigioyiyaoyot ihoakutaotit hapkuninga ihomagiyaoyonik ihoilotaoniaghugiyaoyonik hapkuninga Tagiokmi ekaluknik/emakmiotatnik niginiakviitnik: ihoakutighait elioagaktaoniaktot ahivaknahoakloget uvalunin ikkilivaligahoakluget hapkua ihoilotaoniaktot hapkununga emmap kanokininganot uvalu halomailgonik kanokinikanik, uvalu emakak atokninga haffuminga Etkogahoaklugo Tagiokmiotat ihoaghaotighaita Parnaiyaotat. Taimaitmat, hamna hiamatjakninga halomailgonik nigioyiyaongitok tatvani VEC-gata Tagiokmi ekaluitnik/emakmiotat niginiakviitnun. Tatva halomailgot uvalunin tingilgalaktot halomailgot ayokhaotikalaitnahogiyaoyot.

Tagiomi Ekalukakningit

Tatva 19-guyonik allatkinik ekalukhimayot tatvani naonaiyaihimagmata akungani 2001-mi uvalu 2013-mi, uvalunin ekalukniakhimayait, tatvanga Tagiokani haffuma LSA-gata. Hapkua ammagaitkiyaoyot ekalughimayait Kanayoit, innagayok uvalu allatkit ekalukpiakyoniot. Hapkua allatkiit ekaluganoit naonaiyaktaohimayot ihomagiyaonitot ekilivaliyot uvalunin tammakpaliayot. Hapkua ekalukpiit piyaohimangitot hapkua naonaiyaktaotitluget, kihiani tahamaninginaknahugiyaoyot LSA-gani tahamna kukaoyakakmat ekalukpit nayogakingmatjuk tatvani Tagiokmi RSA-gani. Ihomagiyaoyot hapkua Havagiyaoyomi ihoilotaoniaghugiyaoyot ihomagiloaghuget hapkua Ekalukpiit uvalu ilaliothilugit hapkua tokkunaotiginiagahugeyaoyot hapkununga emmakmi havagiyaoniaktot uvalu kakaktaghimaktitluget, tatvalo emakmiotat amegaikpalianingit hiamakpata emmakmi kakaktaktitluget, uvalu emmap attanin koinginaktot nivvyaghimatitluget omitjat avatinot ingilgahimaaktitluget. Ihoaghaotighaita oktotighat uvalunin ikkilivaliothighait hapkua ihoilotaoniaghugiyaoyot hapkua ilaliothilugit ikkilivaligahuakluget hapkua emmap attani havagiyaoyot, piikpiakloget hapkua emmap atani kakaktaknik, uvalu malikanik ehoaghitilugit hapkua omitjat ingilganighaitnik kayomiitomik tatvuna ingilayangagot haffuma RSA-gata. Katimayiit hapkuninga ihoaghaitjutighaitnik tatvani Emmakmiotatnot Ihoilotaoniaktotnik Monagitjutighaita Parnaiyaotaitni (AEMP; Makpigak 10, Titigak 19), tatvalo Omitjat Parnaiyaotaitni (Makpigak 10, Titigak 15), and the Koinginaktot Nivyaktitpaliangitangita Parnaiyaotaitni (Makpigak 10, Titigak 18), hamna naonaiyaotat hapkuninga hiamaghimayonik halomailgonik Tagiokmi ekalukakningitni tatva naonaiyaotaotitluget hapkua Ekalukpiit ihomagiyaoyot tatva **ihomalotaongitot**. Tatva ihomagiyaoyok tatva halomaitgonik hiamakpalianinga naonaiyaktaohimayok haffuma Tagiokmi RSA-gani. Hamna hiamakpalianinga hapkua koinginaktot ihomagiyaoyot tatvani **Ihomalotaongitot**. Tatvalo ahinnot hiamaktokalaitmata hapkuninga ihoilotaoniaktugiyaoyonik.

Tagiokmiotat Hoggat/Tagiokmiotat Tingmitjat

Tagiokmiotat hoggat uvalu tagiokmiotat tingmitjat ilaliothimayot hapkua tikkikataktot allatkit tingmitjat tahamungakataktot Tagiokmi kanninganot okiogalok hila kanogilingagaloaktitlugo uvalu naonaiyaktaovlotik hapkua allatkit hoggatjat ilaliothilugit kingalgit, scoters, ollut negliviitlo kangoitlo uvalu kokyot, povyakpaktot mitkiit ahangit, tulliit, kakhaut uvalu naoyat. Tagiokmiotat Hoggat Tagiokmiotat Tingmitjat tatvalo ivvatitluget obluit monagiyaoyot tatvani kavamatokatkut Tikkikataktotnik Tingmitjat Nayoghaitlo Maligaitni (1994). Hapkua pingahuyot Tagiokmiotat Hoggat Tagiokmiotat Tingmitjat allatkit titigaghimaliktait ematot “Ammiknaghiyot” tapkunani Kanatami Tammakpalianingitnik Omayonik Katimayiitnit (CESCC) ihomagivluget hapkua Nunavummiutat: Huukloktuiy, naoyat allangayot, uvalu hapkua ahangit (CESCC 2010). Tingmiakut uvalu nunakut naonaiyaihimagmata tahamani Tagiokmi omayotnik RSA akungani 200-mi uvalu 2013-mi ivvatitluget

(June-mi July-milo) tatva;p ihhaliktitluget (Aggasimi) naonaiyaihimagot kititluget hapkua 23-goyut allatkitnik hoggatjanik tatvani Tagiokmi RSA tatvani Killohiktomi ihhatitluget. Ihomagiyaoyot tatva Havagiyaoyomi ihoilotaoniagahugiyaoyot ilalioitluget koingetkutiginahugiyaoyot effects (oktotigiloget, nipikpalat) uvalu ekkilivaliagahugitaoningit eknioktot. Ihoaghaotighaita oktotighat ahivakahoakloget uvalunin ikkilivaligahoakluget hapkua ihoilotaoniagahugiyaoyot: Naonaiyatiakloget uvalu aktoktailinahoakluget hapkua attoloaktait ingilgayangit ehoakhailotik hapkuninga tingmiat kulaotakvighaitnik ingilgavighaitniklo akoangitangita tingmitjat hoggatjatlo ihhatitluget nayogait, naonaitiaghimaloget hapkua kollaotakvighait ematot 650 m kangagoakloget hapkua kaoyimayaoyot ihhakakviolet. Katimayit ihoaghait hapkuninga titigaghimagot tatvani Angotighaniik Ihoaghaitjutighait uvalu Monagitjutighaitniklo Parnaiyaotait (Makpigak 10, Titigak 20), una naonaiyaotait hapkuninga hiamayaghimagot ihoilotaoyonik ihomagiyaot tatva **Ihomalotaongitok**. Tatvalo ahinnot hiamaktokalaitmata hapkuninga ihoilotaoniaktugiyayonik.

Nattit

Tingmiakut naonaiyaihimagmata opingaghami nattiit mitkoiyaliktitluget (kittikaliktitlugo-May akkuningani July kittikanot) akkuningani 2007-mi 2013-mut tatvani Tagiokmi RSA-gani naonaiyagahokluget amegaitilangit uvalu nanikatakhangata nattit. Tatva naonaiyaktahimagmata hapkua nattikakningit tahamani kangikhoani Kingaokmi, tatva hapkua nattit nayogagiyait naonaitot tatamavloni hamna kangighok, kihiani hamna hivogani haffuma RSA-gata hivogani Kingaop tahamani ikkitkiyaoyot nattit hapkua enekniit uvalu nattiaghait naonaiyaktahimagot. Nattit agluit apputip atani nayogait nalvanguyahimagot tunnuani RSA-gata naonaiyaihimagtitluget; nattit agluit naonaiyaktangitot hivogani hapkua RSA-gani uvalunin tatvani LSA-ni. Ihomagiyaoyot tatvani Havagiyaoyop ihoilotaoniaknahogeyaoyot ilalioitluget hapkua nayogaita niginiakviit, koingakningit (oktotigiloget, nipikpalat), kanok tokotjuthahimagot uvalu annikuthahimagot, pinahoghamaitomik tokotjuthahimagot, aktokningit tokonaktonik halomailgonik, tatvalo ikkilivaliotait ekniokatakningitnik. Tarva omitjat ingilganingit aolakatakniaktot kihiani hikoigaikpat aoyaotitlugo tahamani Havagiyaoyomi (Aggasimi 25 tatvunga Aktopa 31) taimaitlugo nattikakninga tahamani Tagiokmi LSA uvalu RSA nigiyogiyoyot tatva nattikatiangitnahugiyaoyot. Hapkua havagiyaoyot tatvani Marine Laydown Area-mi nigiyogiyoyot hikukangititlugo omiaktoknaktitlugoli havagiyaoniaktot uvalu okiom hapkua okiom apkohiokhimalikata ingilgavighaitnik (Desaipa akkuningani Masimot). Hapkuai havagiyaoniaktot nattikagohimalaktitlugo tahamna LSA-gani uvalunin hivugani RSA-gata (hivogani Kingaop). Ehoaghaotighat oktotighait ahivagahokluget uvalunin ikkilivaligahoakluget hapkua ihoilyaotaoniagahugiyaoyot ilalioitluget: naonaiyakloget uvalu pitailinahoakloget hapkua nattit agluit kakipkaviit apputip atanni. Una Havagiyaoyot ihomagiyaongitok tatva ihoilotaoniakloni hapkuninga nattitnot uvalu hiamatjinga halomailgot tahamunga tikkitniagahogiyayongitok.

Inulikinikut Avatilikitjutighait

Engilgaknitat Eniitokliit

Kangahanoak tatvani iglukpiovioniaktomi naonaiyaihimagmata eloani haffuma Havagiyaoniaktomi Hannavikhaitniklo Iglukpioklotik (PDAs), hapkuningalo eniitokliitnik LSA-gani uvalu RSA-gani hapkua okiot attoktitluget 2001, 2002, 2004, 2007, 2010-mi akkuningani 2013-mut. Elangit hapkua engilgaknitnik tohaktitjutighaktot tatvunga RSA-ganit hatkiomayot taimanganin 1970-nit akkuningani 1990-nut. Hamna iglukpiokviokpat Havagiyaoyot ihomagiyaoyot tatva ihoilyaotaoniagahugiyaoyot hapkuninga engilgaknitnik eniitokliitnik. Tatva ihomagiyaoloaktot hamna ihoaghaotighat tatvani havakvioniaktomi ema aktoktailinnahoakloget hapkua eniitokliit havaktonit tatvani Havagiyaoyomi. kihiani, ayoknatoakat aktoktailinnahoakluget, tatva ihoaghaotighait hapkua eniitokliit havagiyaoniaktot hamna iglukpiokvigiyaoiktinnago. Hapkuataok engilgaknitat eniitokliit naonaiyaktahimagot iliitkogiyahimagot iglukpioliktitluget, havakviahimagotitlugo, uvalu omiktaonialiktitlugo hamna naonaiyaktahimagot ukkua Havagiyaoyomi eniitoklikiyiyaitnit,

titigaktaolotik, uvalu onipkagiyaoniaktot tatvunga Nunavut Kavamat-nut Havakviatnun ukkua Eliitkohilikiyiit uvalu Engilgaknitalikiyiit atoklugo hamna “Akoaghinikomik Havagiyagiakaktait.” Hapkua eniitokliit akkuaktaohimayot havagiyaoniaktot monagiyaolotik uvalu ihoaghaktaolotik ajikohioktaolotik hapkua ilihimaliktatik eniitokliit okaotaohimayot. Tatva aktoktaohimangitpata uvalu/uvalunin ihoaghaotighaitnik ihoaghitiyaohimangikata, havagiyaoyop kihingoktaoningit hapkunani ilihimayaoyoni eniitoliitni ihomagiyaoyot tatva **Ihomalotaongitot**. Hapkuali angetilangit nayogaitlo eniitokliit tatva hiamaktokalaitogiyaoyok halomailgonik uvalu tingilgalakluni halomailgok hapkununga tatvunga Havagiyaoyomit hapkununga VSEC engilgaknitat eniitokliitnun.

Inulikinikut-pivalianikut

Hapkua naonaiyaotait hapkuninga ihoilotaoniaknahugiyaoyonik tatvani Havagiyaoyomi inulikinikut-pivalianikut pitjutikaktot talimanik VSECs: 1) pivalialikinikut; 2) nanminiktakutighanik; 3) havaghanik; 4) ilikhaknikut uvalu ilihakpaliotighanik; uvalu 5) anniaktailitjutighanik uvalu nunaliitni innutiagotighaitnik. Tatva kititluget hapkua 10-guyot ihoilotaoniagahugiyaoyot naonaiyaktaohimayot, ehoaghitihimayait 7-nik ihoaghaotighanik, malgoknik ihoilotaoniagahugiyaoyonik, uvalu ataohikmik tamakmik ihoakutaoloni uvalu ihoilotaoloni. Nakuatot ihoakutighat naonaiyaktaohimayugaluit kihiani kimilgoktaohimangitot ihoilotaoniakata uvalunin ihomagiyaongitot ihoilotaolotik uvalunin hiamaktikutaolotik ihoilotigiyaoniaktonik. Ihoilotaoniagahugiyaoyot huli naonaiyaotaohimayot ihoiyaotaolotik, taima ilaliothimayot tatvunga ihoilotaoyonot uvalu hiamaktigitjutighaitnik ihoiyaotinot naonaiyaotaovlotik.

Pivalialikinikut

Hamna Kitikmeotni Aviktoghimaninga avugektonik pivaliatjutikaktot, havagiyaoloakhutik hapkua kavamatkuni havagiyaoyot, nanminikaktotlo pivaliatjutikakhutik, uvalu hapkuninga iliitkohiktotaitnik havagiyakakhutik. Eliitagiyaohimayot hapkua pivaliatjutaoyot ihomagiyaoloaktot ilaliothimayot: kavamatkuni atanikakvit, anniaktailinikut havagiyaoyot uvalu inulikinikut, ilihaktolikinikut, niovvoyot, iglulioknik, ingilgalikinikut, polaktolikinikut, hanaoyaknikut uvalu mighoknikut, auvalu uyagaghioknikut nalvakhiochnik uvalu pivalialikinik (Naonaiyaiyiit Kanatami 2007). Hapkua kavamatkuni havagiyaoyot havagiyaoloaktot hamani Kitikmeotni maniliokutaoloakhutik, havagiyaovlotik hapkununga 80%-nik havaktikakhotik. katitluget, amegaikpalikniagahugiyaoyok hamna pivaliatjutigiyaghait hamna Havagiyaoyok aolakutigiakat uvalu hapkua naonaipkutaoniaktot: amegaikpalikniaktot nunaliitnin havaktot,manighakviokataliktotik, tatvalo niovgotigikataliklugo hamna manighagiyatik; Havagiyaoyomit-akkiliktotait (nunaliitni, aviktoghimayoni) hapkua nanminikaktot tahamanititluget Kitikmeotni uvalu nanilikak Nunavumi, taima amegaikpalikniaktot ikkayotighait manilikinikut hapkua nanminikaktot; ilaliothialialuget hapkua notaat nanminiktaktait uvalunin angiklivalikata hapkua nanminikaktot eloani Kitikmeotni Aviktoghimayoni havakaktot hapkuninga nioviaghanik uvalunin ikkayotighanik hivoagot piyaohimangitonik; uvalu/uvalunin pivalianahoakluget hapkua, uvalunin ilaliothinahoakloget maniliokutighait, Inuit-nanminiktaghimayait. Aghivaligahoaklugo hamna pivaliatjutaoyoghak, allatkiknik, uvalu havagiyaotiakningit nigigiyaoyot nakokutaoniagahugiyaoyot hapkuninga VSEC pivaliatjutigiyaitnik. Taima hamna kihingoktaoninga ihoakutaoloni atkunaotaoniagahugiyaoyok, hamna ihoilotaoniaknahugininga havagiyaongitmat ihoilotaoningit uvalu hiamotiyaoniakningalo naonaiyaktaohimangitok.

Nanminikakutighat

Ukkua Nunavut Kavamatkut tigomiakloaktat hamna nanminiktakutighak uvalu aghokutaoloaktot hapkuninga pivaliatjutighaitnik hapkua Kitikmeotni nunaliit. Kavamatkuni havagiyaoyot uvalu olasikataknik maniliokutigiloaktat hapkua inuit tatva taima,otiktaotioyoyaghuni, ikkayotaongmiyok hapkuninga nanminikaktonik tamaitni nunaliitni. Havagiyaoyomi havangit nigigiyaoyot hapkua angiklivaliotighait uvalu naovaliatjutighait hapkua Inuit uvalu okioktaktomi nanminikaktot ilaliothilugit:

kanoginingit nanminikaktot oktotighait uvalu ilaliotihimayot nanminikaktot oktotighait, ihomagiloakhuget hapkua niovgotaokataktot ihoakutighanik uvalu ikkayotighanik hapkunanga nunaliitni nanminikaktot; uvalu ikkayotaoniakmata havaktot manighagiyaghaitnun, manighakamanighakataligomik niovgotighakalikniakmata nunaliitni inuit havakalikpaliagomik. Hamna nigiogiyaoyok amegaikpaligotighait nunaliitni nanminiktagotighait ilikut tatva nigiogiyaongmiyok hatkitigiluni akkitonunik maniliokutighanik expected (oktotigilugo., naovaliatjutaoloni ilavaliotighanik nanminigiyaoyonik uvalunin aolatjutyoghnik notanik nanminiktakutighanik) hamna nigiokiyaovaliatitlugo Havagiyaoyoniaktok. Nunaliitni nanminikaktot hatkiktitaoniaktot oktotighainik nanminigiyaoyonik oktokataoyomanikata Havagiyaoyomi havaghanik, monagiyaoyonik tatvani Havagiyaoyoni hapkuninga ihoaghaitjutaoyonik uvalu monagiyaoyonik oktotaitnik hapkua oktotaitniakmata ikkayotighait hapkua nanminikaktot havaghaitnik uvalu nunaliitni niovgotaokatakniaakmata uvalu ikkayotighanik pitjutaolotik. Hamna allangokpalianinga uvalu to the growth uvalu allatkinik Inuit uvalu okiokatomi nanminikaktot nigiogiyaoyot nakokutaolotik hapkuninga VSEC nanminikaktot oktotighaitnik. Hamna ihoilotaoniaknahugininga havagiyaongitmat ihoilotaoningit uvalu hamaotiyaoniakningalo naonaiyaktaohimangitok.

Havakhait

Hamna ihomagiyaoyok havaktighakhioknik eloani hapkua Kitikmeotni nunaliitni emailingaok 3,475 uvani 2006-mi. Hapkua havakaktot hapkunani nunaliitni nahaotait emailingayot 2,185 havaghimayot, tatva naonaipkutaoyot havaktot emailingayot naonaipkutait 62.9%. Hamna Havagiyaoyok nigiogiyaoyok allangutaoloni haffuminga VSEC havagiyaoyonik pitjutigilugot: 1) allangutait havaghanik uvalu manighagikataktaitnik havaktot; 2) alangotait hapkua havaghakhiokt; uvalu 3) allangutait okokomayot nunaliitni havaghakhiokt. Ihoaghaotighait uvalu monagitjutyoghait oktotighait ihomagiyaoyot hapkuninga ilihakpaligotighanik, havaktighakhioknikut, uvalu havaktihimaakutighaitnik ehoaghaktaohimaliktot ilavaliogomavloget hapkua nunaliitni Inuit tatvani Havagiyaoyomi havagomayot tatva naonaiyaghimayot tatvani Havaktolikunikut Parnaiyaotaitni (Makpigak 10, Titigak 28). Hapkua parnaiyaotait oktotighait tatvani Havagiyaoyomi havaghakhioknikut ilaliotihimayot: Havaktonik pitiakutighait Parnaiyaotait; una Kitionik Havaktikagomaloakningita Parnaiyaotait; Havaktot Elihakpalikutighait Parnaiyaotait; uvalu ukkua Havaktigiyait Himaotigekataotighait Parnaiyaotait. Hamna ihomagiloakhugo havaktighakhioknik Inuinnaknek havagomayonik nigiogiyaoloaktok ematot ikkilivaliatjutaoniakmat amegaitonik havangitonik. Una Havagiyaoyok tohaktitakatakniaakmatjuk hapkua nunaliitni nanminikaktonik, timigiyaoyonik, uvalu hamalatkunik hapkuning havaktighakhiokutaita maligagiyaonik hioniani haffuma ihoaghaotighaitnik hapkuninga Igluliokutighanik uvalu Aolatjutyoghaitnik uvalu ihoakhaikataoyomaniaktot ikkilivaliotighaitnik hapkua ihoilotaokataktonik amegalikangata nunaliitni havaghakhioktonik.

Ihomagiyaoloaktot hapkua, havaghakatoagangata uvalu manighakatagangata tatvanga Havagiyaoyomit ikkayotaoloaktot uvalu ihomagiyaoloakhutik tatva ikkayotaoloakniaktot nalunangitok inuhikatiakutiginiaaktat hapkua havaktot uvalu katanguyait hamani Kitikmeot nunaliitni. Tatva Havagiyaoyomi havakaknik uvalu manighakataknik nigiogiyaoyok amegaikpaliotaoniaktok havakaktonik, ihomagiyaoloakhutik hapkua ayungitot uvalu havaktutokaoyot Kitikmeotni havaktot. Amegaikpalikhimalikata hapkua havaktot ikkilivalioktaoniakmata havakangitonik, akunaotaovalialonilo pivaliatjutaoyonik, uvalu pivaliatjutaoniakmingmata aviktoghimayonit havaktighakhiokutighaitnik ikkayotaoniakmata hionighami Havagiyaoniaktonik. Allangtigotaitnik hapkua manighagikataktainik uvalu havaktot amegaikpalianiakmata, tatvataok alangotikutait hapkuninga amegaikpaliotaitnik havaktughanik, nigiogiyaongmiyot nakkukutaolotik hapkuninga VSEC-mi havaktonik.

Tatva tatvani Havagiyaoyomi havaktot uvalu manighakataktot ihoilotaoyunghakmiyot ematot nunaliitni havalingoyonot. Taimaitmat, una Havagiyaoyok ihomagiyaoyok tatva hapkua inuit tatva havakaktot hamani Kitikmeotni Aviktoghimayoni kimmaiunghakmiyot havagiyamingnik havagiaktokomavlotik uyagaghiokvioniyomi. Kihianionghmat, amehoyot hapkua Kitikmeotni inuit havakaktot ahini

nigiogiyaongitot ihinnaklugit hapkua havagiyatik havaghakhiokumanikmut tatvani Havagiyaoyomik. Hamna ihoilotaoniakat **Ihomalotaongitok**. Hamna ihoilotaoniagahugiyaoyonik naonaiyaktaohimayok ilalioitivluget hapkua Havakvioniaktot uvalu inuit holilokagotait tahamani Kitikmeotni uvalu Nunatiامي tatva ihomagiyaoyot hapka ihoilotaoniagahugiyaoyot ilangit inulikinikut-pivalialikinikut attayot tatvani RSA-gani hapkua ikpigiyaoniakmata hapkuninga nunaliitni nunakaktonot. Hamna angiklihoilotaoniagahugiyaoyop 'allangoktigoktaitnik hapkua nunaliitni havaghakhiokt' nigiogiyaoyok ihoilotaovalalaitnahugiyaoyok tatvalo **Ihomalotaongitok**. Tatva hamna ihoilotaoniaknahugingitaat havagiyaongitmat ihoilotaoningit uvalu hiamatiyaoniakningalo naonaiyaktaohimangitok.

Elihaknik uvalu Elihakpalikutighat

Hapkua tamaita nunaliit naonaiyakviahimayot, kihingokhugik ukkua Kingaok uvalu Umingmaktok, hatkiomaiaktot hapkua iliaotighait hapkua ilialihaktonoit, sikokpaliktot ilihakviit, uvalu angayoghiitnik ilihakviitnik. Hapkua sikokutait hatkiktitaohimayot hapkua iliaotighait oktoinagialakivluget angayokhiit ilihakvitatni inniktigotighaitnik (uvalunin ajikotani) tatvani angilgaomalotik nunamingni. Hapkua ihoilotaongitogaloit kihiani aktomatitaoniakumata tatvunga Havagiyaoyomot ilihaknikut uvalu ilihakpalikinikut tatvalo alangoktikutait pitjutigilugit hapkua ilihaknikut uvalu ilihakpalikinikut aghokutaovalianginakniakmata, uvalu alangoktigotait hapkua inolgamiit ihomagiyaait uvalu ikpigiyaait hapkua ilihaknikut uvalu ilihakpalikutinot. Sabina-kut nigioktot ikkayokigiyomavluget hapkua nunaliitni kavamaoyot, ilihaknikut, Inuit timigiyaait, uvalu hapkua allat ukkua uyagaghioktit ikkayotigiyaait enekhitiyangita notamik Kitikmeotni uyagaghioknikut ilihakvighamik uvalunin huli ilalioitinahoaklugit hapkua uyagaghiokvikmi havaghanik ilihaktitilotik tatvani NAC-kut ilihakpalikvitatni. Huli okaotaohimaaktok nunaliitni ikayotighak una Nunaliit Ikkayotighaita Parnaiyaotaitni (Makpigak 10, Titigak 26). Una Havaktigiyaaitnik Havagiyaaitnik Elihakpalioitighaita Parnaiyaotait, una naonaiyaotaohimayok tatvani Havaktolikiyiita Parnaiyaotait (Makpigak 10, Titigak 28), naonaiykutaoyok havagiyaoyoghak ehoaghakpaligahoaklugo hamna ikkayohiakutighat tatvunga Havagiyaoyomi havaghanik hapkunanu nunaliitni ehoakhainahoaklotik parnaiyaotighanik ikayokatigekahoaklotik; ikkayokahoaklotik nunaliit ikayotighaitnik uvalu ilihakpalioitighaitnik; ehoaghailotik havakvigiyaitni ilihakpalioitighanik uvalu havaghanik ilihaktitilotik; ehoakhailotik havaktighamik hapkuninga Inuit Havakhakhioktolikiyi uvalu Elihaktolikiyoyok; ilalioitilugit hapkua inolgamiit okaotjikatakloget havaghanik. Ihomagiyaoloaktot tatva, alangoktikutighait ilihaknikut uvalu ilihakpalioitighanik, tatvalo allangotighaitnik inolgamiit ihomakhotaitnik ilihaknikut uvalu ilihakpalioitighanik, taima ihomagiyaoyot nakoatot ikkayotaoniaktot. Tatva hamna ihoilotaoniaknahugingitaat havagiyaongitmat ihoilotaoningit uvalu hiamatiyaoniakningalo naonaiyaktaohimangitok.

Anniaktailitjutighat uvalu Nunaliit Innutiakutighait

Nunavummiut atoghimayot ikkitkiyaovakhotik haonikloktot, aungitnik sukakpalagatik, evyahungukatangitot, uvalu aungitlo takkaini kayomikpalaghotik amegaitkiyaovlotik Kanatamioniit. Kihiani, amegaikiyaoliktot Nunavummiut okomaitpalaghotik povalavalaktot, uvalu amegaitkiyaovaklotek anniakutikalipaktot kasanik (512.1 per 100,000) ikkitkiyaovlotik hapkua Kanatamiotat (404.9 per 100,000). Kanoklikak nunaliitni innutiagotait, tatva titigaghimayot tatvani AANDC-kut nunaliit innutiakutighaita naonaiykutaitni, tatva ikkitkiyaovlotik hamani Kitikmeotni nunaliitni. Hapkua ihoilotaoniaknahugiyaoningit tatvani Havagiyaoyomi Anniaktailinikut uvalu nunaliitni innutiakutait0 (CWB) nigiogiyaoyot tatva namagiyaovlotik ihoilotaovlotiklo uvalu hapkua ilalioitihimayot: tatva allanguktikutait innuhikmingnik hapkua havakaliktot tatvani Havagiyaoyomi; allangektikutait ellikut uvalu katangotaita niovgotikaligangata; tatvalo allangektigotait hapkua katangotegit/iglomiokategit innutjuhiit. Havalokaghotik manighiolokaktituget, tatvalo manighagiyatik monagitiagahoakhoget, uvalu monagitiakhotik inmingnik havakaligamik ihomaghotialiktot uvalu innuhikatiakpaliktot. Hapkua elingaiyakpaligotaovlotik tatva havaghimakutigilikitait Havagiyaoyomi taima hapkua nunaliit ilalioitivluget amegaikpaligomayait Inuit havaktot (oktotigilugit, EFAP, manighagiyaaitnik monagitjutighaitnik okaotjikaliklotik) tatvani naonaiyakhimayot Havaktolikiyiita Parnaiyaotaitni (Makpigak 10, Titigak 28).

Una Havagiyaoyok nigikiyaoyot amegaikpaliktititjutighaitnik hapkua innuhikatiakutaitnik havaktot tatvani Havagiyaoyomi-pitjutaotitluget havagiyaoyot, taimatot hapkua kihingokhimayait nakoatot nakokutaoniakmata hapkuninga VSEC-gitni Anniaktailitjutighait uvalu CWB-gitnik.

Tamakmik nakokutaolotik uvalu ihoilotaolotik ihomagiyaoyot hapkua Anniaktailitjutighait uvalu CWB-gita allangokpalialikmata ellikot uvalu katangotaita niovgotikhakaligamik. Emakak nunaliitnin inuit havakhaniktitaonigomik tatvani Havagiyaoyomi manighagikataktatik hunnaongitonot (oktotigiloget, piannainaklotik, higakloknot, tatvalo emikhikataliklotik) tatvalo atokpaliktotik nakungetonik innuhikhaongitonik, hamna taima ihoilotaoniaktok tatvani CWB-gani. Kihiani, manighagikataktatik atokpakomiku ilingaiyaotighamingnek (oktotigilugo, ilingaiyaotighaitnot iglumot, nikkitakutighanot) pikataoget hapkua allatkit akkugotaoyot pitjutaoyot tatvani Havagiyaoyomi havagiyat nakoatot ihoakutiniakmatjuk tatvani CWB-gani. Ihomagiyaoyok, hamna kihingotaohimayok ihoilotaoniagahogiyaoyok ellikut uvalu katangotaitalo niovgotikhakalikamik, tatvalo ihoilotaoniagahogiyaoyot hapkua allangoktigotait katangotigiit uvalu iglomiokatigiit innuhiit, tatva ihomagiyaoyot **Ihomalotaongitot**. Una naovalianingata naonaiyaotaohimayok ilalioitivloget hapkua Havakviyot uvalu inuit holilokakutait tahamani Kitikmeotni uvalu Nunatiami ihomagiyaoyot ihoilotaoniagahugiyaoyot hapkuninga inulikikut-pivalianilikikut tatvani RSA-mi ajikotagiyaitli hapkua nunakatigiyatik tatvani nunaliitni. Tatva hapkua ihoilotaoniagahogiyaoyok tatvani **Ihomalotaongitot**. Tatvalo hamna hamna hiamangninga tittiknilioghimayaita ahianot naonaiyaktaohimangmiyok. Hamna ihoilotaoniagahogiyaoyok tatvani Havagiyaoyomi hapkuninga Anniaktailitjutighait uvalu CWB-ganik nigigiyaoyot tatva ajikutaginaktaitlo hapkua mikinighaoyot okioktaktomi nunaliit. Tamakmik hapkua ihoilotaoniagahogiyaoyot mikkitkiyaoniagahogiyaoyot nunaliitnin hilataniitonin Kitikmeotni Aviktoghimayoni. Tatva ihomaghotaoloaghimayok hamna ihoilotaoniagahugiyaoyok titikniliokhimayaita pitjutigiyaitnik anniaktailinikut aolatjutaitnik tatvani Nunatiami taimatot hamna Havagiyaoyomi nigigiyaoyot monakhikakviyonik. Tatva ukkua Havagiyaoyok nigigiyaongitot hapkuninga titikniliokutaoyonik ihoilotaoniaktonik hapkuninga anniaktailitjutighaita aolatjutaitnik tatvani Nunatiami tatva tingmitjat tikkikatainakmata uvalu aolakkatainakmata tatvanga Havagiyaoyomit tatvalo malikainakmata hapkuninga monakhikakviitnik tatvani Havagiyaoyomi iglukpakakviatni. Hapkua havaktot tatvani Havagiyaoyomi nigigiyaoyot huli attoghimagahoakloget hapkua monakhikakviit angilgavigiyamingni nunaliitni uvalu taima atoinakniaktatlo hamna monakhikakvik tatvani Havagiyaoyomi monakhiliakagiagomik.

Nunanik Atokatakninga

Hamna naonaiyaotaoyok hapkuninga ihoilotaoniagahugiyaoniaktonik tatvani Havagiyaoyomi tatva nunalikinikut nunanik atokatkniga ihomakhutaoyok malgok VSECs: 1) ilikohiktotaongitonik nunanik uvalu nalvakhiokvigiluget atokatknig; uvalu 2) angonahoaknikut manikhiotigiluget uvalu nunanik atokatknig. Tatva kititlogit hapkuna pingahor ikpingnaktot naonaiyaktaohimayot naonaiipkutigivluget ukkua tamaita VSEC, taimaitmat tatva kittitluget hapkua 6-sioyot kihingoktaoniagahugiyaoyot ihoilotaoniagahugiyaoyot. Huli ihoilotaoniagahugiyaoyonik naonaiiffakhimayot naonaiyagomavloget ihoilotaoniagahaita.

Iliitkohiktotaongitot Nunakutait uvalu Nalvakhiokvigiloget Atoktait

Hapkua manikhioyaoyot nunnat atogaoyot pitjutaoloaktot gaittiktaovlotik akkiliktoivlotik anguniaktonik, polakatalikinikut atogaoyot, uyagaghioktot nalvakhiovgiyait, tahapkualo ingilgayolikinikut uvalu omiitjat attogagiyait. Tatvatoangoyok ilalioiyaoniagahugiyaoyok ukkua Havagiyaoyomi havakviat uvalu una Iliitkohiktotaongitot Nunakutait uvalu Nalvakhiokvigiloget Atoktait ihomagiyaoyot hapkununga polakatalikinikut atogaoniakahugiyaoyot ikpigiyaakniaknayogiyaoyot hapkununga: alangoktiginigita hapkua atoktaoningita nunaat uvalu nungolaitolikinikut atoktaoyot; alangokpialianingakut hapkua hilami manikami avatilikitjutait; uvalu allangoktikutighait hapkua atkunaotighait uvalu avikotighainik hapkuninga nalvaghiokvighaitnik. Ihomagiloaghugit, tatva ataohinaokmat una nanminikaktok, una

Kingaokmi Polaktakviat, ilihimayaovloni ilani atoktaonginakhoni tahamani kanigiyatni haffuma Marine Laydown Area (MLA) eloani haffuma nunanik atoktaoyomit LSA, tatvalo hapkua allat nunaat eloani haffuma RSA, auyaotitlugo. Hapkua amihoyot atogaoloaktot monagitjutait uvalu ihoaghaotighait ehoaghitihimayait hapkua ihoakutaoyot ihoiyaotaovalakunagit hapkua atoktaoyot tatva Havagiyaoyomi, taimaititlugo akunaotigiyomavluget hapkua ikkayotaoniaktot maniliokutaoyoghat hapkua pitjutaongmata iliitkohiktotaongitmata nunakutait uvalu nalvakhiokvigiloget atoktait. Hamna monagitjutighait uvalu ihoaghaotighaita oktotighat pikataoyungnaktot tamaitni hannaohimayoni uma Havagiyaoyop aolatjutiginiaktaitni, tatvalo hapkunani naonaitiaghimayot ilaliothimayait oktotayoghat ehoaghaktaohimayot ihagiagiyaoyot naonaiyaktaohimangmata. Hapkua ihoaghaotighat naonaiyaktaohimangmiyot ilaliothimangmata naonaitiaghimavlotik tatvunga angotighanot tatvani Angotighanik Ihoaghaotighat uvalu Kimilgokutighaita Parnaiyaotaitni (Makpigak 10, Titigak 20), uvalu ihoaghaotighait hapkununga koinginaktonot uvalu hilami kanokininganik pitjutaoyot tatvani Nipigektonik Koinginaiakpaliothighaita Parnaiyaotaitni (Makpigak 10, Titigak 18) uvalu tatvani Hilami Kanokiningata Kimilgokutait uvalu Monagitjutighaita Parnaiyaotaitni (Makpigak 10, Titigak 17). Hamna ihoilotaoniagahugiyaoyok naonaiyaghimayot **Ihomalotaongitok**. Hamna kihingoktaoninga naonaiyaktaohimangmat ilaliothivloget Havagiyaoyot uvalu inuit havagiyaait tahamani oatani Kitikmeot tatva ihomagiyaongmata ihoilotaoniagahugiyaoyot eloani haffuma nunnat atogaoyoni RSA-gani tatva taima ajikutaginaktait hapkua tatja nunanik atogaoyonik havagiyaovlotik. Tatva tamaita ihomagivluget, hamna ihoilotaoninga naonaiyaktaohimangmat tatva **Ihomalotaongitok**. Hamna kiningotaohimayok ihoilotaoniagahugiyaoyok tatvani Havagiyaoyomi Iliitkohiktotaongitot Nunakutait Atoktaoyot avatkotiyoitot tahapkunani titiknilioghimayaita hapkua Nunavumi Nunatagihimayaitnik (NSA) uvalu tatva taimaitmat, pitjutaoyungnangitot titikniliokhimayot ihoilotiginiaktaitnun.

Angonahoaknikut Manikhiotigiluget uvalu Nunanik atokatakningit

Hamna Inuit iliitkohitokangit uvalu innuhigiyait tatva taimangagalok aktomatiaktok nunamot. Hapkua Inoinait Kitikmeotat tatva atokhimangitnaktait hamna Inuit Kaoyimayatokangit, uvalunin kaoyimatiakningit hapkua nunaat uvalu avatilikinikutlo. Annaomanahoakutigivlugo hamna nuna atokpaktaktokangit angoniakvigivlugo, ekalukhiokvigivlugo, nanigiaktokvigivlugo uvalu paaktaotivlotik katighokvigivakhugo hamna tamaat nuna atoinaghutjuk RSA. Angonahoakutigivlugo hamna nuna manighiokutigivaliktat tatva taimatot hamna nunnanik atoktaoninga kanok ihoiyaotaovaliaoyok hapkunanga: alangokpalianingitnit atoktaoningata nunanik uvalu nalvaghiokvigivaliavlogit hapkua nunaat; alangokpalianingitlo atotaita hapkua nunnat iliitkohitoktait; uvalu alangokpalianingit hapkua amegaitilangit uvalu atoktaoningata avatilikitjutinik. Tatva taimatot ehoaghaihimayot kaffinik monagitjutighaitnik uvalu ihoaghaotighaita oktotighaitnik hapkua ihoaghaotigiyomavlogit hapkununga angoniaknikut manighiotaotitlugo hamna nuna, ilaliothiloget hapkua Havagiyaoyomi, kanok nakunighaoyonik monagitjutighaita oktotighaitnik, uvalu kimilokutighaitnik. Angonahoakvigivlugit hamna nuna atokninga ihomagiyaoniaktok hamna ehoakhihimalugo havaktot himaotigekataotilotik tatvani Havagiyaoyop havakviatni, tatvalo ikkayogahoaklogit hapkua nunanik atokataktot uvalu atokataklugit hapkua nunanik kaoyimayaitnik. Hamna ihoaghaotighat naonaiyaktaohimaliktok tatva hamna atangmat tatvunga angotighanot tatvani Angotighanik Ihoaghaotighat uvalu Kimilgokutighaita Parnaiyaotait (Makpigak 10, Titigak 20), uvalu tatva ihoaghaotighat hapkununga nipigiktonot uvalu hilami kanokininganik hamna ilaliothimayok tatvani Koinginaktonik Koinginaiakpaliothighaita Parnaiyaotaitni (Makpigak 10, Titigak 18) tatvanilo Hilami Kanokininganik Kimilgokutaita Parnaiyaotaitni (Makpigak 10, Titigak 17). Tatva tohaktitakatakunik avatingnot pikatigivlogit hapkua nunakaktot inuit uvalu nunaliit pitjutaokatakniaktot katimakatigikataklogit uvalu katimakatigikataklogitlo ukkua Ekaluktutiami uvalu Kugluktumi Nunaliitni Okaotjiyiovlotik Katimayiit (CAGs). Kiotjutighanik piyaoniaktot hapkununga uyagaghiokvikmi havaktonit, nunaliitni nunaotaitnik atokataktonit, hapkununga nunaliitni Angoniaktiita Katimayiitnin uvalu Hamalatkunit, hapkunangatlo Nunaliitni Okaotjiyiovlotik Katimayiitnin CAGs tatva taima tohaktitakatakniakmata avatinot tohagakhanik taimatot ihoaghaikatigikataklotik ihoaknighaoniakmat piyagiakakata.

Nikkainaktotait

Nikkainaktotait hapkunanga angotighanit, naotianitlo atoinaktaitni inuit nikigivlogit uvalunin havaotigivlogit tatva angotigivakhugit angunahoakhutik, ekalukhiokhutik, uvalunin katighiovlotik naotianik (Anniaktailikiyit Kanatami 2010). Tatva hapkua kaffioyot Halomailgokakningit Ihomalotaoniaghugiyaoyot (COPCs) takughaovalianahugiyaoyot hapkunani nikkainaktotaitni LSA tatvani aolayaohimaaktitlugo una Havagiyaoyok. Hapkua ihomalotaoniaghugiyaoyot halomailgot naonaiyaktaohimangmata uvalu hapkua ihoilotaoniaghugiyaoyot iliitogiyaoyot atoghugit ukkua ihoaghaotighat uvalu monagitjutighaita parnaiyaotait. Hapkua havivaloitli aolaganginaktot nikkainaktotaitni LSA, ilani hapkua havivaloit avatkutpagait namagiyaoningit (tahamanivalak nunami), tatva taima hilap iliitkohitokagingmatjuk aolaninga. Hamna taimaitmat una tokhiktotaoyok Havagiyaoyok haviknik uyagakatvioniakmat uvalu hapkua haviktakakmata avatilikiyaitni allangutaoyungnaktot tatvani Havagiyaoyop havagiyaitni, hapkua haviktalgit pitjutaohimayot amegaitningit naonaiyagomavlogit ihoilotaoniaknikata hapkuninga nikkainaktotaitnik. Tatva aghokutaolotik ihoaghitjutighaitnik uvalu monagitjutighaitniklo oktotighait ehoaghaktaoniaktot tatv ikkilivaligahoaklogit uvalunin ahivagahoaklogit hapkua ihoilotaoniaktot hapkununga avatilikitjutaitnun (hila, emmak, halomailgok, nuna, uvalu naotiat,) hapkualo nikkainaktotait (ekaluit uvalu angotighat). Hapkua naonaitiaghimayot tatvani Makpigak 4 (Hilalikinikut Avatilikinik), Makpigak 5 (Manikami Avatilikinik), Makpigak 6 (Emmagiktonik Avatilikinik), Makpigak 7 (Tagiokmi Avatilikinik), uvalu Makpigak 10 (Atanguyaita Parnaiyaotait).

Naonaiipkutagivlugit hapkuninga nikkainaktotaitnik kimilgokutaita naonaiyaotait, nikkainaktokloni LSA tatva naonaiyaotait atoghugit tatva kayagiyakagiakangitot anniakutikangitmata hapkua nikkainait hapkunani COPCs inuknun nikkainaktoktunot hapkua naonaiyaotit atoghugit. Naonaiipkutagivlugit hapkua nikigingningit uvalu amegaitilangita ihoilotaonginit naonaiyaotaongmata, hamna nikkiningit hapkua nikkainaktotait nigioyiyaongitot tatva allangokpalalaitmata kayangningit. Tatva taimaitmat, inuit kanoginingit nikitotutitlugit nikkainaknik tahamangat nikkainaktotaitnik LSA tatva nigioyiyaongitot allangotighait tatvanganin naonaiyaotigiyaitnit. Taima ihoilotaoniaghugiyaoyot naonaiyaktaohimangmata tatva anniakutaoniaktonik inuknun nikkainaktoktonik nigioyiyaongitiaktot hapkua havagiyaohimaaktitlugit tatvani Havagiyaoyomit uvalunin tammayaotaitnin tatvani Havagiyaoyomi. Tatva taimatot nigioyiyaongitot hapkua ihoiyaotaoniakningita tatvani Havagiyaoyomi, tatva ihoilotaoniaghugiyaongitot uvalunin titiknilioghimayait aktoktaolaitot.

Havagiyaoyomi-Ihoilotaitnik Naonaiyaotaita Enektitkutait

Naonaiyaotait hapkuninga Havagiyaoyomi-Ihoilotaitnik Naonaiyaotaita iliitogihimayait hapkua ihomalotaongitot. Tamaita naonaiyaotait ihoilotaoniaktonik ihomagiyaait tatva mikitovlotik ikkituvalaaktot, himiktaohimavlotik hiamangitangita ahinot, otiktitaoyungnaktot uvalunin hivitungitot tatva hamna ihoaghaotighat uvalu monagitjutighaita oktotighat ehoaghaktaohimalikata. Ajikohiokhugitlo iliitkohigiyagaloangitnik ihoaghaotighat ihomagiyaoyugaloit hapkuninga naonaiyaotaitni. Nakoanakhimayot hapkua ihoaghaotighait naonaiyaghimayot tatvani VSECs-gita pivaliatjutaitnik, nanminiktakutighainik, havaghakhiokutighaitnik, uvalu ilihaotighaitnik uvalu ilihakpalikutighaitnik.

Taimaitmat tatva hamna tamatiomalugo kanogininga tatvani Havagiyaoyomi hapkuninga hilalikinikut, mannikamiotanik, Emmagiktoni, Tagiokmi, uvalu inuit iliitkohiktotaitnik tatva ihomaghutaohimayot ematot Ihomalotaongitot.

Amegaikpaliotiginiaktaitnik Naonaiyaotaitnik Enektitkutait

Ihomagiyaait hapkua amegaikpaliotiginiaktaitnik naonaiyaotait havagiyaohimayot tatvani tamaitni ukkua VEC-gani uvalunin VSEC-gani naonaiyaghimanikata tatvani Havagiyaoyomi-havagiyaoyomik ihoilotaonikat. Pihimayakangitot hapkuninga Havagiyaoyomi havagiyaoyomik ihoilotikaktomik (takulugo

una Titigak 6 uvani Atoktaoloaktomi Makpigami), kihiani tamaita hapkua ihomalotaoloangitot Havagiyaoyomi-havagiyaoyot ihoilotaonikata naonaiyaktaohimangitot.

Naonaiyaotait hapkuninga Havagiyaoyomi-Ihoilotaitnik Naonaiyaotaita iliitogihimayait hapkua ihomalotaongitot, kihiani pikangitot hapkuninga ihoilotaoniagahugiyaoyonik. Tamaita naonaiyaotait ihoilotaoniaktonik ihomagiyaait tatva mikitovlotik ikkituvalaaktot, himiktaohimavlotik hiamangitangita ahinot, otiktitaoyungnaktot uvalunin hivitungitot tatva hamna ihoaghaotighat uvalu monagitjutighaita oktotighat ehoaghaktaohimalikata. Nakoanakhimayot hapkua ihoaghaotighait ilaliothimangitait hapkununga ihoilotaoniagahugiyaoyonot uvalunin titiknilioktaohimayot naonaipkutaitnun.

Taimaitmat tatva hamna tamatiomalugo kanogininga tatvani Havagiyaoyomi tatva ihoaghaikatiginahoakluget hapkua allat kingoani, ublomi atoktaoyoni uvalunin kakugunoak hivonighami hapkua Havagiyaoniaktot hapkuninga hilalikitjutinik, mannikami, tagiokmi, uvalu inuit huli yokagotaitnik tatva ihomagiyaoyot Ihomalotaongitot

Titiknilioknikut Naonaiyaotaita Enektigotai

Ataohik una ukkua NIRB-kut hapkua 10-gungmata ikkitiyaoyot EIS-ni maligakiyait tatva ilaliothiyagiakakmata hapkuninga titiknilioknikut kanogilyokaknikat naonaiyaotaitnik. Hamna maligagiyat titigaghimangmat tatva “emaitmat ihoakutaokpat, hamna EIS ilaliothimayagiakaktok tamaitnik ihoilotaoniagahugiyaoyonik hapkuninga avatilikinikut uvalunin inulikinikut-pivalialikinikut titikniliokutaoniaktonik.” Tatva ihoilotaoniagahugiyaoyonik pihimayakangitot tatvani Havagiyaoyomi. Kihiani, tamaita hapkua ihoilotaoniagahugiyaoyot ihomalotaongitot hapkua titikniliokutaoyonik naonaiyaotait. Hapkua nakoatokutaoyot ihoakutait ilaliothimangitait tatvunga titikniliokutaita naonaiyaotaitnun.

Hamna titikniliokutaitnik ihoilotaoniagahugiyaoninga okaotaohimayogaloak ilaliothimavloget tatvunga kihingotaohimayonik naonaiyaotaitnun, tatva ihomalotaoniaktonik ihoilotaoyonik nigigiyakangitot.

Taimaitmat, hamna Havagiyaoyok nigigiyangitok tatva ihoilotaoloni hapkununga titikniliokutaoyonik hapkuninga hilalikinikut, mannikami havagiyaonik tagiokmi, uvalu inuit holilokagotaitnun.

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BACK RIVER PROJECT

FINAL ENVIRONMENTAL IMPACT STATEMENT:

MAIN VOLUME

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Glossary

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[illegible]

English Term	Translated Inuktitut Term	Translated Inuinnaqtun Term	English Definition	Inuktitut Definition	Inuinnaqtun Definition
Ephemeral	ᐅᑲᓴᓕᐸᐱᐃᐃᓂᓄᓇ	Uumanikittut	A stream which flows only during or after rain or snow-melt and has no base flow component.	ᐅᑲᓴᓕᐸᐱᐃᐃᓂᓄᓇ ᐱᓄᐸᐱᐃᐃᓂᓄᓇ ᐅᓇᓴᓂᓄᓇ ᐸᐱᓂᓄᓇ ᐸᐱᓂᓄᓇ ᐸᐱᓂᓄᓇ.	Kuugauyaq tamna kuuktuq kihimiuyuq atuqtitlugu kinguagutluniit nipaliqaqtit aputulunit auktuqnianik kuukinagutaitsuqlu.
Esker	ᓯᐅᓴᐅᓕ ᐸᓄᓄᓂᓄᓇ	Qlmiq	A long winding ridge of stratified sand and gravel formed by glacial meltwater.	ᐸᓄᓄᓂᓄᓇ ᐸᓄᓄᓂᓄᓇ ᐸᓄᓄᓂᓄᓇ ᐸᓄᓄᓂᓄᓇ ᐸᓄᓄᓂᓄᓇ.	Takiyuq hangua yaqtuq qimiqqaligiktitaqhimagayug hiugaq tuapaliaqlu pinguatuhimagayug hikuqpiaqhimagaluamit auktuqnia imaq.
Exploration	ᓄᓄᓂᓄᓇᐸᓂᓄᓇ	Havikhaqhiuqniq	Process and activities of finding ore to mine.	ᓄᓄᓂᓄᓇᐸᓂᓄᓇ ᓄᓄᓂᓄᓇᐸᓂᓄᓇ ᓄᓄᓂᓄᓇᐸᓂᓄᓇ.	Pityuhiq huliniitlu naniyauyut havikhath uyagakhiuqni.
Explosive magazine	ᓴᓴᓂᓄᓇᐸᓂᓄᓇ	Qaqtautiquavik	A building used for storage of explosives.	ᐸᓂᓄᓇ ᓴᓴᓂᓄᓇᐸᓂᓄᓇ.	Igluqpak atuqtauuyug tutqumavinik qaqtautit.
Exposure ratio	ᐸᓂᓄᓇᐸᓂᓄᓇ ᐸᓂᓄᓇᐸᓂᓄᓇ	Hatqiumaviuyug aktilanga	Method of estimating the risk to human health from a chemical. Calculated as the ratio of the estimated daily intake of a chemical to the tolerable daily intake of the chemical.	ᓴᓴᓂᓄᓇᐸᓂᓄᓇ ᐸᓂᓄᓇᐸᓂᓄᓇ ᐸᓂᓄᓇᐸᓂᓄᓇ ᐸᓂᓄᓇᐸᓂᓄᓇ.	Pityuhiq mikhauttaqtuq hivuganaqnik inungnut aaniaqtailininut tapkunanga avugiyauttaqtut. Kititayuq aktilanga mikhaushmania upluqmunt timimuktaqnia naamagilaqnia upluqmunt timimuktaqnia avugiyaavaktuq.

English Term	Translated Inuktitut Term	Translated Inuinnaqtun Term	English Definition	Inuktitut Definition	Inuinnaqtun Definition
Fugitive dust	ᑭᑦᑭᑦ ᐃᓕᑦᑕᑦᑕᑦᑕᑦᑕᑦ	Ahiningaqtuq puyuuq	Particulate matter, often sand or mineral dust, released to the atmosphere by mechanical disruption or wind scouring.	ᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦ ᐃᓕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦ.	Mikiyut hunavaluit, amihuniqhani hiugait havikhatluniit puyuit, hiamaktut havagiyaayunut qanuguqtitaqninut anuqimitluniit algaktaqninit.
Glaciofluvial	ᑭᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ	Hikuqpiaqhimaningaqtut	Deposits and landforms created by glacial rivers and streams.	ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ.	Piqaqnit nunatlu pinguatuhimayut hikuqpiaqhimaniqumin kuugait kuugauyatlu.
Greywater	ᐃᑦᑕᑦ ᐃᑦᑕᑦ	Halumaittut imait	Water that originates from a camp kitchen, sink, or laundry.	ᐃᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ.	Imaq tahapkunangaqhimayuq hiniktaqvikmi niqhiuqvikmin, uaqvikmin, aanuganutluniit uaqviknit.
Gross Domestic Product (GDP)	ᑭᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ	Katitlugu Inungnut Havakhimayat (GDP)	The total monetary value of all final goods and services produced within a region, territory, or country within a specified period of time.	ᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ.	Tapkuat katitlugit maniit aktilat tamaitnut kinguliqpamik hunat kivgaqtutitlu hanayat tahamani nunaliit avikhimani, nunatagaq, nunaqyuaqluniit iluani taihimayup pivikhani.
Human health risk assessment	ᐃᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ	Inungnut aaniaqtailini hivuganaqnit naunaiyautit	A process used to estimate the nature and probability of adverse health effects in humans exposed to chemicals in environmental media, now or in the future.	ᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ.	Pityuhiq atuqtauyuuq mikhauttaqni ilitquhit pilagahuquqnili ihuittumik aktuanit inungnut hatqiumani avugiyauvaktut avatiliqutinut hunait, tatya hivunikhamullu.
Incinerator	ᐃᑦᑕᑦᑕᑦ	lkualattivik	An apparatus for burning waste material until it is reduced to an ash.	ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦ ᐃᑦᑕᑦᑕᑦᑕᑦᑕᑦᑕᑦ.	Hanalgut ikulattiviuuq iqakunik hunanik mikhinnuaqhiqhugit aqyanguqnit.

[illegible]

English Term	Translated Inuktitut Term	Translated Inuinnaqtun Term	English Definition	Inuktitut Definition	Inuinnaqtun Definition
Longhole open stoping (LH)	ᑭᐱᓕᔪᏗ ᐅᙵᓚᓂᑦᐸᓈᓄᓂᒃᐳᓂᑦ	Takiyuq putulik imiktailaittuq (LH)	An underground mining method involving development of open stopes (unsupported spaces) parallel to the strike of the ore body.	ᓇᓇᐅᓕ ᐸᑖᓂ ᐅᙵᓚᓂᑦᐸᓈᓄᓂᑦ ᐸᑖ ᓁᓴᓴᓂᑯᓂᑦ ᙲᓴᓁᐱᓂᑦᐸᓈᓄᓂᑦ ᐸᓂᓴᓂ (ᑭᐱᓕᔪᏗ ᐅᙵᓚᓂᑦᐸᓈᓄᓂᑦ ᐸᓂᑦ) ᙲᐸᓴᓴᓴᐱ ᓇᓴᓚᓂᑯᓂᑦ ᐱᙶᐸᑖᑐᐱᓂᑦ.	Nunap iluani uyagakhiuguhiq ilalik pivaliatitninik angmaumayuq imiktailaittuq (ikianginaq) nalaanittuq pitaqvikhanut tahamna havikhaqaqania.
Metal leaching/acid rock drainage (ML/ARD)	ᓇᓴᐱᓂᑦ ᙰᐸᑖ ᐱᙶᓴᓴᑖᑦᐸᓈᓄᓂᑦᐸᓈᓄᓂᑦ/ᐅᓇᓚᓂᑯᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ ᐅᓇᓂᓴᓚ	Havik maqiniq/huguilaaq uyagak kuukviunia (ML/ARD)	Naturally occurring processes that happen when minerals containing metals and sulphur (called sulphides) come in contact with both air and water. Oxidizing sulphides can produce acid which, when carried by water, is called acid rock drainage (ARD). Metals from the surrounding rocks can be leached into water, which is called metal leaching. This can happen at acid or neutral pH.	ᓇᓴᐱᓂᑦ ᐸᐅᑖᓂᑦᓴᓴᓂᑯᓂᑦ ᐅᙵᓚᓂᑦᐸᓈᓄᓂᑦ ᙰᐸᓴᓴᓂᑯᓂᑦ ᐸᓴᓚ ᐸᐸᓴᓴᓴᓴᓂᑦ ᙲᓴᓇᐸᓂᑦ) ᓴᐱᐱᑖᑐᐱᑖ ᙲᑖᓴᑖ ᐸᓴᓚ ᐸᓴᓴᑖ. ᓴᐱᐱᑖᑐᐱᑖ ᙲᓴᓇᐸᓂᑦ ᙲᓴᓁᐱᓂᑦᐸᓈᓄᓂᑦᐸᓈᓄᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ, ᐸᓴᓴᐸᑖ ᐸᓴᓴᓴᓴᓂᑯᓂᑦ ᐸᙵᓚᓂᑯᓂᑦ. ᐅᙵᓴᓴᐱᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ. ᐸᓴᓴᓴᓴᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ. ᐸᓴᓴᓴᓴᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ. ᐸᓴᓴᓴᓴᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ. ᐸᓴᓴᓴᓴᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ. ᐸᓴᓴᓴᓴᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ ᐅᙵᓴᓴᐱᓂᑦ.	Ilitquhia pivakniq pityuhia havikhait haviktaqagangata huguuqniqu (taiyauyuq huguilaaq) aktuayagangat tamatkiknik hilaman imaqlu. Qattiniqpalaativakta huguilaaqniq pinguatittugu huguilaaq uyagakmin maqiviunia (ARD). Haviit tahapkunanga avatigiyanit uyaqatmaqilat imaqmuna, tapkuat taiyauyut haviit maqinit. Una pilaaq huguiniq hakugitpalaaqniauniit immapa qanugitnia.

[illegible]

English Term	Translated Inuktitut Term	Translated Inuinnaqtun Term	English Definition	Inuktitut Definition	Inuinnaqtun Definition
Production rate	ካሊታሪዮር-ሰራተኝነት ክላሳሪዮር	Hanayaunianut kayumiknia	Average mining and ore processing rate.	ከአማካኝነት ሰራተኝነት ካሊታሪዮር-ሰራተኝነት ክላሳሪዮር	Atuqpakniqhaq uyagakhiuvik havaguhiata kayumiknia.
Proponent	ጋኑሪኛባ	Uuktugutilik	The individual or organization that proposes to develop the Project.	ፈጠራዊ ግንባታ ለፖሊሲ ጋኑሪኛባ ካሳታፋሪ ለፖሊሲ	Tamna inuk timiuyuqluniit uuktutilik pivaliatitnianik tamna Havanguyup.
Public	ዎታሪ	Inungnut	Any potentially affected person in potentially affected communities, which includes individual members of an affected community, as well as organized community interest groups.	ወጥሮ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ	Kitutliqak aktualaqnit inuit aktuayaunahuquqtut nunaliuyut, ilagit inmigut ilauyut aktuayayumun nunaliyumun, timiuyuluttauq tuhaumaqatauyumayut ilagiit.
Pycnocline	ፈረድ ልዩነት	Immap uqumaitnia	Vertical zone in the water column in which density changes rapidly with depth. Seawater density is a function of salinity and temperature.	ፈረድ ልዩነት ፈረድ ልዩነት ለፖሊሲ ፈረድ ልዩነት ለፖሊሲ ፈረድ ልዩነት ለፖሊሲ ፈረድ ልዩነት ለፖሊሲ ፈረድ ልዩነት ለፖሊሲ	Qunmut pivigiya imaqmi anmuinaq tahamna uqumaitnia ahianguqtaqtuq qilamik itinianut. Tagiuq imaq uqumaitnia piyauyuq tagiuquqtunia uunaqnialu.
Quarry	ካሊታሪዮር	Tuapaktaqvik	A pit from which rock is extracted, usually for use as a construction material.	ካሊታሪዮር ከፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ	Ilutuniqtahamangat uyagak amuyauyuq, atuqnihauvaktut hanalgutaayunut hunanut.
Reasonably foreseeable future projects or activities	ፖሊሲ ለፖሊሲ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ	Naamaktumik atuqniagahugiyaunia hivunikhami havanguyup huliniitluniit	Projects (or activities) formally accepted into a regulatory approvals process occurring within the outer geographical limit of possible interaction with the Project.	ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ ፈጠራዊ ግንባታ ለፖሊሲ	Havanguyut (huliniitluniit) naamangiyautaqhimayut aulattiuyunit angigutainit pityuhiqnit atuqhimayut iluani hilatagut nunaliqutit kikiani ilaliutyalanqianit taphuma Havanguyup.

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Acronyms and Abbreviations

Acronyms and Abbreviations

Terminology used in this document is defined where it is first used. The following list will assist readers who may choose to review only portions of the document.

AEMP	Aquatic Effects Management Plan
BACT	Best achievable control technology
BC MOE	British Columbia Ministry of Environment
BIF	Banded iron formation
BIPR	Bathurst Inlet Port and Road
CCME	Canadian Council of Ministers of the Environment
CESCC	Canadian Endangered Species Council
COPC	Contaminants of potential concern
COSEWIC	Committee on the Status of Endangered Wildlife in Canada
CWB	Community Well-being
CWS	Canadian Wildlife Service
DEIS	Draft Environmental Impact Statement
EC-MSC	Environment Canada - Meteorological Service of Canada
EFAP	Employee and Family Assistance Program
EIS	Environmental Impact Statement
EIS guidelines	Nunavut Impact Review Board final Guidelines for the Preparation of an Environmental Impact Statement
EUB	Alberta Energy and Utilities Board
FEIS	Final Environmental Impact Statement
ILCR	Incremental lifetime cancer risk
INAC	Indian and Northern Affairs Canada (now Aboriginal Affairs and Northern Development Canada)
IOL	Inuit Owned Land
ISQG	Interim sediment quality guideline
KIA	Kitikmeot Inuit Association
LSA	Local Study Area
MLA	Marine Laydown Area
NBS	Network for Business Sustainability
NIRB	Nunavut Impact Review Board
NLCA	Nunavut Land Claims Agreement

NLUP	Nunavut Land Use Plan
NPC	Nunavut Planning Commission
NTKP	Naonaiyaotit Traditional Knowledge Project
NU	Nunavut
NWT	Northwest Territories
PASS	Passive air sampling station
PDA	Potential Development Area
PEL	Probable effect level
PRISM	Program for Regional and international Shorebird Monitoring
Rescan	Rescan Environmental Services Ltd., an ERM company
RIC	Resource Inventory Committee
RMWI	Recommended maximum weekly intake
RSA	Regional Study Area
SARA	<i>Species at Risk Act</i>
TEM	Terrestrial ecosystem mapping
TK	Traditional Knowledge
TSP	Total Suspended Particulate
TSS	Total Suspended Solids
US EPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
UTM	Universal Transverse Mercator
VEC	Valued Ecosystem Component
VSEC	Valued Socio-economic Component
WHO	World Health Organization

1. Introduction

1. Introduction

Sabina Gold & Silver Corp. (Sabina) has prepared the Final Environmental Impact Statement (FEIS) for the development of the Back River Gold Project (Project). The FEIS has been developed to conform to the Guidelines for the Preparation of an Environmental Impact Statement (NIRB 2013) with the concordance table found in Appendix V1-1. The FEIS document index is included in Appendix V1-7 and a complete FEIS Table of Contents is presented in Appendix V1-8. The FEIS consists of the following volumes:

Volume 1: Final Environmental Impact Statement: Main Volume – provides an overview of the FEIS, including a summary of the proposed Project, background and need for the Project, baseline studies, effect assessment methods and results, as well as the management and mitigation plans to meet commitments in this EIS.

Volume 2: Project Description and Alternatives – describes the proposed Project, including estimated schedule, facilities and infrastructure, phases including mobilization and construction, operation, and closure and post-closure activities, estimated workforce, and alternatives considered to the Project and within the Project.

Volume 3: Public Consultation, Government Engagement, and Traditional Knowledge – presents results of extensive engagement and consultation completed to date and the Traditional Knowledge available at both a regional and local level.

Volume 4: Atmospheric Environment – includes results of background atmospheric studies, an assessment of the Project's GHG emissions relative to Nunavut, Canada and the world, and potential effects of the Project on air quality, noise and vibration levels in the region.

Volume 5: Terrestrial Environment – describes results of background studies and potential effects of the Project on the terrestrial environment, including sensitive landforms, vegetation, birds, and caribou.

Volume 6: Freshwater Environment – presents results of background studies and potential effects of the Project on the freshwater aquatic environment, including flow and quality of water, and effects on fish and fish habitat.

Volume 7: Marine Environment – addresses results of background studies and potential effects of the Project on the marine environment, including sea ice, water and sediment quality, fish and marine mammals.

Volume 8: Human Environment – presents results of socio-economic background studies and potential effects of the Project on nearby communities and the people in these communities.

Volume 9: Methodology, Effects of Environment on Project, Accidents and Malfunctions – presents methods used to undertake assessments of potential effects on the biophysical and socio-economic environments. The cumulative effects assessment of the Project considering past, present, and reasonably foreseeable projects and activities in the region that might also cause effects on valued components assessed in the EIS. Other assessments included an evaluation of potential accidental events, their potential effects, and likelihood of occurrence of these events, as well as the effects of the environment on the Project (i.e., extreme weather, climate change).

Volume 10: Management Plans – presents Sabina’s management system and related management plans that will be established to limit and mitigate any potentially negative effects and enhance benefits of the Project on its employees, contractors, residents of Nunavut, and the natural environment.

The list of agencies, organizations and individuals to receive a paper and/or electronic version of the FEIS is presented in Appendix V1-5.

The Project includes the Goose Property, a Marine Laydown Area situated in the southern portion of Bathurst Inlet, and interconnecting winter ice roads. The Project is mostly on Inuit-Owned Lands (IOL) with some supporting access corridors located on Crown Lands. The Project has an estimated ten year operating mine life with current reserves identified in four deposits at Goose Property. The mine plan includes open pit and underground mining methods with a total ore feed to a single mill at the Goose Property of 19.8 million tonnes. The tailings will report to a Tailings Storage Facility (TSF) at the Goose Property and mined out open pits. The Goose Property and the Marine Laydown Area will each have a power plant, fuel storage, and accommodations complex. Annual resupply of materials, equipment, and consumables will use sealift methods during the open water season and aircraft year round. Access between Goose Property and the Marine Laydown Area will be by the seasonal construction and use of a winter ice road corridor.

1.1 PROPONENT INFORMATION

Sabina is a public Canadian mining company (SBB: TSX) that is focused on the development of its 100%-owned Back River Project. Company contact details are as follows:

Sabina Gold & Silver Corp.
375 - 555 Burrard Street
P.O. Box 220
Vancouver, BC V7X 1M9
Tel: 604-998-4175 or 888-648-4218
Fax: 604-998-1051

Sabina has been actively completing mineral exploration in the Kitikmeot Region since 2004 initially at the Hackett River Project and at the Back River Project since it was acquired in 2009. Through these continued programs, Sabina has developed a robust corporate structure and workforce to support advanced exploration and continues to build toward project development and operations.

Sabina intends to build a mine with integrity – one that is safe, environmentally responsible, and beneficial to all parties involved. To meet this commitment, Sabina has commissioned numerous consultants and experts to contribute and write the FEIS for the Back River Project. This information is provided in Appendix V1-4.

Sabina believes that its record in Nunavut demonstrates how it has learned to incorporate environmental and socio-economic considerations successfully into the exploration activities to date. Sabina has demonstrated its ability to adaptively protect the environment and minimize the adverse impacts of its operations on the land, water, and wildlife of the area. Sabina has also fostered relationships such that it has learned to work with local communities, Inuit organizations, and government agencies in an adaptive manner to minimize, where possible, the adverse social impacts of its activities while maximizing the socio-economic benefits to the residents of the Kitikmeot region and Nunavut as a whole.

Sabina intends to balance good stewardship in the protection of human health and the natural environment with the need for economic growth.

1.2 REGIONAL CONTEXT

The Back River Project is an advanced exploration gold Project located in the West Kitikmeot region of Nunavut, as shown in Figure 1-1, at approximately 65° to 66° north latitude, and 106° to 107° west longitude. The Project includes the Goose Property, the Marine Laydown Area in southern Bathurst Inlet, and connecting winter ice roads.

The closest communities to the Project are Kingaok, located approximately 160 km to the north of the Goose Property, and Omingmaktok located approximately 250 km to the northeast of the Goose Property. The communities of Kugluktuk and Cambridge Bay are the closest major regional settlements. Kugluktuk and Cambridge Bay are likely sources of workers and contractors. Communities of the Eastern Kitikmeot region are also likely sources of workers and contractors including Gjoa Haven, Kugaaruk and Taloyoak. Yellowknife, NWT and Edmonton, AB are transport hubs and sources for workers, goods and services.

1.3 LAND TENURE

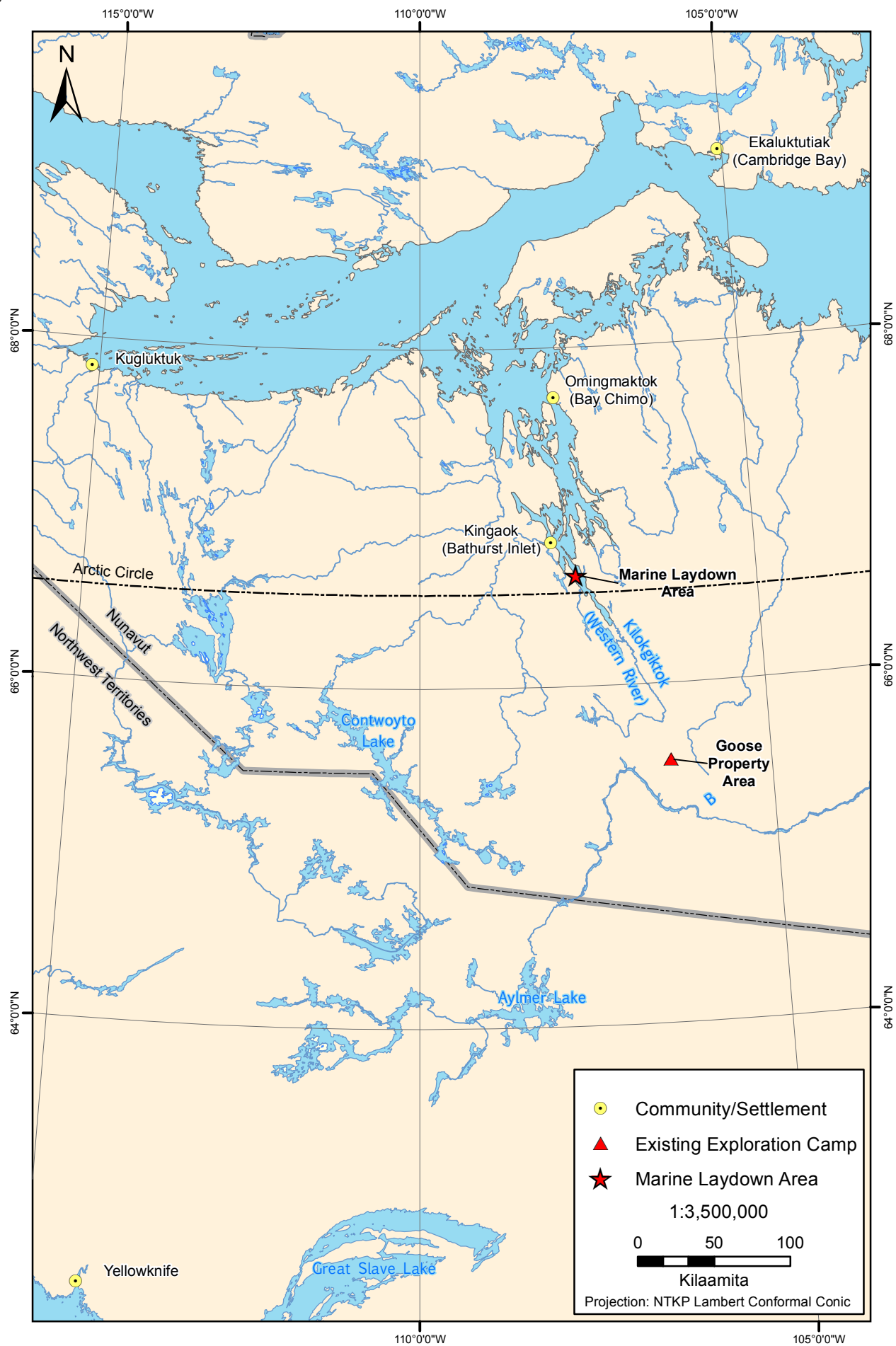
The Property comprises 45 federal mineral leases and 19 federal mining claims covering approximately 54,042 ha (Appendix V1-3). The mineral tenure are administered by Aboriginal Affairs and Northern Development Canada (AANDC), and referred to as Crown Land. The Project's gold deposits are situated on Inuit Owned Lands (IOL) and administered by Nunavut Tunngavik Inc. (NTI; sub-surface and mineral rights) and the Kitikmeot Inuit Association (KIA; surface rights) on behalf of the Inuit Beneficiaries as designated under the NLCA. The mineral leases covering the Project's deposits and prospective areas were recorded by the Government of Canada prior to the creation of Nunavut under the NLCA in 1999. Consequently, they are considered to be 'grandfathered' under the NLCA, meaning that the mineral production royalties payable to the mineral rights owner are administered by the Government of Canada under the Canada Mining Regulations. The royalties collected are then transferred to NTI as the new sub-surface mineral rights owner.

1.4 NEED AND PURPOSE OF THE PROJECT

The purpose of the Back River Project is to mine and process ore from four deposits (Goose Main, Llama, Umwelt, and Echo) and ship gold doré to world markets so there is an economic return on investment while protecting the environment and maximizing the socio-economic benefits to the region.

The need for this project is:

- to provide a return on investment to the Company's shareholders;
- to supply gold to the international marketplace. The reasonably foreseeable international demand for gold has created market conditions that Sabina believes are favourable for operating mines at the Back River Project;
- to support the Nunavut Planning Commission Broad Planning Principles, Policies and Goals (Nunavut Planning Commission 2007);
- to contribute to the development of infrastructure, skills training, employment, and business opportunities in Nunavut, as outlined in the Nunavut Exploration and Mining Strategy (Government of Nunavut 2007). This will help build healthy communities and strengthen partnerships between Sabina and stakeholders and institutions;



- to contribute to Canada's northern strategy to strengthen Canada's sovereignty, protect the country's environmental heritage, promote economic and social development and improve Northern governance (Indian and Northern Affairs Canada 2008); and
- to provide overall net benefit of the Project to sustainable development in Nunavut.

1.4.1 Precautionary Principle

Sabina is committed to environmentally responsible and socially acceptable exploration and mining practices. We are dedicated to creating and maintaining a safe environment for both the land we occupy and the people that drive its success. The company's philosophy is to conduct its operations to protect not only the environment, but the health and safety of its employees and the public as well.

Sabina also subscribes to the principles of sustainable development in mining. While mining cannot occur without some impact on the surrounding natural environment and communities, our responsibility is to limit negative environmental and social impacts and to enhance positive impacts. The use of the Precautionary Principle promotes action to avert risks of serious or irreversible harm to the environment.

Sabina integrates the application of the Precautionary Principle throughout the design of the Project. This approach forms the basis for project design criteria, the effects assessment volumes of the FEIS (Volumes 1 through 9), the alternatives assessments, and the EHS management practices which are detailed in the Environmental Management System (Volume 10). The application of the precautionary approach will continue with ongoing engineering and a list of commitments made throughout all volumes of the FEIS is found Appendix V1-6. This list will be revised and updated with development and advancement of the Project.

Application of the Precautionary Principle

As understood by Sabina, the "precautionary principle" or precautionary approach means as follows: if an action has a suspected risk of causing harm to the public or to the environment, in the absence of scientific consensus, then that action should be considered harmful (Volume 2, Section 2.1.4). The principle implies that there is a social responsibility to protect the public from exposure to harm when scientific investigation has found a plausible risk. These protections can be relaxed only if further scientific findings emerge that provide sound evidence that no harm will result. Sabina's approach can be summarized as follows:

- Priority 1 – collect the scientific data required to allow scientific consensus to be achieved;
- Priority 2 – consult with local stakeholders to incorporate local and traditional knowledge into our data to help reach consensus;
- Priority 3 – design all facilities and activities with adaptive management in mind. In cases where uncertainty remains, Sabina has considered experience from other locations and projects. Sabina has also built in appropriate safety factors in the design of the facility or in the proposed action. Sabina has incorporated flexibility so that the activity or design can be actively adapted to accommodate possible future change; and
- Priority 4 – design and implement monitoring programs to address all areas of uncertainty so that data are being generated to a) allow for scientific consensus to be achieved and b) to allow activities where some uncertainty exists to be adaptively managed in a timely manner.

1.5 ALTERNATIVES

Alternatives within the Project have been evaluated according to the following key criteria: technical feasibility; economic viability; potential impacts to the environment; amenability to reclamation,

community acceptability and socio-economic effects. Community engagement and consultation discussions have been considered as part of alternatives assessments. Detailed discussion of public consultation is presented in Volume 3.

For each Project alternative, once an option is judged “technically feasible”, key criteria can be qualitatively evaluated on the basis of professional judgement and previous experience with similar projects or situations. Criteria are meaningful attributes that are essential for Project success, and the ranking of these provides the basis for distinguishing between various options.

A summary list of selected alternatives is presented in the following two sections. Detailed discussion of alternatives can be found in Volume 2, Chapter 4.

1.5.1 Tier One Alternatives for the Project

Tier One alternatives are related to executing the project and decisions on this level have shaped the overall development of the Back River Project. Tier One alternatives include:

- Project “Go/No Go” decision;
- access and transportation for freight and personnel;
- mining and mineral processing operations;
- mining waste (tailings and waste rock) management;
- location of the main tailings storage infrastructure;
- site selection for Marine Laydown Area
- water management;
- power generation; and
- site reclamation and closure approach.

1.5.2 Tier Two Alternatives within the Project

Once decisions have been made on the major alternatives shaping the Project, a second tier of alternatives are considered as means of executing components of the Project. Tier Two alternatives include:

- location of the Goose infrastructure;
- ore management;
- domestic waste management;
- airstrip design;
- marine shipping season;
- options for quarry sites;
- source of fresh make-up water;
- options for diesel fuel transfer to the MLA;
- standard work rotation during operations; and
- worker sourcing (direct points of hire).

As engineering and baseline technical and environmental data collection advances, alternatives will be further refined and assessed as part of continued project design.

1.6 OPTIMIZATION OF BENEFITS OF THE PROJECT

Sabina believes in the economic viability and potential of the Back River Gold Project, and that project development will bring much needed training and employment opportunities, as well as increased investment in services to the people of the Kitikmeot region and Nunavut as a whole. This economic development will further support self-reliant communities with reduced dependence on government without a compromise to the health of the people or the land through the continued creation of stable private sector employment.

Many of the policies and strategies for Nunavut speak to self-reliance and improved quality of life as drivers for balanced economic development that require both the protection and use of renewable resources with the development of non-renewable resources. Sabina believes that the Project can be a key driver in meeting these objectives, particularly within the Kitikmeot region of Nunavut. Sabina has provided its understanding and projections of how the Project can benefit the Kitikmeot communities and all Nunavummiut in Volume 8 of the FEIS.

The proposed Project has the potential to offer year-round employment to interested Nunavummiut in Kitikmeot. Benefits will accrue to Inuit from the IIBA, and also from royalties paid to NTI over the operating life of the mine.

For the construction phase, key economic benefits of the Project include the following:

- direct Project employment of approximately 223 person-years for Nunavut (assumed mainly within the Kitikmeot Region) and 1,494 person-years for all of Canada;
- total employment (direct, indirect, and induced) of approximately 260 person-years for the Kitikmeot Region, 347 person-years for Nunavut, and 4,339 person-years for all of Canada;
- total GDP (direct, indirect, and induced) contributions of approximately \$33.2 million in the Kitikmeot Region, \$43.6 million in Nunavut, and \$502.0 million in all of Canada; and
- total tax revenue (federal and provincial/territorial) contributions of approximately \$5.6 million from economic activity in the Kitikmeot Region, \$7.6 million in Nunavut, and \$94.5 million for all of Canada.

For the operation phase, key economic benefits of the Project include the following:

- direct employment of approximately 1,659 person-years for the Nunavut (assumed mainly within the Kitikmeot Region) and 6,968 person-years for all of Canada;
- total employment (direct, indirect, and induced) of approximately 1,938 person-years for the Kitikmeot Region, 2,928 person years for Nunavut, and 20,828 person-years for all of Canada;
- total GDP (direct, indirect, and induced) contributions of approximately \$263.0 million in the Kitikmeot Region, \$382.2 million in Nunavut, and \$2,557.5 million in all of Canada; and
- total tax revenue (federal and provincial/territorial) contributions of approximately \$23.1 million from economic activity in the Kitikmeot Region, \$45.0 million in Nunavut, and \$408.8 million for all of Canada.

The Back River Project is located in an isolated, remote area of Nunavut with limited access. For this reason, infrastructure such as roads and marine docking facilities are needed to access the Project as

well as connect the Properties that make up the Back River Project. Sabina is open to other negotiated use and access along its winter ice road corridor; however, at this time it will be considered a private road along with the marine facility and closed to public use.

1.7 FUTURE DEVELOPMENT

1.7.1 Project Phases

The life of the Back River Project is 27 years (including closure and post-closure) as indicated in Table 1.7-1. On-site preparation activities could begin in 2016 with mobilization followed by construction of the MLA and Goose property infrastructure. For the purpose of this assessment, the first year of production is termed “Year 1”. Production will carry on for 8.5 to 12 years followed by the period of reclamation and closure activities (eight years). Sabina expects to follow up with post-closure monitoring of the site for approximately five years. However, post-closure monitoring will carry on until closure objectives have been achieved.

Table 1.7-1. Life of Project

Activities	Duration	Year (Estimated)	Section of Volume 2
Mobilization and Construction	4 years (Year -4 to -1)	2016-2019	Section 6
Operation (for the purpose of the environmental assessment)	10 years (Year 1 to 10)	2020-2029	Section 7
Reclamation and Closure	8 years (Year 10 to 18)	2029-2037	Section 8
Post-closure Monitoring	5 years (Year 18 to 23)	2037-2042	Section 8

1.7.2 Potential Development Area

For each site, Sabina has identified a Potential Development Area (PDA). Since the Project design is at the feasibility phase, the actual footprint of these facilities may shift within their respective PDA as further geotechnical investigations are undertaken and the design of the facilities is finalized. The PDA makes allowance for potential relocation of certain facilities within its boundaries. With the exception of the freshwater aspects, for the purpose of the environmental effects assessment on other aspects (landform, vegetation, wildlife), it is assumed that the entire area of the PDA is lost for the duration of the mine life. For freshwater aspects, the assessment focuses on the expected physical footprint of the facilities and their expected effects on the freshwater VECs.

1.7.3 Potential Use of Infrastructure and Development of Additional Ore Deposits

The infrastructure at the Goose Property, as well as the Marine Laydown Area, is designed to enable ongoing use and expansion beyond the currently defined operating mine life. The “Life of the Project” may extend beyond ten years should additional mineral deposits become economical to develop (Volume 2, Section 3).

The infrastructure at the Goose Property and the MLA is designed to enable ongoing use and expansion beyond the currently defined operating mine life. Additional infrastructure would be required to mine deposits at the George Property. Four mineral deposits are currently identified at the George Property; these are LCP South, LCP North, Locale 1, and Locale 2. Both open pit and underground mining methods would be employed and would use a combination of equipment mostly relocated from Goose Property with some purchased new. As all processing of ore is planned to be done at Goose Property, only mining and activities in support of mining are planned for George Property. Run of mine ore would be crushed, stockpiled, and then transported seasonally to Goose Property using dedicated ore haulers.

As exploration is a Life of Project activity, it is likely that additional deposits will be delineated and become economical to develop over the life of the project. The current environmental assessment which includes cumulative assessment focusses on mining activities within the Potential Development Area of each site. Should additional deposits be located outside of the PDAs as defined in this EIS, Sabina will submit an application for an amendment to its Project Certificate.

As most of the mineral deposits targeted have a short extraction life (one to five years), Sabina will adopt the same progressive reclamation approach for those as for the base Project.

1.8 REGULATORY REGIME

The Project is subject to a regulatory regime relating to Project approval, construction, operations, maintenance, and monitoring. A list of existing and required authorizations is found in Appendix V1-2. The primary project approval regulations and requirements include a Part 5 environmental review by the Nunavut Impact Review Board and a Project Certificate under the NLCA Article 12; a Water Licence under the Nunavut Waters and *Nunavut Surface Rights Tribunal Act*; a possible amendment to the Metal Mining Effluent Regulations for inclusion of a Tailings Impoundment Area on Schedule 2; an Authorization under Section 35 of the *Fisheries Act*; leases and surface rights from AANDC under *Territorial Lands Act* in relation to activities on Crown Lands; leases and surface rights from the KIA in relation to activities on Inuit Owned Lands; an Inuit Impact and Benefits Agreement; and a Water Compensation Agreement. A detailed list of applicable statutes, regulations, codes, and standards to which the Project will be subject may be found in Appendix V1-2 of this volume.

1.8.1 NIRB Exception from Review

There are currently no plans to request additional Exemptions from Review other than those for ongoing exploration and camp operations.

2. Public Consultation and Engagement and Government Engagement

2. Public Consultation and Engagement and Government Engagement

2.1 PUBLIC CONSULTATION AND ENGAGEMENT

Public consultation and engagement is a legal requirement in Nunavut, an industry best practice, and important corporate commitment. Effective public consultation and engagement helps ensure that community members are informed and knowledgeable about proposed projects, that community support for those projects is more readily obtained, and sustainable development goals are achieved. A key goal of Sabina's public consultation and engagement program has been to ensure the Company obtains a "social licence to operate", by securing the support of a majority of residents from potentially impacted local communities.

In order to obtain this goal, a number of process goals have been followed¹: 1) identification and prioritization of communities and community stakeholder groups; 2) developing an understanding of key community and stakeholder views regarding the Project; 3) addressing community and stakeholder issues and expectations; and 4) continuous improvement. The establishment of open, respectful, and jointly beneficial relationships with local communities and stakeholders have been, and will continue to be, key priorities for Sabina. Sabina further recognizes the unique characteristics of the Inuit lifestyle and has strived to engage local communities in a culturally sensitive and appropriate manner. The Company is also committed to maintaining ongoing dialogue with local communities and will continue to be open to suggestions as to how its public consultation and engagement activities can be improved.

Sabina has and will continue to engage with the Kitikmeot Inuit Association (KIA), which is the primary Inuit organization with rights and responsibilities in the Project area. Kitikmeot Region communities have also been a key focus of Sabina's public consultation and engagement activities. These communities have been categorized based on the different levels of consultation and engagement employed by Sabina in each location. Categories were determined using a community's proximity to the Project, their potential to be affected by Project-related socio-economic and ecosystemic effects, and linkages to other aspects of the Project.

Category 1 communities include those communities closest to the Project and are where the Project will have the strongest ecosystemic or socio-economic influence. Category 1 communities have been engaged by Sabina more frequently and intensively than other communities in the region and include Cambridge Bay (Ekaluktutiak), Kugluktuk (Coppermine), Kingaok (Bathurst Inlet), and Omingmaktok (Bay Chimo). Residents of Category 1 communities will be given employment and contracting opportunity preference for the Project, and Cambridge Bay and Kugluktuk will serve as points-of-hire. Additionally, the focus of Sabina's traditional knowledge study has been on these four communities.

Category 2 communities, generally, have weaker socio-economic and cultural ties to the Project area than Category 1 communities. Sabina still engaged these communities regularly, but not necessarily to the same extent as Category 1 communities. These communities include Gjoa Haven (Ursuqtuq), Taloyoak (Spence Bay), and Kugaaruk (Pelly Bay). Category 2 communities may become points of hire in the future if employment numbers are sufficient although all residents will be given preference for employment and contracting opportunities with the Project. Category 3 communities have weaker

¹ These process goals are loosely based on the "four steps to community stakeholder engagement" presented in NBS (2012).

socio-cultural and ecosystemic ties to the Project than Category 1 or 2 communities, but may have economic and/or institutional linkages. These communities may also become points of hire in the future. Yellowknife, Northwest Territories and Iqaluit, Nunavut are Category 3 communities. Sabina has engaged these communities on a more limited basis.

A number of Northwest Territories Aboriginal organizations have been engaged for the Project. Engagement has occurred primarily through informational meetings with the leadership and other representatives of these organizations. Publically available traditional knowledge from these organizations has also been reviewed by Sabina and documented in a report on Northwest Territories Aboriginal traditional knowledge.

Sabina's public consultation and engagement program is multi-faceted. It includes a commitment to cultural sensitivity and inclusiveness, and the use of various community engagement methods and tools. These include public meetings, meetings with key stakeholders and stakeholder groups, meetings with community advisory groups in Cambridge Bay and Kugluktuk, Project site visits, social media (e.g., websites and Twitter/email/RSS feeds), a Project newsletter, other distribution materials, establishment of a Cambridge Bay office, use of local employees and contractors including a Cambridge Bay-based Community Liaison Officer, execution of traditional knowledge studies in partnership with the KIA and Kugluktuk Hunters' and Trappers' Organization (HTO), execution of various socio-economic/environmental studies, the eventual negotiation of an Inuit Impact and Benefit Agreement (IIBA) with the KIA, other forms of community engagement (e.g., radio shows, trade show participation, cross-cultural training, and community advertisements), and community donations.

Sabina began its public consultation and engagement program in June 2012. Since that time, dozens of formal meetings and numerous informal meetings with Project stakeholders have been held. Meeting minutes were taken during many of Sabina's public consultation and engagement activities, and have been incorporated into a public consultation database that contains 165 topic directories. This database has been analyzed to identify key issues and concerns amongst communities and stakeholders. These can be categorized under three main themes: community benefits and engagement, employment and training, and environmental management and monitoring.

Community Benefits and Engagement

- Inuit culture, harvesting, and livelihoods should not be negatively affected by the Project.
- Kitikmeot communities should receive maximum benefit from the Project.
- Concern that the Project may not be built (e.g., due to economic factors) and/or operate for a long enough period of time. Fears have also been expressed that the Project will prematurely shut down, promised benefits won't be realized, and negative socio-economic effects will result.
- Communities should be regularly engaged about the Project, throughout the mineral development process.
- Inuit should play a role in Project-related environmental management and monitoring.
- Mechanisms pertaining to the permitting, regulation, and oversight of the Project are unclear in some instances.

Employment and Training

- Preferential employment opportunities should be made available to Inuit from the Kitikmeot Region.

- Training and apprenticeship programs should be established to help those without mining skills and experience to become meaningfully employed.
- Mandatory criminal record checks will mean that many Kitikmeot residents will not be considered for employment.
- Youth should be a focus of the employment and training initiatives developed by Sabina.
- Routing employees through Yellowknife should be avoided as it leads to issues pertaining to substance abuse, absenteeism, and family instability.
- Programs should be developed to support workers and their families dealing with personal, financial, and employment-related issues.

Environmental Management and Monitoring

- A comprehensive environmental management and monitoring program should be developed. Key areas of concern for local communities include caribou, fish, water quality, mine tailings and contaminants, and other wildlife resources.
- Archaeological sites within the Project footprint must be protected.
- Project-related shipping must be conducted safely and responsibly, and impacts to the marine environment must be avoided.
- Spill training, avoidance, and response capabilities must be developed by the Company.
- Concerns pertaining to the navigability of Bathurst Inlet, placement of dock infrastructure, and the alignment of winter roads for the Project must be remedied.
- Cumulative and transboundary effects of the Project must be assessed and managed.
- Guarantees must be in place that mine closure will be done properly.

Information obtained through public consultation and engagement has played a role in the planning and design of the Project in a number of ways including baseline data collection, impact prediction, significance assessment, and the development of mitigation and monitoring programs. Communities were also provided with opportunities to comment on the alternatives assessment conducted for the Project during June 2015 community visits. No major issues were raised by community stakeholders at this time, although community feedback has been incorporated into various aspects of the alternatives assessment.

Public consultation and engagement will also provide new information to be considered as the Project advances. For example, Sabina's *Community Involvement Plan* (see Volume 10) commits the company to regular meetings and community engagement throughout the Project's development and operation. Likewise, procedures will be put in place to document and respond to any community feedback, suggestions, and concerns that arise. Sabina will also adapt its Community Involvement Plan as necessary to ensure it remains relevant and effective.

Other management plans developed by the Company reflect public comments and concerns. For example, Sabina has gone through extensive effort to ensure no significant negative socio-economic and environmental effects will result from the Project, and has used both scientific methods and TK in this process. Likewise, Sabina has developed policies and plans that address key areas of concern for local communities including: caribou, fish and water quality, mine tailings and contaminants, other wildlife resources, and shipping. Sabina has additionally committed to providing various opportunities to the Kitikmeot Region including preferential employment, contracting, and training for local Inuit, continued implementation of a Kitikmeot-focused donations policy, and the paying of all applicable

taxes and royalties to governing bodies. An IIBA to be negotiated with the KIA will further outline Sabina's benefits-oriented commitments. Sabina hopes to additionally fly Kitikmeot employees directly to site or through Cambridge Bay. Overnighting in non-home communities, such as Yellowknife, will be avoided wherever possible. An Employee and Family Assistance Program (EFAP) will be made available to every Sabina employee and their immediate families and all employees will have access to Human Resources personnel to whom they can speak in confidence. Further information on the commitments Sabina has made to address public comments and concerns is provided in Section 1.6.3 of Volume 3 and Volume 10 (Management Plans).

2.2 GOVERNMENT ENGAGEMENT

The purpose of Sabina's government engagement program is to provide government officials with clear and comprehensive information regarding the proposed Project and the various management and mitigation plans that support its development. Sabina has also regularly communicated important Project timelines and milestones to government officials, so that they can more effectively plan their workloads and be sufficiently prepared to participate in the environmental assessment process.

To date, the goals of Sabina's government engagement program have been to:

- develop two-way communication and dialogue that builds trust and results in action;
- provide information to government officials about the Project in a timely, transparent, and accessible fashion to support government agencies in their review processes;
- obtain information and knowledge from government agencies in order to help Sabina address issues and develop appropriate management and mitigation strategies; and
- enhance Sabina's reputation as a good corporate citizen.

Sabina has engaged a number of federal agencies on various occasions about the Project, including the Canadian Northern Economic Development Agency (in particular, the Northern Projects Management Office), Fisheries and Oceans Canada (including the Canadian Coast Guard and Canadian Hydrographic Service), Aboriginal Affairs and Northern Development Canada, Environment Canada, Natural Resources Canada, and Transport Canada. Sabina has often looked to the Northern Projects Management Office to help coordinate information exchange, and assemble the most appropriate federal officials to participate in meetings and other events such as site visits.

The Government of Nunavut participates in, and provides expertise during, the environmental assessment and review process for proposed mines in Nunavut. Sabina will continue to work with the Government of Nunavut co-ordinator for its government engagement activities but will also engage specific departments as needed (e.g., those interested in socio-economic and wildlife issues). The Government of the Northwest Territories has been involved primarily in the assessment of transboundary and cumulative effects for the Project.

Sabina has used a wide range of government engagement methods and has emphasized building trust and personal relationships to the greatest extent possible. Introductory and follow-up meetings have been held with various government regional and headquarters management teams. These meetings often involved as many relevant people as possible (and appropriate), across various interest areas.

Sabina's corporate web page (<http://www.sabinagoldsilver.com/s/Home.asp>) and the Company's Project-specific web page (<http://www.backriverproject.com>) provide useful Project information and are regularly updated as new information on the Project becomes available. Project newsletters (prepared primarily with a northern community audience in mind) are also sent to interested

government officials. Other Project information and materials (e.g., presentation hand-outs; Project summary sheets; pictures, posters, and maps; other materials) have additionally been distributed to government officials.

Sabina recognizes there will be an on-going need for both formal and informal government engagement activities. Any significant Project-related correspondence will be provided directly to NIRB and will become part of the public record, as required by their process.

3. Project Description

3. Project Description

3.1 INTRODUCTION

The Back River Project (the Project) is a proposed gold project owned by Sabina Gold & Silver Corp. (Sabina) within the West Kitikmeot region of southwestern Nunavut. It is situated approximately 400 km southwest of Cambridge Bay, 95 km southeast of the southern end of Bathurst Inlet, and 520 km northeast of Yellowknife, Northwest Territories.

The Project is comprised of two main areas with interconnecting winter ice roads: the Goose Property and a Marine Laydown Area situated along the western shore of southern Bathurst Inlet. Sabina has prepared an Environmental Impact Statement to identify and assess potential environmental and social effects resulting from the Project that meets the requirements outlined in the Nunavut Land Claim Agreement and the Nunavut Impact Review Board Guidelines for the Preparation of an Environmental Impact Statement for the Back River Project (NIRB File No. 12MN036; NIRB 2013).

The life of the Back River Project is estimated to be 27 years (including closure and post-closure) as indicated in Table 3.1-1. Mobilization and construction activities could begin in 2016 with the staging of materials at the MLA, followed by three years of construction of the Goose Property infrastructure. For the purpose of this assessment, the first year of production is termed “Year 1.” Production will carry on for 10 years followed by the period of reclamation and closure activities (up to eight years). Sabina will continue post-closure monitoring until closure objectives have been achieved.

Table 3.1-1. Project Phases

Phase Name	Activities	Duration*	Project Year
Mobilization and Construction	Mobilization, earthworks, facilities, equipment, mine development	4 years	-4 to -1
Operation	Mining, processing, progressive reclamation	10 years	1 to 10
Reclamation and Closure	Deconstruction, decommissioning, reclamation, WRSA closure, water treatment	8 years	10 to 18
Post-Closure Monitoring	Monitoring of water quality, geotechnical, terrestrial and aquatic effects	5 years	18 to 23

**years do not sum due to rounding*

Sabina intends to build a mine which is safe, environmentally responsible, and beneficial to all parties involved. Sabina will balance good stewardship in the protection of human health and the natural environment with the need for economic growth. The Project will bring much needed training and employment opportunities as well as increased investment in services to the people of the Kitikmeot region and Nunavut as a whole. The Feasibility Study, completed in June 2015, positively identified the economic viability and potential of the Back River Project.

3.1.1 Current Activities

Sabina is currently conducting exploration at both the Back River Project and Wishbone-Malley Project. These activities in the Kitikmeot Region are supported by the Goose and George exploration camps. Sabina is also authorized to establish temporary seasonal camps to support exploration and environmental baseline programs.

The Goose Property currently consists of a 135-person all-season camp powered by a 433 kW diesel-powered generator with a backup. It includes offices, core processing facilities and heavy equipment maintenance facilities. The George Exploration camp consists of an 80-person camp, core processing facilities, maintenance facilities and fuel storage. Both camps are operated on a seasonal basis with camp generally closed annually from early October to late January. Seasonal winter connections between the camps and Bathurst Inlet have been used in prior exploration work to support annual re-supply and transfer of equipment and fuel.

3.1.2 Future Development

Exploration activities are ongoing and will continue over the life of the project. Mineral reserves may expand and new mineral resources may be added. The inclusion of additional reserves in the mine plan may extend the operations period of the mine life. Therefore, for the purpose of the Environmental Assessment, the Project “Potential Development Area,” or PDA, includes the working of these potential future mines. Should additional deposits be located outside of the PDAs as defined in this EIS, Sabina will submit an application for an amendment to its Project Certificate.

Four mineral deposits are currently identified at the George Property for potential future development by open pit and underground mining methods; these are LCP South, LCP North, Locale 1, and Locale 2. The infrastructure at the Goose Property and the MLA is designed to enable ongoing use and expansion beyond the currently defined operating mine life. Additional infrastructure would be required to mine deposits at the George Property. If Sabina opts to advance the George Property in the future, an additional regulatory process may be required.

3.1.3 Land and Mineral Tenure

The majority of the Project, including the MLA and Goose properties, is located on either surface rights or surface and subsurface rights on IOL administered by the KIA. A portion of the proposed connecting winter ice roads are located on Crown Land.

The Property comprises 45 federal mineral leases and 19 federal mining claims covering approximately 54,042 hectares. There are six claim groups included in the Back River Property: Goose Property and five exploration prospects: George, Boot, Boulder, Del, and Bath. All of the tenure is in good standing and a description of the tenure type, size, and ownership of each property is listed in Volume 2 Chapter 1.

The mining leases have been surveyed by a registered Canadian land surveyor and do not require filing of annual assessment work; however, an annual fee of Cdn\$1/ acre is required to maintain the leases in good standing. All leases and claims are 100% owned by Sabina, and are currently in good standing. Annual reports were delivered to the KIA, Aboriginal Affairs and Northern Development Canada (AANDC), the Nunavut Impact Review Board (NIRB), and the Nunavut Water Board (NWB) as per the terms and conditions of authorizations issued for work done on the properties.

3.1.4 Project Phases

The Feasibility Study (FS), completed in June 2015, positively identified the economic viability and potential of the Back River Project. The FS produced a preliminary design of what the mine may look like, economic studies to suggest whether a mine would be financially possible and environmental studies to determine what effects a mine would have on the environment. The Final Environmental Impact Statement parallels and describes this work.

After detailed engineering and the successful arrangement of financing and receipt of the necessary operating permits, mobilization and construction activities could begin as early as 2016 (Table 3.1-1).

This phase will comprise the construction of the, Marine Laydown area at Bathurst Inlet, the ore processing plant (mill), camps for the workers, site roads, and infrastructure for power, water and waste and initial work on the open pit mines. The Mobilization and Construction phases will need substantial numbers of workers, contributing markedly to the Nunavut economy.

The Construction phase will lead into the Operation phase. The latter is expected to continue for 10 years based on the mineral reserves that are currently identified. Sabina will seek to recruit a stable workforce capable of operating the mine efficiently and safely, giving preference to northern residents. The taxes paid by the Project to federal and territorial levels of government will materially benefit both the local and national economy. Sabina will continue to explore for gold in the area; further discoveries may extend mine operation beyond 10 years.

The available gold mineralization will ultimately be exhausted, whereupon the mine will enter the Closure and Reclamation phase. Expected to last about 8 years, this phase will decommission the mine, demolish the buildings, and will return the site to a stable condition that has no effect on the environment. Post-Closure Monitoring will continue for 5 years or until closure objectives have been met.

3.2 PROJECT DEVELOPMENT CONSIDERATIONS

3.2.1 Sustainability

Sabina is committed to environmentally responsible and socially acceptable exploration and mining practices. Sabina subscribes to the principles of sustainable development in mining. While mining cannot occur without an effect on the surrounding natural environment and communities, Sabina's responsibility is to limit negative environmental and social impacts and to enhance positive impacts.

3.2.2 Public Consultation and Traditional Knowledge

Traditional Knowledge (TK) is an "indispensable element both as baseline information and as an Inuit lens through which impact analyses can be better understood and can also result in a more active and meaningful community engagement" (NIRB 2013). Sabina has undertaken extensive public consultation and TK studies which have guided the development of the Project.

3.2.3 Biophysical Environment

Comprehensive baseline studies were done to characterize the receiving environment at both the local and regional scale. A range of mitigation measures were identified that will enable Sabina to minimize effects on the receiving environment.

Construction activities will utilize the existing Project infrastructure and footprint to minimize land disturbance and improve the overall efficiency of construction activities. Where possible, permanent support infrastructure will be built at the onset of construction, to be used during both Construction and Operation. In many instances, temporary infrastructure will be used for the duration of the Construction phase.

Several mitigation measures are incorporated into the Project design in order to minimize potential adverse impacts on the receiving environment. These measures include:

- minimizing the Project footprint, thus minimizing the loss or alteration of habitat and reduction of habitat effectiveness;
- containing the Project mining activities within the Goose watershed;

- avoiding known archaeological and culturally sensitive sites and prioritize avoidance of important (unique and/or old) sites;
- maintaining a 31-metre buffer from streams and waterways;
- using winter ice roads for access to the Goose property and George exploration camp;
- maximizing air transportation to bring supplies and material to Project sites;
- maintaining a buffer zone from important bird nesting areas;
- maximizing sourcing of aggregate and borrow materials from open pits; and
- selecting water sources in which Project water withdrawals will minimize the potential for drawdown and effects to fish habitat and the aquatic environment.

The Project area has a broad range of wildlife species. Sabina discourages unnecessary disturbance to wildlife such as feeding and harassment of wildlife. Wildlife encounters are logged and reviewed and hunting is prohibited on Sabina sites.

3.2.4 Economic Impacts of the Project

The Project will create significant socioeconomic benefits. If the mineral resource is not developed, the potential effects and predicted benefits would not be realized. The total GDP impact is estimated to be over \$500 million during the Mobilization and Construction phase. The Project will substantially benefit Nunavut and will contribute as much as \$44 million in GDP to Nunavut during these four years. Construction is estimated to result in a total of about 4,300 person-years of direct, indirect, and induced employment across Canada.

Total Canadian GDP impacts of the Project are predicted at \$2.5 billion over the 10 years of production. Total tax revenue during operation is estimated at \$400 million, consisting of \$200 million in federal, \$200 million in provincial/territorial tax revenue, and Nunavut mining royalties of nearly \$100 million over the life of the mine. The Project will substantially benefit Nunavut and will contribute as much as \$380 million in GDP to Nunavut during the Operation phase. The total direct, indirect and induced employment for Canada as a whole will be approximately 21,000 person-years over the 10-year operations phase of the Project.

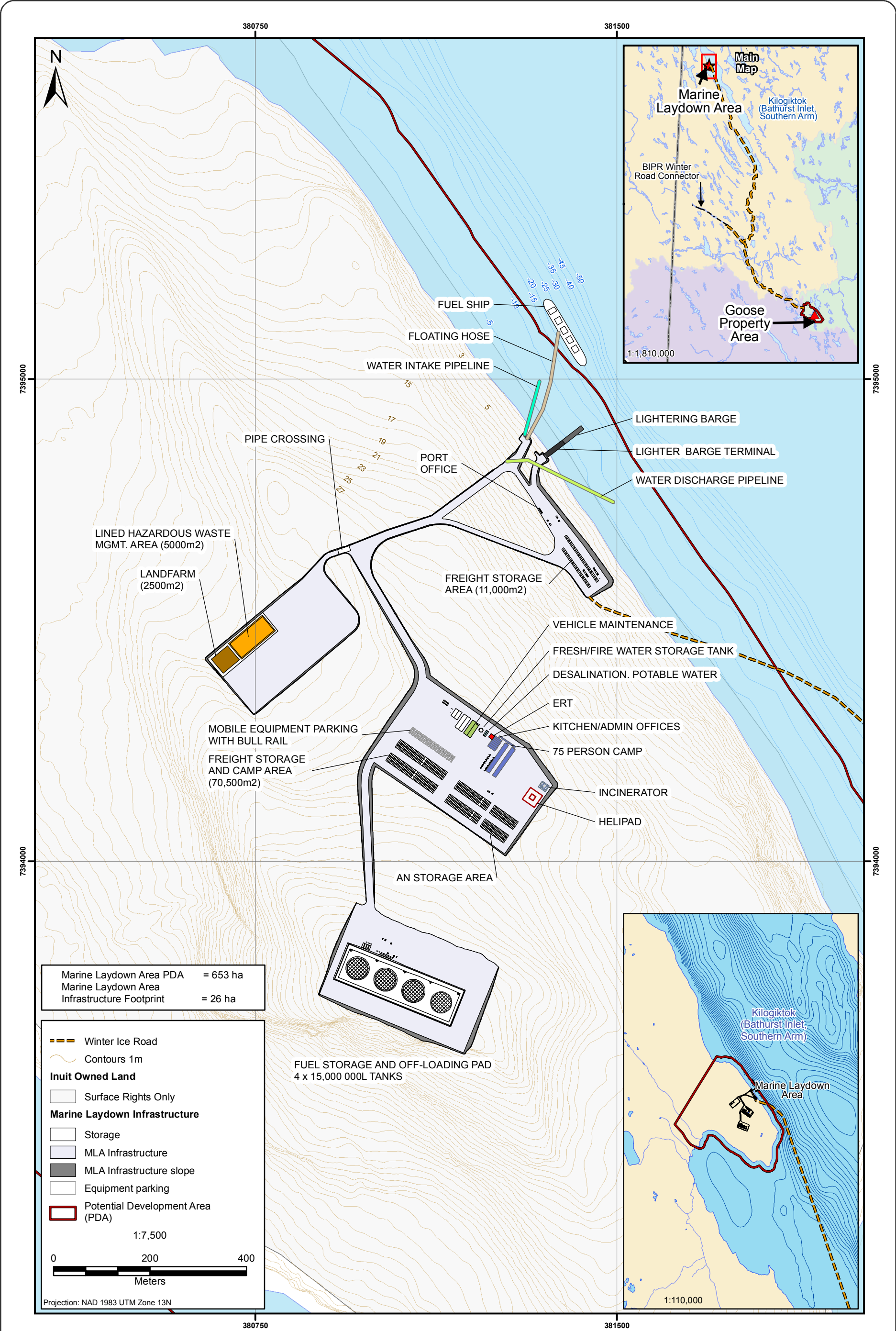
3.2.5 Potential Effects of the Environment

Environmental considerations have informed the design, operation, and closure of the Project. Extreme weather (storms, extreme rainfall or snowfall, extreme low temperatures) and geo-hazards (seismicity, ground and slope instabilities) pose risks to the Project infrastructure and in turn represent concerns for human safety and the environment. Included in the context of extreme weather is the potential for global climate change to affect the Project. The flat terrain and permafrost also add to the engineering challenges which the Project must surmount. Engineering hazard assessments have been completed to outline these potential effects and the engineering measures that will be implemented to mitigate and control them.

3.3 PROJECT INFRASTRUCTURE

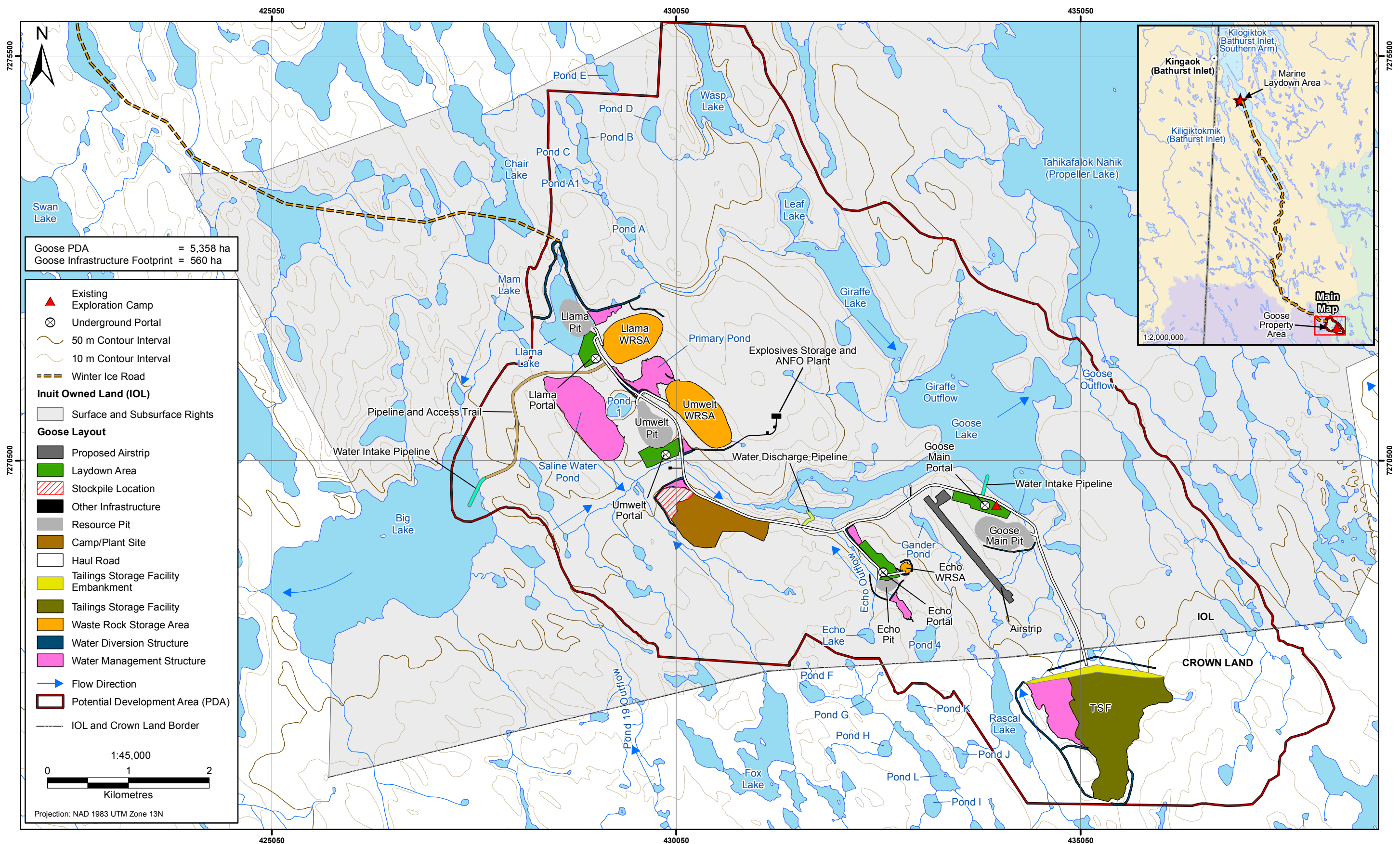
The Back River Project consists of two main sites and winter ice road corridors:

- MLA (Figure 3.3-1);
- Goose Property (Figure 3.3-2); and
- Winter Ice Road Overview (Figure 3.3-3).



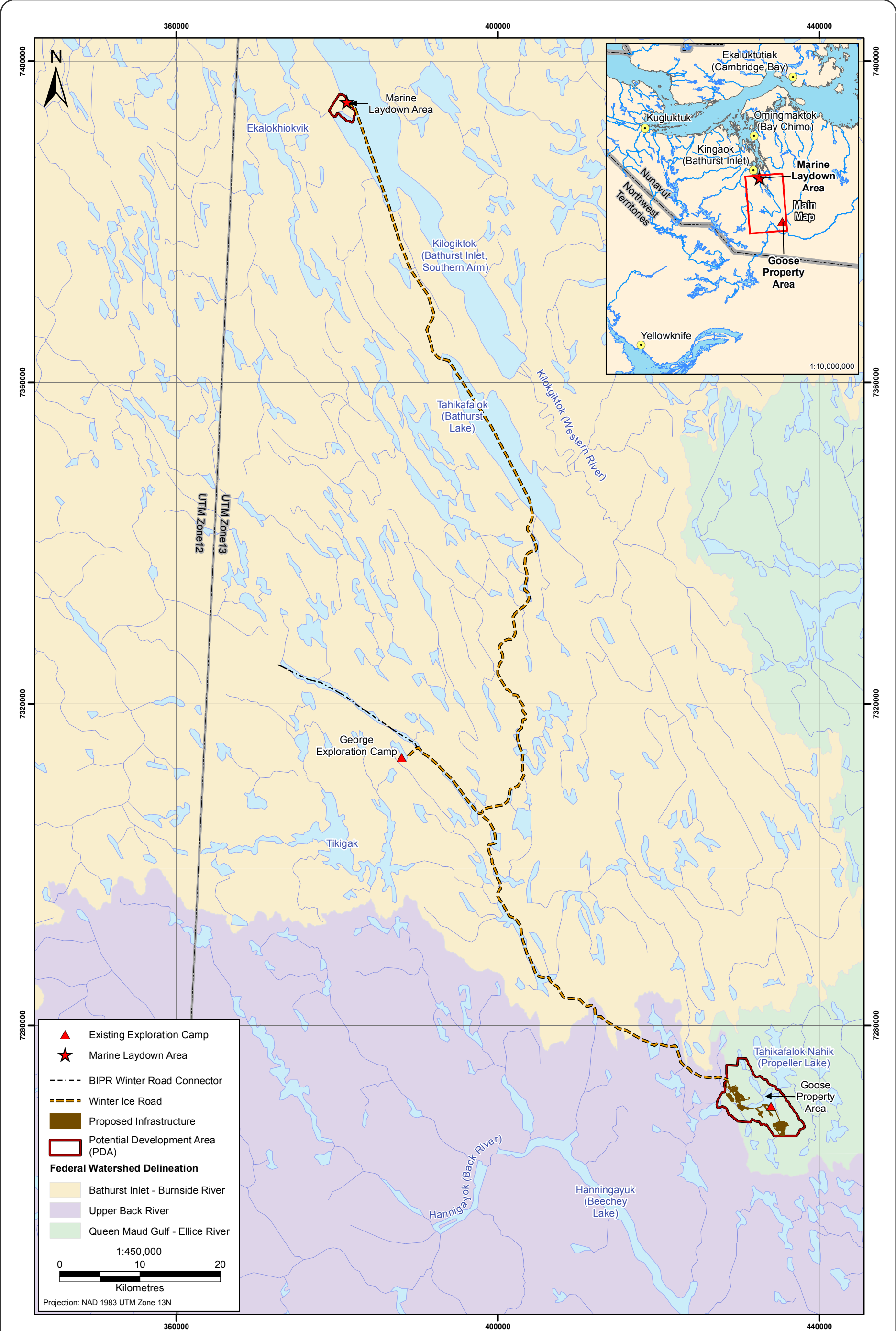
Potential Development Area and Infrastructure Areas - Marine Laydown Area

Figure 3.3-1



Potential Development Area and Infrastructure Areas - Goose Property

Figure 3.3-2



For each site listed above, Sabina has identified a Potential Development Area (PDA). Since the Project design is at the feasibility design phase, the actual footprint of these facilities may shift within the PDAs as further geotechnical investigations are undertaken and the design of the facilities is finalized. The PDA makes allowance for potential relocation of certain facilities within its boundaries. With the exception of the freshwater aspects, for the purpose of the environmental effects assessment on other aspects (landform, vegetation, and wildlife), it is assumed that the entire area of the PDA is lost for the duration of the mine life. For freshwater aspects, the assessment focuses on the expected physical footprint of the facilities and their expected effects on the freshwater VECs.

3.3.1 Access to Project Sites

3.3.1.1 Logistics

Logistics and establishing cost effective access to the mining sites is an important factor for the successful development of this Project. Options for access are via air, marine, or over land using winter or all-weather roads. An extensive Logistics and Transportation Study was undertaken in order to establish the most economical and environmentally sound means of accessing the Project site for bulk deliveries of equipment, materials and consumables. This study concluded that the preferred methods of access are:

- Air access throughout the mine life from all-weather airstrip capable of servicing passenger and large cargo aircraft at Goose. Ice and open water airstrips may also be used at Goose and MLA.
- Two marine shipping routes to deliver cargo and fuel to the Marine Laydown Area at Bathurst Inlet which is accessed during the open water season (end-August to October 15).
- Winter ice roads to link the MLA to the Goose property and George Exploration Camp. Material, equipment, and supplies delivered to the MLA will be transported to the Goose property over a winter ice road from mid-January to April annually. See Figure 3.3-3.
- All-weather on-site roads.

3.3.1.2 Marine Shipping and Marine Laydown Area Facilities

The Project includes a Marine Laydown Area located at Bathurst Inlet, approximately 130 km north-northwest of the Goose Property. As gold doré and not concentrate is the market product, it will not be exported via the port but transported by outbound flights. Cargo will be transported to the MLA by barges and ships originating on the East or West coasts during the open water season. The ships and barges will be self-sufficient for offloading cargo. Lightering barges will be used to transfer cargo from the vessel to the MLA terminal barge. Fuel will travel in tanker ships and/or barges and then will be transferred through floating hose to storage tanks at the Marine Laydown Area. Incoming and outgoing cargo and incoming fuel will be staged at the Marine Laydown Area while awaiting transfer to the project sites by transport trucks on a winter ice road or awaiting the appropriate ship for back-haul. Outside of the aforementioned periods, MLA activities will be limited to on-site storage and monitoring for loss prevention.

3.3.1.3 Air Transportation

Fixed wing aircraft and helicopters are integral parts of the plan to transport people, materials, and supplies. There will be airstrips at the MLA, Goose Property, and George Exploration Camp.

The MLA will be able to accommodate aircraft on an ice strip during winter and floatplanes on open water in summer. The MLA will not have an all-season airstrip.

At Goose, an all-weather airstrip and apron capable of servicing passenger and large cargo aircraft will be constructed. Ice and open water airstrips will continue to be used as required. The all-weather airstrip may be up to 1524 m long, 45 m wide and may be hard-surfaced. The airstrip will be equipped with lights and instrumentation in accordance with appropriate Federal regulations. Approximately four (fixed wing) flights per week are expected during the construction phase, three flights per week during the Operations phase, three per week during Closure, and one flight per month during summer through Post-closure. The airstrip infrastructure will include a radio shack/communications, generator, and dispatch office.

3.3.1.4 *Winter Ice Roads*

Two winter ice roads will be constructed for the Back River Project: 1) connecting the MLA and the Goose Property and 2) connecting the George Exploration Camp and extending from there to the proposed Bathurst Inlet Port and Road (BIPR) all-weather road.

The winter ice roads cross both IOL and Crown land. The designated Potential Development Area (PDA) includes a 200 m corridor, or 100 m on either side of the road centre line. Water for their construction and maintenance will be from various sources along the winter ice road corridor that will satisfy DFO under-ice water taking protocol. The characteristics of each winter ice road are as follows:

- Goose Property - Marine Laydown Area Winter Ice Road:
 - The winter ice road between MLA and Goose Property will be approximately 160 km long, 10 to 30 m in width, and travels over 42% land and 58% water.
 - Period of use: January to April annually transport fuel, equipment and supplies from MLA to George or to Goose. The available trucking window is 100 days. The number of Super B-train trucks needed per year range from 11 to 21 (depending on mine operations schedule).
 - Emergency shelter located mid-distance along the road.
- Goose-George Exploration Camp Winter Ice Road:
 - The spur road connects George Exploration Camp to the Goose-MLA Winter Ice Road is 13 km and may extend 20 km farther to connect to the proposed BIPR all-weather road. These winter ice roads will range from 10 to 30 m in width.
 - Period of use: As needed, January to April annually (site preparation to closure). The available trucking window is 100 days.

3.3.1.5 *All-weather Roads*

The onsite roads within each Property will be constructed as all-weather roads. Roads will be private and not for public use. All-weather roads will be constructed with run-of-quarry rock placed directly onto the tundra to preserve the permafrost. A layer of graded surfacing material will be placed to provide a protective trafficking layer. Construction materials are assumed to be from locally developed geochemically suitable rock quarries. Relatively small stream crossings are assumed to be non fish-bearing water will use large diameter culverts and larger crossings are assumed to be fish-bearing water will use culverts or free-span bridges if required.

3.3.2 **Marine Laydown Area Site Preparation and Construction**

The MLA will be developed as a staging area for equipment, material, fuel, and supplies required for the operation of the Project. Construction of the MLA will begin in Year -3 and the facility will be operational for construction. The MLA will remain operational until closure although the last sealift will occur in Year 8 of Operations. Dry freight requirements for Year 9 and 10 are significantly reduced;

therefore, all sea freight required for those final operational years will be transported to the MLA in Year 8 and the Winter Ice Road will operate as required thereafter. The conceptual layout of the MLA is presented in Figure 3.3-1 and the characteristics of the facilities that will be constructed at the Marine Laydown Area are presented in Table 3.3-1.

Table 3.3-1. Characteristics of the Infrastructure Constructed at the Marine Laydown Area

Potential Development Area	653 ha Footprint of facilities within MLA PDA = 27 ha
Site Roads	All weather roads will be constructed on the site. Construction materials will be from locally developed geochemically suitable cuts, and only rock quarries if needed. Roads will be private and not for public use.
Quarry Sites and Borrow Area	Aggregate required for construction: up to 1.3 Mt. Quarry area: cut and fill in balance; local quarry as required. Only geochemically suitable rock quarries will be developed if needed.
Water Supply	Source: Bathurst Inlet - Desalination unit Quantity: domestic uses = 48 m ³ /day; Industrial use: 24 m ³ /day; potable water treatment plant/desalination unit.
Fuel Storage	On land storage of 60 ML (four tanks at 15 ML). Fuel delivered by sealift during open water season. ISO containers as required (camp/shop facility).
Power Generation	Power plant at camp and maintenance facilities: 3 × 500 kWe (N+1).
Laydown and Storage Area	Ammonium nitrate storage area: up to 3,900 tonnes inert AN in 207 ISO containers. Explosives storage area: no packaged explosives and detonators will be received or stored at MLA during operations. Explosives magazines destined for Goose will be used to store packaged explosives for use at the MLA during construction. General laydown area for material and supplies: 4.5 ha. Lined hazardous waste management area = 0.5 ha.
Waste Management	<i>Landfarm</i> - for treatment of hydrocarbon contaminated soils or snow. <i>Incinerator</i> - at camp for incineration of combustible waste including sewage waste from Pacto units. <i>Hazardous waste</i> : Temporary lined hazardous waste storage area. Hazardous waste shipped off site for ultimate disposal during annual sealift season.
Airstrip	Airstrip capable of accepting small turboprop aircraft constructed on ice during winter. Access by floatplanes during open water, if necessary.

3.3.3 Goose Property Site Preparation and Construction

The Goose Property will be the primary site for the Back River Project. The development proposes four open pits and four underground mine operations.

Site infrastructure at the Goose Property includes the following: waste rock storage areas; ore stockpile; process plant; maintenance and service buildings; fuel tank farm; explosives storage; airstrip and associated navigation equipment; TSF; Goose Camp; laydown area including heated, unheated and outdoor storage; powerhouse and emergency powerhouse. The site layout of the Goose Property is presented in Figure 3.3-2. Characteristics of the infrastructure constructed at the Goose Property are presented in Table 3.3-2.

Table 3.3-2. Characteristics of the Infrastructure Constructed at the Goose Property

Potential Development Area	PDA is 5,358 ha with ~15% of area being waterbodies Footprint of facilities is 758 ha
Site Roads	All weather roads will be constructed with run-of-quarry rock. Roads will be constructed in accordance with mine haul road specifications which require safety barricades. Roads will be private and not for public use.
Quarry Sites and Borrow Area	Estimated aggregate required for construction: 5 Mt tonnes. Number of rock quarries: one. Number of borrow areas: none. Only geochemically suitable rock quarries and borrow sources will be developed.
Water Supply	Source: Goose Lake and Big Lake Industrial uses: up to 900 m ³ /day Domestic uses (from Goose Lake) = up to 150 m ³ /day; potable water treatment capacity. Industrial uses (maintenance facilities, vehicle wash, other uses) = up to 400 m ³ /day.
Fuel Storage	On site fuel tank farm = tank farm consists of 3 steel tanks at 15 ML capacity. ISO containers as required (each underground mine portal, AN facility, incinerator, boilers, and power plant).
Power Generation	Combined heat and power plant (CHP) consisting of five (N + 1) diesel fired reciprocating engine generator sets. Three generators will be rated for continuous duty 6.6 MW and two generators will be rated for continuous duty 5.1 MW.
Explosives	ANFO facility servicing bulk ANFO mixing truck. Bulk storage area for ammonium nitrate: up to 3,900 tonnes inert AN in sea containers. Explosive magazines containing 32 tonnes of packaged explosives and 600 cases of detonators located in 40ft and 20ft magazines, respectively.
Laydown and Storage Area	General laydown area for material and supplies. Secure sea containers for hazardous materials, e.g., mill reagents. Cold storage building.
Waste Management (other than waste rock and tailings)	<i>Waste sorting facility</i> - adjacent to the Process Plant. <i>Landfill</i> - for disposal of non-hazardous, non-leaching, inorganic garbage, to be located in one or more Waste Rock Storage Areas. <i>Landfarm</i> - for treatment of hydrocarbon contaminated soils or snow, located in one or more Waste Rock Storage Areas. <i>Incinerator</i> - at camp for incineration of camp combustible waste including sewage treatment plant sludge / Pacto waste (3.0 kg/person/day). <i>Hazardous waste</i> - temporary storage area at site. Dispose off-site in an approved facility. <i>Used tires and machinery</i> - remove hazardous waste from equipment not being salvaged, clean and landfill equipment. Landfill used tires.
Airstrip	All weather airstrips and aprons capable of servicing passenger and large cargo aircraft will be constructed at the Goose Property Area. Ice airstrips will continue to be used as required. Dimensions: up to 1524 m long, 45 m wide airstrip equipped with a Global Positioning System (GPS) Instrument Approach system allowing for instrument flight rules (IFR) approaches and departures. Expected number of flights: • Construction: 3 - 4 per week; • Operation: 2 - 3 per week; • Closure: 2 - 3 per week; • Post-closure: 1 per month (summer season).

(continued)

Table 3.3-2. Characteristics of the Infrastructure Constructed at the Goose Property (completed)

Airstrip (<i>cont'd</i>)	An operations center will contain radio equipment for ground to air communications, and all electrical services and controls for the airstrip. The automated weather observation station (AWOS) will be located along side of the control center. An emergency back-up diesel generator will be located at the operations center.
Wastewater Treatment	Sewage Treatment Plant provided for 465 person camp. Membrane bioreactor plant housed in 20 ft. container with a separate sludge drying system housed in a 40 ft container. Treated effluent discharged to land during construction. Oily water treatment plant. For light vehicle and mine maintenance shops - water treated and recycled within shop. Oil to be collected and either burned in an approved waste-heat generator or drummed and removed from site as hazardous waste.
Buildings	Process Plant and crusher buildings; Assay laboratory; explosives magazines; Detonator magazines; AN facility; Reagent storage; Core logging facility; Warehousing facility; Emergency facilities (fire and ambulance station); General maintenance building (site services); Mine maintenance and dry building; Waste management building; Light vehicle maintenance workshop; Heavy equipment maintenance workshop; Wash bay; 465-person camp complete with kitchen, Recreational facilities; Administration complex; Modular potable water treatment system; Modular sewage treatment system; Diesel power plant; Power utility building.
Overburden, Waste Rock Areas and Ore stockpiles	Develop overburden storage areas for each quarry and/or mine area. Develop waste rock storage areas for Umwelt, Llama, Echo, and Goose Main. Develop ore stockpile pad at the Process plant area.
Water Crossings	Up to five water crossings (culverts) will be needed and will be designed to minimize Permanent Alteration to, or Destruction of, fish habitat (PAD), conform with DFO Measures to Avoid Causing Harm to Fish and Fish Habitat. Culvert diameters will range from 1.0 m to 2.5 m.

3.3.4 Tailings Storage Facility (TSF) Construction

The tailings management system at the Goose Property will entail deposition of 19.8 million tonnes (Mt) of tailings at three separate locations; see Table 3.4-6 for the deposition schedule. The initial 2 years of production will be deposited in a purpose-built Tailings Storage Facility (TSF) located about 2 km south of the Goose Main open pit. Tailings deposition will then transition to in-pit deposition into the mined out Umwelt open pit (referred to as Umwelt Tailings Facility [Umwelt TF]) for a period of about four years. Finally, tailings deposition moves to the mined out Goose Main open pit (referred to as Goose Main TF), for deposition during the remaining four years of the mine life.

Containment structures for the TSF will be designed and constructed according to stringent engineering standards. The long-term monitoring and inspection of containment structures for the TSF will be considered during the design and construction phase. Specific design allowances will be made for permafrost conditions, slopes, seismic activity and site drainage requirements, particularly during peak flow conditions. An overview of the design parameters is presented in Table 3.3-1.

3.3.4.1 Dam Hazard Classification

The guidelines provided by the Canadian Dam Association (CDA) have been used to determine the dam classification and to suggest the corresponding minimum inflow design flood (IDF) and earthquake design ground motion for the tailings embankment. The dam safety classification for the tailings embankment is considered 'HIGH' requiring the facility to be designed for an IDF of 1/3 between the PMF and the 1/1,000 year 24-hr storm event for this project equating to approximately 131 mm, an earthquake design ground motion (EDGM) of the 1/2,475 year seismic event, which, for this project site, is a peak ground acceleration (PGA) of 0.036 g.

3.3.4.2 TSF Development Plan and Schedule

The dam will be completed before the Goose Process Plant begins production. Construction of the TSF dam and South Dyke will start in Q4 of Year -2 with excavation of the key trench, followed by grouting of the shallow fractured bedrock zones. The key trench excavation and backfill must be completed in the winter (i.e., end of Q1 of Year -1) to eliminate potential issues caused by thawing of the soft overburden soils, as well as to ensure that a thermal blanket is completed to protect the permafrost in the foundation.

Table 3.3-3. Design Basis for the Tailings Storage Facility

Item	Design Criteria
Tailings Properties	% solids = 49% Average in-situ dry density of 1.1 t/m³ from start up to the end of Year 1, 1.2 t/m³ from start of Year 2 to EOM. Ice entrainment allowance of up to 20% (i.e., about 0.63 Mm³).
Tailings Storage Facility	Frozen foundation rock fill with geomembrane. Geosynthetic clay liner (GCL) into a key trench, dam of run of mine NPAG waste rock. Embankment constructed for approx. 3 years of tailings production plus Inflow Design Flood (IDF), freeboard, and process water. Basin and embankments covered with the GCL, between compacted bedding material, or anchored to pony wall. Overlaps will be at least 0.5 m wide. Minimum 600 mm of bedding material (sand). Inflow Design Flood (IDF) of 1/3 between 1:1000 year event and probably maximum flood; approximately 131 mm. Wind and wave run-up and additional allowances of 1.4 m. Minimum static factors of safety: • 1.3 - During Construction; • 1.5 - During Operations and Closure.

3.3.4.3 TSF Monitoring

Geotechnical instrumentation will be installed in the tailings embankment and foundation during construction and during the life of the project. This may comprise of vibrating wires, thermistors and slope inclinometers and movement (survey) monuments along the embankments. The instrumentation will be monitored during the construction and operation of the TSF to assess embankment performance and to identify any conditions different to those assumed during design and analysis. Amendments to the ongoing designs and/or remediation work can be implemented to respond to the changed conditions, should the need arise. Monitoring of civil and mechanical operational components will be a daily/shift requirement, to ensure that systems are functioning correctly. Excess noise, wear, movement, leakage, and spillage may indicate problems with pipelines or valves.

3.3.5 Waste Management Facilities

The waste management infrastructure for the Project will be established at the onset of the mobilization and construction activities for use during Construction, Operations, and Closure and Reclamation. At Goose Property this will consist of:

- a sewage treatment plant;
- an incinerator for combustion of non-hazardous and combustible wastes (including sewage sludge);

- a landfarm for the treatment of contaminated soils and snow;
- a waste sorting facility;
- one or more landfills for disposal of non-hazardous solid wastes; and
- a lined hazardous waste storage area.

At the MLA waste management facilities will include:

- an incinerator for combustion of nonhazardous and combustible wastes (including sewage);
- a landfarm for the treatment of contaminated soils and snow;
- a waste sorting facility; and
- a lined hazardous waste storage area.

All waste products will be sorted at waste sorting facilities local to each project site. Material will be safely stored until it is transported to an appropriate recycling or disposal facility. Both the MLA and Goose property will have indoor and outdoor storage, and waste will be segregated, handled, transported, and stored appropriately to ensure containment and physical security.

Combustible wastes will be temporarily stored in dedicated bins within the waste incineration building or in proximity to the portable incinerators until they are to be incinerated. Hazardous waste and recyclable non-hazardous, non-combustible materials will be temporarily stored on site in designated and approved storage areas. The majority of other items will be stored in the laydown yard outdoors, and in shipping containers where appropriate. This includes recyclables such as tires, electronics and electrical materials, and scrap metal. Materials designated for offsite disposal will be packaged for shipment to certified waste management facilities for subsequent treatment, recycling, and/or disposal.

The sewage treatment facilities established at the onset of construction activities at Goose will be maintained for the duration of the Project. Sewage and grey water from the camps and facilities will be conveyed in heat traced pipes or trucked to pre-packaged wastewater treatment plants (membrane bioreactor). During construction, treated sewage effluent will be discharged to a designated area in the terrestrial environment. The discharge area will be designed to minimize erosion and degradation of permafrost. Once the TSF becomes available for use, treated sewage effluent will be discharged to the TSF.

At the MLA, the incinerator will be capable of safely incinerating Class I, II, III, and IV solid wastes. Sewage will be collected from Pacto units and incinerated. The main source of domestic type solid wastes will be from the Accommodation Complex. The solid wastes, oil soaked materials, paper, etc. will come mainly from the Maintenance Shop, Warehouse and Power Plant facilities.

The design and performance of all incinerator systems will comply with all applicable CSA Codes and Standards. The incinerators emissions will meet the requirements set by Canadian Council of Ministers of Environment (CCME) latest revision and other local Provincial and/or Territorial codes and standards.

3.4 OPERATIONS

3.4.1 Resources and Reserves

Canadian Institute of Mining (CIM) guidelines define mineral reserves as “the economically mineable part of a Measured or Indicated Mineral Resource demonstrated by at least a Preliminary Feasibility Study.” AMC have categorized the Back River grade estimates as a combination of Measured, Indicated and

Inferred resources in accordance with the criteria set out in the Canadian NI 43-101. The Measured, Indicated and Inferred resources currently reported for the Llama, Umwelt, Goose Main, Echo, and George deposits are summarized in Table 3.4-1. Sabina's mineral tenures are shown on Figure 3.4-1.

Table 3.4-1. Back River Project Resource Estimates (October 2014)

Deposit	Tonnes (kt)	Au (g/t)	Metal (koz Au)
Measured			
Goose Main Open Pit	4,478	4.32	621
Goose Main Underground	110	6.24	22
Llama Open Pit	1,874	5.86	353
Llama Underground	110	5.72	20
Umwelt Open Pit	3,699	6.07	722
Umwelt Underground	1.0	9.21	0.3
Total Measured	10,273	5.27	1,740
Indicated			
Goose Main Open Pit	2,877	4.19	388
Goose Main Underground	853	7.32	201
Echo Open Pit	321	6.07	63
Echo Underground	596	6.17	118
Llama Open Pit	821	6.01	159
Llama Underground	752	8.72	211
Umwelt Open Pit	1,963	5.38	340
Umwelt Underground	3,387	8.92	972
George Open Pit	4,321	5.04	700
George Underground	2,079	6.62	443
Total Indicated	17,969	6.22	3,593
Total Measured and Indicated	28,242	5.87	5,333
Inferred			
Goose Main Open Pit	215	3.20	22
Goose Main Underground	429	6.83	94
Echo Underground	71	5.91	14
Llama Underground	295	6.77	64
Umwelt Open Pit	121	2.29	9
Umwelt Underground	1,788	11.59	667
George Open Pit	929	4.75	142
George Underground	3,902	6.69	840
Total Inferred	7,750	7.43	1,851

Notes: CIM definitions were used for the Mineral Resources.

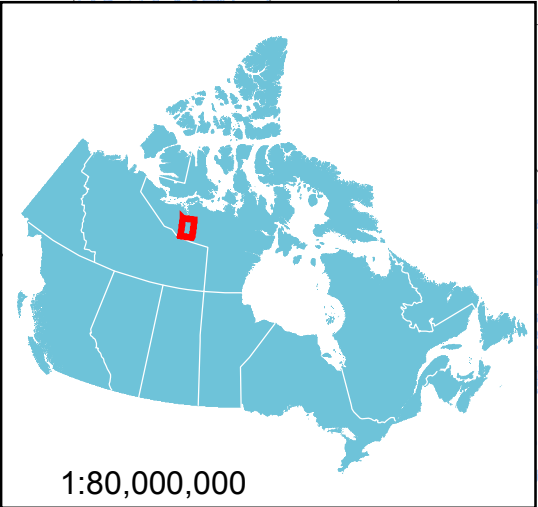
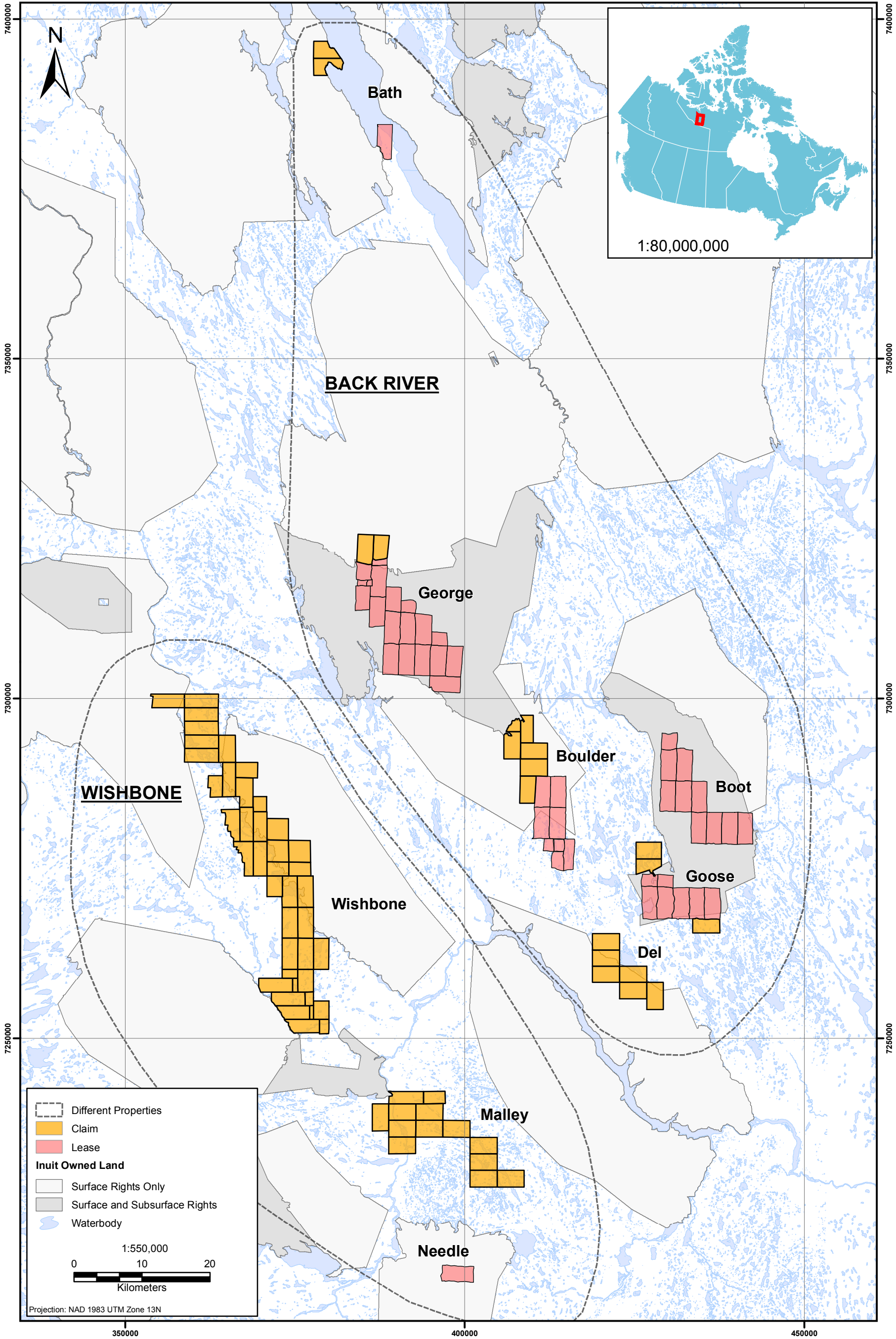
Open-pit Mineral Resources are constrained by an optimized pit shell at a gold price of US\$1,500/oz gold.

The cut-off grade applied to the open pit Resources is 1.0 g/t gold. The underground cut-off grade is 4.0 g/t gold for all George Mineral Resources (LCP North, LCP South, Locale 1, Locale 2, GH, and Slave), 3.5 g/t gold for Goose Main, Echo and Llama, and 4.5 g/t for the Umwelt deposit.

The George Mineral Resources were estimated within mineral domains expanded to a minimum width of 2 m for the underground Resources.

Drilling results up to December 31, 2013, are included except for Echo (new drilling to July 4, 2014) and Loc 1 and Loc 2 (new sampling to July 21, 2014).

The numbers may not add due to rounding.



Different Properties

Claim

Lease

Inuit Owned Land

Surface Rights Only

Surface and Subsurface Rights

Waterbody

01020

1:550,000

Kilometers

Projection: NAD 1983 UTM Zone 13N

To convert Mineral Resources to Mineral Reserves for the Goose Deposits (JDS Mining 2015), extraction design was undertaken, mining cut-off grades (COGs) were employed, mining dilution was added, and mining recovery factors were applied. To calculate the Mineral Reserves for the Back River Property, mining methods and economic viability were determined for each deposit at the Goose Property. The total mineral reserves are summarized in Table 3.4-2.

Table 3.4-2. Total Mineral Reserves for the Goose Deposits (as of February 13, 2015)

Area	Classification	Tonnes (kt)	Au (g/t)	Contained Au (koz)
Umwelt Open Pit	Proven	3,104	6.08	606
	Probable	466	4.45	67
Llama Open Pit	Proven	1,351	6.20	270
	Probable	122	5.36	21
Goose Main Open Pit	Proven	3,447	4.37	484
	Probable	873	4.45	125
Echo Open Pit	Proven			
	Probable	112	4.60	17
Total Open Pit	Proven	7,902	5.35	1,360
	Probable	1,573	4.53	229
Umwelt Underground	Proven	2	8.10	1
	Probable	4,462	6.26	898
Llama Underground	Proven	82	7.02	18
	Probable	870	7.67	215
Goose Main Underground	Proven	172	4.81	27
	Probable	1,072	5.80	200
Echo Underground	Proven			
	Probable	592	5.26	100
Total Underground	Proven	256	5.54	46
	Probable	6,997	6.28	1,413
Total Back River Property	Proven	8,158	5.36	1,405
	Probable	8,570	5.96	1,642

Notes for open pit:

A gold price of 1,250 US\$/oz is assumed.

An exchange rate of CDN\$1.05 to US\$1.00 is assumed.

Dilution and recovery factors are applied as per Open Pit mining method.

A COG of 1.39 g/t was used for the Umwelt Open Pit Mineral Reserve estimate.

A COG of 1.41 g/t was used for the Llama Open Pit Mineral Reserve estimate.

A COG of 1.37 g/t was used for the Goose Main Open Pit Mineral Reserve estimate.

A COG of 1.30 g/t was used for the Echo Open Pit Mineral Reserve estimate.

Notes for underground:

A gold price of 1,250 US\$/oz is assumed.

An exchange rate of CDN\$1.05 to US\$1.00 is assumed.

Dilution and recovery factors are applied as per underground mining method.

A COG of 3.18 g/t was used for the Umwelt underground Mineral Reserve estimate.

A COG of 3.80 g/t was used for the Llama underground Mineral Reserve estimate.

A COG of 3.77 g/t was used for the Goose Main underground Mineral Reserve estimate.

A COG of 3.21 g/t was used for the Echo underground Mineral Reserve estimate.

3.4.2 Geology and Mineralogy

The Back River Project is located in the central-eastern portion of the Slave Structural Province and forms part of the Canadian Shield. The Slave Structural Province is predominantly comprised of metamorphosed greenstone and turbidite sequences and plutonic rock underlain by older gneiss and granitoids. Volcanic-turbidite series rocks are widespread and abundant, consisting of large areas of turbidites flanked by narrow volcanic belts. Iron formations are locally abundant in the volcanic-turbidite series and host most of the stratabound gold deposits.

The targeted gold deposits in the Back River Project (located within the Goose property) are hosted by oxide and silicate iron formations that are cut by quartz and sulphide-bearing quartz veins. Most of the known or observed gold mineralization identified is associated with the sulphide-bearing quartz veins which are accompanied by pyrite, pyrrhotite, arsenopyrite, silicification, and shearing. The gold mineralization to a lesser extent also occurs within greywacke units beneath the iron formations. Gold appears to have a spatial association with narrow porphyritic felsic dikes wherever these units are present.

3.4.3 Mining

The mine plan consists of open pits and underground mining operation supporting a 6,000 t/d milling operation. The current plan for open pit and underground mine production focuses on achieving an average production of 350,000 ounces of gold annually. Four deposits at Goose Site (Umwelt, Llama, Goose Main, and Echo) are planned to be extracted using both open pit and underground mining. The proposed underground mining methods include post pillar cut and fill (PPCF), drift and fill (DF) and longitudinal open stoping (LOS), and the proposed open pit mining method is truck and shovel.

As exploration activities continue, additional deposits may be identified that could be developed by both open pit and underground methods.

Mining will begin with open pits at the Goose Property with pre-stripping and ore stockpiling beginning in Year -2. Throughout the mine life, production from open pit mining at the Goose pits is supplemented by the underground mines starting with production from Llama underground in Year -1. Ore will be stockpiled to optimize mill feed grades and add flexibility to the mine plan.

Table 3.4-3 summarizes the key aspects of the mining operation for the Goose property.

3.4.4 Waste Rock Management

Waste rock The Goose Property will utilize three waste rock storage areas designed to properly manage potentially acid-generating (PAG) and non-potentially acid-generating (NPAG) mining waste. After the TSF has received the design quantity of tailings, it will also be covered with waste rock. Over the life-of-mine, a total of 77 Mt of mining waste will be produced, including the overburden. Of that, it is estimated that 38 Mt is PAG material, 33 Mt is NPAG material, and 6 Mt is overburden.

Progressive reclamation will begin during operations, which entails capping all WRSAs and the TSF with a 5-m NPAG cover to promote aggregation of permafrost and encapsulation.

Table 3.4-4 summarizes the key aspects of waste rock management for the Goose property.

Table 3.4-3. Summary of Goose Property Mine Operations

Open Pit Mines	
Umwelt Open Pit (Year -2 to 2)	Pit Surface Area Projection: 161,800 m² Maximum Pit Dimensions: 550 m × 330 m Maximum Depth: 135 m below ground surface Characteristics: • Pit limits do not impact on waterbodies. • Segregation of PAG and NPAG waste rock in WRSA adjacent to Umwelt open pit - see Section 3.4.4 "Waste Rock Management". • Open pit will be backfilled with processed tailings and water.
Llama Open Pit (Year 1 to 3)	Pit Surface Area Projection: 129,700 m² Maximum Pit Dimensions: 500 m × 300 m Maximum Depth: 135 m below ground surface Characteristics: • Pit limits impinge on Llama Lake. Llama Lake must be isolated and drained for mine workings. Dewatering to occur in Year -1. Llama Lake will be recharged in modified form after completion of mining. • Segregation of PAG and NPAG waste rock in WRSA adjacent to Llama open pit - see Section 3.4.4 "Waste Rock Management". • At closure, mined out open pit is allowed to fill with water from adjacent stream/waterbodies.
Goose Main Open Pit (Year 2 to 6)	Pit Surface Area Projection: 237,400 m² Maximum Pit Dimensions : 700 m × 300 m Maximum Depth: 150 m below ground surface Characteristics: • Pit limits impinge on an inflow stream to Goose Lake. This watercourse will be diverted upstream of the pit and airstrip to another Goose inflow waterbody to the west. • Segregation of PAG and NPAG waste in WRSA areas south to Goose Main open pit and on top of TSF - see Section 3.4.4 "Waste Rock Management". • Open pit will be backfilled with processed tailings and water.
Echo Open Pit (Year 4 to 5)	Pit Surface Area Projection: 32,900 m² Maximum Pit Dimensions : 260 m × 120 m Maximum Depth: 45 m below ground surface Characteristics: • Pit limits impinge on an inflow stream to Goose Lake. This watercourse will be diverted upstream of the pit to flow around the pit and reconnect with the same Goose inflow waterbody. • Segregation of PAG and NPAG waste in WRSA adjacent to Echo open pit - see Section 3.4.4 "Waste Rock Management". • At closure, mined out open pit is allowed to fill with water from adjacent stream/waterbodies.
Underground Mines	
Umwelt Underground (Year 2 to 10) Method: Post pillar cut and fill	Decline/Ramp: portal located at surface next to Umwelt Open Pit. Mine Workings: trend downward ~30° from horizontal for ~1,000 m southeast of the Umwelt Open Pit. Maximum Depth: 650 m below ground surface. No segregation of PAG and NPAG waste rock from underground development; all underground development waste rock will be used as backfill to fill mined out stopes - see Section 3.4.4 "Waste Rock Management".

(continued)

Table 3.4-3. Summary of Goose Property Mine Operations (completed)

Underground Mines (cont'd)	
Llama Underground (Year 1 to 4) Method: Drift and fill	Decline/Ramp: portal located at surface next to Llama Open Pit. Mine Workings: trend downward ~30° from horizontal for ~500 m southeast of the Llama Open Pit. Maximum Depth: 380 m below ground surface. No segregation of PAG and NPAG waste rock from underground development; all underground development waste rock will be used as backfill to fill mined out stopes - see Section 3.4.4 "Waste Rock Management".
Goose Main Underground (Year 5 to 9) Method: Drift and fill	Decline/Ramp: portal located at surface next to Goose Main Open Pit. Mine Workings: to a planned depth of ~200 m located directly below the Goose Main Open Pit. Maximum Depth: 390 m below ground surface. No segregation of PAG and NPAG waste rock from underground development; all underground development waste rock will be used as backfill to fill mined out stopes - see Section 3.4.4 "Waste Rock Management".
Echo Underground (Year 6 to 9) Method: Longitudinal open stoping	Decline/Ramp: portal located at surface next to Echo Open Pit. Mine Workings: trend downward ~60° from horizontal for ~350 m southeast of the Echo Open Pit. Maximum Depth: 325 m below ground surface. No segregation of PAG and NPAG waste rock from underground development; all underground development waste rock will be used as backfill to fill mined out stopes - see Section 3.4.4 "Waste Rock Management".

Table 3.4-4. Summary of Goose Property Mine Waste Rock Management

Waste Rock Management		
Umwelt Waste Rock Storage Area (WRSA)	Surface area = 394,800 m ² Umwelt Waste Rock: • PAG Rock: 11,607 kt • NPAG Rock: 3,390 kt	Segregation of PAG and NPAG waste rock; stockpile adjacent to Umwelt open pit. A 5 m buffer of NPAG will be placed around and on PAG during and after construction to accommodate freeze back. Some waste rock from the open pits will be repurposed and reclaimed for use as backfill for Umwelt, Llama, Goose Main, and Echo underground workings.
Llama WRSA	Surface area = 375,500 m ² Llama Waste Rock: • PAG Rock: 10,546 kt • NPAG Rock: 5,459 kt	Segregation of PAG and NPAG waste rock; stockpile adjacent to Llama open pit. A 5 m buffer of NPAG will be placed around and on PAG during and after construction to accommodate freeze back. Some waste rock from the open pits will be repurposed and reclaimed for use as backfill for Umwelt, Llama, Goose Main, and Echo underground workings.
TSF WRSA	Surface area = 1,751,900 m ² Goose Main Waste Rock: • PAG Rock: 10,685 kt • NPAG Rock: 17,527 kt	Segregation of PAG and NPAG waste rock; stockpile adjacent to and on TSF. A 5 m buffer of NPAG will be placed around and on PAG during operations. Some waste rock from the open pits will be repurposed and reclaimed for use as backfill for Umwelt, Llama, Goose Main, and Echo underground workings.
Echo WRSA	Surface area = 13,800 m ² Echo Waste Rock total: • PAG & NPAG Rock: 122 kt	Segregation of PAG and NPAG waste rock; stockpile adjacent to Echo open pit. A 5 m buffer of NPAG will be placed around and on PAG during and after construction to accommodate freeze back. Some waste rock from the open pits will be repurposed and reclaimed for use as backfill for Umwelt, Llama, Goose Main, and Echo underground workings.

3.4.5 Ore Management

A fleet of 64-tonne trucks will move ore from the open pits and underground mines to the ore stockpiles located at the Goose Plant Site. Ore will be sorted based on ore grade into one of three stockpiles: low grade (LG), mid-grade (MG), or high grade (HG). The three stockpiles will be located on the same pad NW of the process plant. The process plant mill feed will be made up of ore from stockpiles and ore fed directly from the open pit and underground mines.

Table 3.4-5 summarizes the key aspects of ore management for the Goose property.

Table 3.4-5. Summary of Goose Property Mine Ore Management

Run of Mine (ROM) Ore Stockpile and Primary Crushing Facilities	
ROM Stockpiles	Ore stockpile maximum capacity of 3.1 M tonnes in area of crushing/milling facilities. Three designated ore stockpiles: low grade stockpile maximum 2.0 Mt; medium grade stockpile maximum 0.7 Mt; and high grade stockpile maximum 0.4 Mt (maximums not concurrent periods of time).
Primary Crushing	Located at process plant site with 6,000 tpd capacity. Size: product P80 of 110 mm

3.4.6 Mineral Processing

The mill will be sized for a throughput of 6,000 tpd of ore. Metallurgical testwork to date suggests grinding to 50 µm followed by whole-ore leaching will provide economic recoveries. The process will include the following operations:

3.4.6.1 *Crushing and Grinding*

The ore will be crushed in two stages then ground in a ball mill and a fine ore mill. Gravity concentration will recover coarse gold as a unit operation after ball milling. The gravity product will be intensive leached.

3.4.6.2 *Leaching and Gold Recovery*

After crushing and grinding, gold will be recovered by leaching followed by a carbon-in-pulp (CIP) circuit. The leach circuit will continue with carbon elution, electrowinning and smelting to produce gold bullion.

3.4.6.3 *Treatment of Leach Residue*

Leaching the milled material as part of gold recovery will use cyanide solution. The process facilities will include a cyanide detoxification plant that will reduce the cyanide concentration prior to release to the tailings facilities. Residue from the CIP circuit will be pumped to a 27 m diameter high-rate thickener to recover residual cyanide and water. The thickener overflow will flow by gravity to the process water tank for reuse as dilution water in the process. The underflow of the thickener will be sent to the cyanide detoxification circuit prior to being pumped to the TSF or Tailings Facilities (TF - mined out open pits) where suspended solids will consolidate.

3.4.6.4 *Cyanide Detoxification*

The underflow from the tailings thickener will be pumped to a cyanide detoxification circuit. The residual cyanide in the underflow of the thickener will be decomposed by a sulphur dioxide (SO₂)/air oxidation process. Sodium metabisulphite (SMBS) will be fed into two agitated tanks to produce SO₂ and process air will be sparged into the bottom of the tanks before the slurry reports to the final tailings

tank. The cyanide detoxification tanks will be located outdoors. SO₂ gas alarms/monitors will be provided to monitor SO₂ concentration in the areas.

3.4.6.5 *Reagents*

The reagents used in the process will include:

- CIP and gold recovery:
 - slaked or hydrated lime (Ca(OH)₂);
 - sodium cyanide (NaCN);
 - activated carbon;
 - sodium hydroxide (NaOH);
 - lead nitrate (PbNO₃);
 - hydrochloric acid (HCl);
- cyanide destruction:
 - sodium metabisulphite (SMBS);
 - copper sulphate (CuSO₄);
 - slaked lime (Ca(OH)₂);
- others:
 - flocculant; and
 - antiscalant.

All the reagents will be prepared in contained areas in proximity to the points of application but also close to available storage for the feed stock. The reagent storage tanks will be equipped with level indicators and instrumentation to ensure that spills do not occur during operation. Appropriate ventilation and fire and safety protection will be provided at the facility.

3.4.6.6 *Process Plant Water Consumption*

The circulation water load between the TSF and the process plant will be in the range of 4,800 m³/day. Tailings will be pumped to the TSF or TFs as a slurry containing 49% solids. The tailings will settle and consolidate in these catchments. The water content of the consolidated tailings will be in the range of 36 to 40% water and the ponded supernatant will be returned to the process plant for use as process water.

3.4.6.7 *Process Plant Power Consumption*

The process plant peak power consumption is expected to be in the order of 25 MW which accounts for the ore process from grinding through utilities.

3.4.6.8 *Storage and Transportation of Final Product*

Refined gold doré bars will be the final product. The gold bars will be stored in a secure section of the process plant and transported off site via air on a semi-weekly basis.

3.4.7 *Tailings Management*

The FS mine plan entails a ten-year mine life with about 19.8 million tonnes (Mt) of ore, processed at a rate of 6,000 tpd. Based on an assumed density of 1.2 tonnes per cubic metre (t/m³) the required tailings storage capacity is in the order of 16.5 million cubic metres (Mm³).

The tailings management system at the Goose Property will entail deposition of 19.8 million tonnes (Mt) of tailings at three separate locations. The initial 2 years of production will be deposited in a purpose-built Tailings Storage Facility (TSF) located about 2 km south of the Goose Main open pit. Tailings deposition will then transition to in-pit deposition into the mined out Umwelt open pit (referred to as Umwelt Tailings Facility [Umwelt TF]) for a period of about four years. Finally, tailings deposition moves to the mined out Goose Main open pit (referred to as Goose Main TF), for deposition during the remaining four years of the mine life. This is summarized in Table 3.4-6 below.

Table 3.4-6. Tailings Deposition Location Summary

Location	Period (Year and Quarter)	Tailings (Mt)	Tailings (Mm ³)
TSF	Y-1 Q4 to Y2 Q3	3.8	3.1
Umwelt TF	Y2 Q4 to Y6 Q3	8.6	7.2
Goose Main TF	Y6 Q3 to Y10 Q2	7.4	6.2
Total Project	Y-1 Q4 to Y10 Q2	19.8	16.5

Numerous mines have operated, or currently operate, tailings facilities in cold regions under severe winter (freezing) conditions. From these operational mine experiences, design and operating considerations have been developed for Back River Property, which include:

- Shape the tailings impoundment surface (during summer tailings deposition) to provide a winter pond that can be maintained "localized" in one, or specific, areas of the facility.
- Concentrate winter tailings discharge from a single, relocate-able, point. This will tend to channelize the flow and move it through and under the ice cover, where the solid/liquid separation occurs. This prevents sheet tailings flow over the ice (a freezing of water and subsequent ice entrainment in the tailings).
- Store sufficient water in the tailings facility prior to freezing, to provide for all anticipated ice and pore water losses during winter (i.e., develop and maintain a good water/ice balance).
- The potential for dusting can be exacerbated during cold winter conditions as a 'freeze drying' process tends to destroy capillary tensions in partially saturated sand materials, making it more susceptible to dusting. Appropriate provisions will be required to prevent dusting such as increasing the freeboard height and installing sediment control fencing along the embankment crests downwind of the prevailing wind.

A frozen foundation dam would allow for construction of a conventional dam on the deep permafrost foundation, while making use of the permafrost conditions to seal the water retaining feature of the dam with the foundation. There are no known deposits of low permeability soils on the Property, and arctic conditions pose great challenges for the construction of low permeability cores. The decision was therefore made to construct the TSF containment dam as a frozen foundation rockfill dam (built from run-of-mine (ROM) waste rock) with a geosynthetic liner. For this concept to function, the liner will be frozen into the key trench permafrost, and over the life of the structure, the foundation should not thaw deep enough to compromise this seal.

The inferred foundation conditions at the TSF containment dam are not conducive to constructing seepage collection ditches or drains. Seepage collection will therefore be done by constructing a berm downstream of the dam. The berm will incorporate an impermeable liner keyed into permafrost. Depending on the quality of the water, seepage may be directed to sumps from where it will be pumped back into the TSF supernatant pond or discharged to the environment, as appropriate.

3.4.7.1 *Monitoring the Tailings Storage Facility*

The TSF will be controlled and monitored using a formalized procedure that is incorporated into the mine's Environmental Management System (EMS). Geotechnical instrumentation will be installed in the tailings embankment and foundation during construction, and utilized over the life of the Project. The instrumentation will be used to monitor and assess embankment performance and to identify any conditions different to those assumed during design and analysis. Amendments to the ongoing designs and/or remediation work can be implemented to respond to the changed conditions, should the need arise. Key control and monitoring subject areas will include:

- inspections of the TSF with regard to performance monitoring, instability indicators, stability monitoring, tailings deposition, water management and control, and quality of effluent;
- construction controls, including the use of a construction management program;
- procedures for dust control; and
- quality assurance and quality control measures for operations, monitoring, and inspections.

3.4.8 **Water Management**

Water on the Project will be categorized into three types: contact water, which is impacted by mine workings (waste rock, ore stockpile, pits, tailings, etc.); non-contact water, which is runoff from undisturbed areas; and saline water, which is the groundwater inflow to mining areas. Each type of water is managed separately throughout each Project phase using water management infrastructure including diversions, event ponds, pipelines, and culverts.

Freshwater to support domestic and industrial uses will be sourced from Goose Lake and Big Lake. Water intake will be designed in accordance with DFO guidelines for water intakes. These pumping station and water intakes will be established during the Construction phase (refer to Section 6 for details). Water will be reused as much as feasible, with the Goose Process Plant reclaiming an estimated average of 4,914 m³/day from the active tailings facility. Table 3.4-7 provides a summary of site water management features for Goose Property.

Table 3.4-7. Site Water Management Features for Goose Property

Drainage from mine workings	All open pits will be mined in permafrost, except for Llama Pit that will be influenced by a lake talik. Most undergrounds will reach below the basal permafrost. Groundwater can be expected from Llama Pit and from undergrounds that extend below the basal permafrost at depth. Groundwater inflows into the underground mines below the permafrost are estimated as follows: Umwelt up to 600 m ³ /day, Llama up to 350 m ³ /day, and Goose Main up to 85 m ³ /day. Llama Pit groundwater inflows are up to 700 m ³ /day. Short term peak inflows of 1,000 m ³ /day may be encountered. Water seepage into the underground workings will be pumped to the surface for collection in the Saline Water Pond or other temporary reservoir. Water seepage from the open pits will be directed to the current tailings facility via pipe or truck for reuse.
Drainage from WRSAs and open pits	Collection/diversion channels and ponds will be established around waste rock storage areas. Runoff directed to open pits or directly to current tailings facility. Open pit water will be transported to the current tailings facility via pipe or trucked for reuse in milling process.
Tailings Storage Facility	No discharge during Operations. Controlled release during closure. Consolidated tailings contain 49% solids (by weight). Tailings Storage Facility is lined on upstream berm face with Geosynthetic clay liner with ROM NPAG material to protect the liner from freeze/thaw action.
Drainage from Ore Stockpile	Runoff directed to collection/diversion network will be collected and pumped or trucked to current tailings facility.

(continued)

Table 3.4-7. Site Water Management Features for Goose Property (completed)

Milling & Processing	Water from the TSF will be recycled and reused; however, make-up water is required due to losses of water entrapped in tailings. This water will be sourced from Goose Lake or Big Lake.
Sewage Treatment	Treated effluent will be discharged to receiving environment during construction and closure and directed to the current tailings facility to be used as make-up water during Operations.
Maintenance buildings	Oily water treatment units and treated water is recycled for use in maintenance shop. Discharge, when required, will be directed to the current tailings facility during Operations. Oil to be collected and either burned in an approved waste-heat generator or drummed and removed from site as hazardous waste.
AN Facility	No discharge of waste water from AN facility. Water will be pumped and trucked to active tailings facility.
General site drainage	Site drainage designed to contain potentially contaminated runoff and divert non-contact catchment water from mine facilities.

3.4.8.1 Water Use and Supply

Freshwater will be required to support the domestic and industrial water requirements at the Goose Property and the Marine Laydown Area. Freshwater will also be required to support the Goose Process Plant, ongoing exploration activities, winter ice road building, and other activities.

The freshwater will be sourced from the locations shown in Table 3.4-8. Water intake will be designed in accordance with DFO guidelines for water intakes. These pumping stations and water intakes will be established during the construction period (refer to Volume 2 Chapter 6 for details).

Table 3.4-8. Water Supply during Operations

Site	Volume	Source
Goose Property	Domestic: up to 148 m ³ /day Industrial: up to 900 m ³ /day Dust suppression: up to 400 m ³ /day Total water demand: 1448 m ³ /day	Goose Lake and Big Lake. Recycle additional water from TSF and TFs.
Marine Laydown Area	Domestic: 48 m ³ /day Miscellaneous Industrial: 24 m ³ /day Total water demand: 72 m ³ /day	Bathurst Inlet or local freshwater source; desalination.
Winter Ice Road	675 m ³ /km/season	Multiple sources

3.4.8.2 Surface Water Management

During Operations, there will be no discharge of waste water at the Goose Property. All waste water generated from the camp sewage treatment plant, the maintenance facilities, and pit inflow water will be pumped to the active tailings facility.

The fresh water requirement for process plant processes is defined as the following (total approximately 900 m³/day):

- average required for gland seals 398 m³/day;
- average required for reagents 132 m³/day;
- potable water during Operations 148 m³/day; and
- additional fresh water allowance 200 m³/day.

The above values are required from a fresh water source year round, regardless of how much recycled water (runoff from catchments or mine process water) is available. The additional freshwater allowance accounts for miscellaneous needs including process plant cooling water, lime scrubber water, and truck wash water.

For the Goose Property, Sabina's water management approach during Operations is to collect and move all mine contact water (open pit runoff and seepage, WRSA runoff, ore stockpile runoff, underground mine dewatering, etc.) to the active tailings management facility. These diversions will result in the diversion of a small percentage of natural drainage of the Goose watershed. Water collected within the tailings management facilities will be reclaimed to the process plant for use in ore processing.

In preparation of the site for mining of the ore deposits, diversion ditches will be constructed to divert non-contact runoff from mine workings. For each mine working, (open pits, waste rock storage areas, and TSF) drainage patterns within the Goose Potential Development Area (PDA) will be altered either permanently or for the life of the mine workings as shown in Table 3.4-9.

Table 3.4-9. Drainage Pattern Alteration at the Goose Property

Permanent Drainage Patterns Alterations at the Goose Property	
Tailings Storage Facility	Physical footprint of the facility causes permanent changes to drainage patterns. Perimeter ditches/berms/structures to intercept and divert non-contact flows away from TSF. All precipitation and inflows in TSF are contained and there are no releases to the receiving environment until the Post-Closure phase. Seepage intercepted and pumped back to TSF. Controlled release at Post-Closure; runoff directed to a single discharge location to facilitate monitoring and treatment if required.
Waste Rock Storage Areas and Landfill sites	Physical footprint of the facility causes permanent changes to drainage patterns. Perimeter ditches/berms/structures to intercept and divert non-contact flows away from waste rock areas or landfill. All precipitation and runoff are contained, collected and pumped to the active tailings facility. There is no release of runoff to the receiving environment until the Closure phase. Controlled release in Closure; runoff directed to a minimal number of discharge points to facilitate monitoring and treatment if required.
Site infrastructure (plant site, stockpiles, laydown, airstrip)	Physical footprint of the facility causes permanent changes to drainage patterns. Perimeter ditches/berms/structures to intercept and divert non-contact flows away from infrastructure areas. To the extent possible (more infilling than cut), building pads are constructed on top of permafrost thus altering drainage patterns. At closure, infrastructure is removed and surfaces are scarified to promote natural rehabilitation of disturbed areas.
Temporary Drainage Patterns Alterations at Goose Property	
Umwelt Pit	Temporary diversion of streams flowing through the current footprint of the Umwelt Pit (Year -2 to Year 8).
Llama Pit	Temporary diversion of streams flowing through the current footprint of Llama pit. Dewatering of Llama Lake beginning in Year 1.
Goose Main Pit	Temporary diversion of streams flowing through the current footprint of the Goose Main Pit (Year 2 to Year 6).
Echo Pit	Temporary diversion of streams flowing through the current footprint of the Echo Pit (Year 4 to Year 5).

3.4.9 Progressive Reclamation

Progressive reclamation is defined as the opportunistic reclamation activities completed during the operational phase of a project. Progressive reclamation can increase efficiencies by utilizing available mining resources to conduct reclamation activities during the revenue-generating phase of the project. Progressive reclamation typically reduces risks, final closure costs as well as the timeframe for achieving closure objectives.

Progressive reclamation activities can be undertaken as material becomes available and disturbed areas are no longer required. Among other opportunities, the large reclamation efforts will be focused on any final earthworks including:

- filling open pits;
- establishing partial or full boulder fences around open pits and TSF;
- installing proper signage around mine openings and TSF;
- constructing open pit spillways;
- constructing and closing WRSAs;
- buildings and infrastructure will be removed as they become unnecessary during the LOM and the sites will be reclaimed as much as practicable;
- contaminations of soil, snow, and ice will be cleaned up and soil will be remediated and disposed of on site in accordance with Spill Contingency Plan; and
- hazardous wastes will be shipped off-site periodically to minimize the amount of waste requiring removal at closure.

4. Traditional Knowledge

4. Traditional Knowledge

Traditional Knowledge (TK) can be defined as a “cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission” (NIRB 2007). TK studies provide a valuable way of documenting spatial and temporal patterns of hunting, harvesting, fishing, habitation and travel in a given area. They can also provide detailed information on local ecological processes, socio-cultural patterns and institutions, spirituality, ethical, and other matters.

Sabina recognizes the inherent value of TK and the importance local communities place on its use in the environmental assessment of proposed developments. As such, Sabina has made significant efforts to engage local communities through incorporation of their TK into the Project’s planning and design. Volume 3 describes Sabina’s approach to TK and the methods used to collect and interpret it. Specific details as to how TK has been incorporated into these activities are summarized in Volume 3, Table 3.1-1 “Uses of Traditional Knowledge in Sabina’s Final Environmental Impact Statement for the Back River Project”, and are described in further detail in relevant volumes of the FEIS.

Sabina has utilized six primary sources of TK: a Naonaiyaotit Traditional Knowledge Project (NTKP) database report for the Project; theme-based TK workshops; a report on existing and publically available Northwest Territories TK; the results of public consultation and engagement activities; a TK study on the Bernard Harbour Arctic char fishery; and other sources. Likewise, Inuit Qaujimagatuqangit values have helped guide Sabina’s decision making for the Project and have been incorporated into the design of the Company’s overall Project management approach. It is also important to highlight that Sabina partnered with the KIA in two key elements of its TK work - preparation of the NTKP database report and execution of the theme-based TK workshops. The basis of this partnership was a TK Agreement signed between Sabina and the KIA in May 2012. Signing of this agreement provided Sabina with access to TK held by the KIA in the NTKP database. The agreement also outlines the terms and conditions pertaining to Sabina’s use of the TK. Sabina and the KIA additionally cooperated in the collection and reporting of new (or otherwise unrecorded) TK in the Project area.

Sabina has considered TK on an equal basis with all scientific forms of information collected for the Project. For example, TK has been integrated into various environmental and socio-economic baseline studies conducted for the Project. This information has helped complement existing scientific and socio-economic information, provide new and otherwise unrecorded information, and/or provide alternative views and/or interpretations to be considered. For example, baseline studies were designed to characterize wildlife which have been identified as culturally important to Inuit. These studies also involved the collection and analysis of scientific and TK data (e.g., from the NTKP database report) on the relative seasonal and annual trends in abundance and distribution of wildlife, along with estimated productive capacity where practical, migratory patterns, and associated wildlife corridors and travel routes. Wildlife habitat use within the Local Study Area (LSA) and Regional Study Area (RSA), including the identification of critical habitat features such as crossing points for caribou, raptor nest and carnivore den locations, and important staging areas for migratory birds was also documented using TK. Ecosystems of traditional and cultural importance due to their value as wildlife habitat, were incorporated into a habitat suitability model and mapped as high quality habitat, wherever possible.

Some of the wildlife baseline studies also involved the advice and help of local land users in the field to assist with the placement of remote cameras on the tundra in areas deemed as important habitat for wildlife, particularly caribou. Land users were similarly consulted and included with regards to the positioning of posts used for the wildlife DNA mark-recapture study. Workshops were also conducted with land users from Cambridge Bay, Kugluktuk, Bathurst Inlet, and Omingmaktok as part of the

Project's socio-economic studies to document contemporary travel routes, harvesting areas and practices, and other land uses. TK on wildlife and land use activities was also often shared with the Company during public consultation and engagement activities. Information gained from these activities was subsequently used to support the human and environmental risk assessments that were developed. Sabina has additionally utilized traditional Inuinnaqtun place names wherever possible in the FEIS and during Sabina's public consultation and engagement activities.

TK has helped inform the effects assessment that was conducted for the Project in a number of ways. For example, the baseline against which potential effects were assessed was established using both TK and scientific information. However, the results of the NTKP database report (i.e., KIA 2012) were also used for scoping and refining the initial VEC/VSEC list for the Project. This report presents maps and textual descriptions of valued animal species, environmental components, and traditional land use activities. The information contained in this report was used to determine if these valued components potentially interacted with the proposed Project and, if so, they were included in the initial VEC/VSEC list. This information, along with information from public consultation, consultation with regulatory agencies, and regulatory considerations, was used to determine a final VEC/VSEC list. A draft list of VECs/VSECs was also presented to each community advisory group in November 2012 and at public meetings in each Kitikmeot community in April 2013 for review and comment. While a number of clarifications were made to the public, no significant concerns were noted regarding the VEC/VSEC list that was presented.

As a result of TK being incorporated into Sabina's baseline data collection and impact prediction/effects assessment activities, Sabina's final significance determinations have thus been informed by TK. Every effort has been made to ensure equal consideration of TK and scientific data in the conclusions that were drawn. Significance assessment methods and conclusions were additionally presented in each Kitikmeot community and with each community advisory group in November 2013 for review and comment. No major issues were raised by community stakeholders in regards to the significance assessment methods and conclusions presented by Sabina, although a number of clarifying questions and comments were made to the Company at this time.

Finally, TK has helped inform the development of mitigation and monitoring programs for the Project. Public concerns have been raised (e.g., during public consultation and engagement activities) in regards to the potential for the Project to negatively affect wildlife (particularly caribou) or degrade their forage and habitat quality. Mitigation and management strategies have thus been developed for a number of VECs and VSECs that will serve to minimize the potential effects of the Project on wildlife and wildlife habitat valued by Inuit. For example, the Project's design utilizes winter access roads (rather than all-season roads) that preferentially cross large lakes. This will reduce the potential for disruption to the movement of caribou, grizzly bear, and other wildlife during summer movements; minimize loss and degradation of vegetation due to physical clearing; reduce deposition of airborne dustfall; and reduce surface compaction.

Direct and indirect mitigation and adaptive management strategies for wildlife VECs, and the ways in which TK was incorporated into the development of these strategies, are summarized in Volume 3 and detailed elsewhere in the FEIS. TK will also be used in the monitoring of potential Project effects. Not only has TK contributed to the baseline against which future effects can be measured, but locally shared TK will also provide new observations and information to be considered as the Project advances. The future gathering and use of TK has been incorporated into a number of management plans for the Project. For example, Sabina's *Community Involvement Plan* commits the company to regular public meetings and community engagement throughout the Project's lifecycle. Likewise, procedures will be in place to document and respond to any community feedback, suggestions, and concerns that arise. Volume 10 (Management Plans) should be consulted for additional information on these matters.

5. Existing Environment and Baseline Information

5. Existing Environment and Baseline Information

Comprehensive environmental baseline information has been collected for the Project. Details of the available baseline information (as required in Section 7.3 of the EIS guidelines) for all VECs, VSECs, and Subjects of Note can be found in supporting Volumes 4 (Atmospheric Environment), 5 (Terrestrial Environment), 6 (Freshwater Environment), 7 (Marine Environment), and 8 (Human Environment).

Baseline information was collected and used to: 1) understand existing conditions in the local and regional area of the Project; 2) identify potential environmental effects that would likely result from Project components and activities; 3) provide a benchmark (i.e., before-after-control-effect (BACI) approach) for evaluating the potential effects of the Project through monitoring; 4) to characterize pre-disturbance conditions for the purpose of reclamation activities; and 5) support predictive modelling for effect analysis.

Table 5-1 presents a summary of available baseline information. The following sections provide a summary of the existing environment and available baseline information.

Table 5-1. Summary of Field-collected Baseline Information for the Back River Project

Assessment Subject Area and Component	VEC, VSEC, or Subject of Note	Years of Available Data
<i>Atmospheric Environment</i>		
Air Quality	VEC	2011- 2013
Noise and Vibration	VEC	2012
Meteorology and Climate	Subject of Note	2006-2015
<i>Terrestrial Environment</i>		
Geology	Subject of Note	1982-85,1987,1989, 1990-94,1997, 1999, 2000-2015
Geochemistry	Subject of Note	2007, 2010-2015
Permafrost	Subject of Note	2007-2015
Landforms and Soils	Subject of Note	2012
Vegetation and Special Landscape Features	VEC	2012
Caribou	VEC	2007, 2010-2015
Grizzly Bear	VEC	2012-2013
Muskox	VEC	2007, 2010
Wolverine/Furbearers	VEC	2012-2013
Migratory Birds (Upland Birds and Waterfowl)	VEC	2007, 2011-2013
Raptors	VEC	2007, 2011-2013
<i>Freshwater Environment</i>		
Hydrology	VEC	2007, 2010-2015
Groundwater	Subject of Note	2012-2015
Limnology and Bathymetry	Subject of Note	1994, 2006, 2007, 2010-2014
Water Quality	VEC	1993, 1997, 2006-2007, 2010-2013, 2015
Sediment Quality	VEC	2007, 2010-2013, 2015

(continued)

Table 5-1. Summary of Field-collected Baseline Information for the Back River Project (completed)

Assessment Subject Area and Component	VEC, VSEC, or Subject of Note	Years of Available Data
<i>Atmospheric Environment (cont'd)</i>		
Fish/Aquatic Habitat	VEC	2007, 2010-2015
Fish Community	VEC (lake trout; Arctic grayling)	1990, 1996, 2006, 2010-2015
<i>Marine Environment</i>		
Physical Processes	Subject of Note	2001, 2007, 2008, 2010, 2012, 2013
Water Quality	VEC	2001, 2007, 2008, 2010, 2012, 2013
Sediment Quality	VEC	2001, 2002, 2007, 2010, 2012, 2013
Fish/Aquatic Habitat	VEC	2001, 2007, 2010, 2012, 2013
Fish Community	VEC (Arctic char)	2001, 2010, 2012, 2013
Seabirds/Seaducks	VEC	2010, 2013
Ringed Seals	VEC	2007, 2009, 2012, 2013
<i>Human Environment</i>		
Archaeology	VSEC	2001, 2003, 2010-2013
Paleontological	Subject of Note	2012
Non-traditional Land and Resource Use	VSEC	2012
Socio-economics	VEC (Economic Development, Business Opportunities, Employment, Education and Training)	2012
Health, Safety, and Community Well-being	VSEC	2012
Subsistence Economy and Land Use	VSEC	2012
Country Foods/Human Health	VSEC	2012, 2013

5.1 ATMOSPHERIC ENVIRONMENT

5.1.1 Air Quality

The air quality in the region can generally be classified as pristine. Local emissions are limited to stationary (power generation and heating) and mobile sources (trucks, snowmobiles, all-terrain vehicles, etc.) operated by local residents in communities of the West Kitikmeot. Because of the limited local emissions sources, long-range transport of air contaminants is an important influence on ambient air quality. The atmospheric boundary layer in the Arctic is generally very stable and surface inversions occur frequently. As a result, dispersion of air contaminants can be less effective in the Arctic than in other regions.

An air quality baseline program was initiated at the Goose Property in 2011 and in 2012 and 2013, the program was expanded to include the southern part of Bathurst Inlet. Dustfall stations and passive air sampling stations (PASS) for nitrogen dioxide (NO₂), sulphuric dioxide (SO₂) and ozone (O₃) concentrations were deployed on site during the summer months in order to assess the ambient air quality of the area.

The average dustfall levels were approximately 0.2 to 0.4 mg/dm²/day with the highest dustfall measurement of 1.13 mg/dm²/day occurring in July 2011 (Rescan 2012a). These results indicate that the total dustfall recorded was low as expected for a non-industrial area, and values were well below criteria set in the following jurisdictions: Alberta, British Columbia, Ontario, and Saskatchewan. There are currently no applicable dustfall criteria for Nunavut or the Northwest Territories.

Of the 33 metals analysed, fourteen were below the detection limits, and overall metal deposition rates for the nineteen metals that were detected at one or more stations during at least one month were very low. The highest median acid deposition rate observed was 291 eq/ha/yr which occurred in 2011. There are no air quality standards for acid deposition in Nunavut; however critical loads of acid deposition proposed by the WHO (2000) range from less than 250 eq/ha/year to more than 1,500 eq/ha/year, dependant on soil type.

Passive ambient air quality sampling systems (PASS) obtained monthly average concentrations for criteria air contaminants including sulphur dioxide (SO₂), nitrogen dioxide (NO₂), and ozone (O₃). The PASS results are expressed as monthly average concentrations. The maximum 30-day O₃ level of 55 µg/m³ falls within the expected background range of 49 to 78 µg/m³ (25 to 40 ppb; Health Canada 1999). Since there are no 30-day standards for NO₂ or SO₂ in Nunavut, 30-day averages collected by PASS are conservatively compared with Nunavut annual standards. The 30-day average NO₂ concentrations range from 0.1 to 1.1 µg/m³, which is much less than the annual standard of 60 µg/m³; while the 30-day average SO₂ concentrations range from 0.1 to 1.3 µg/m³, which is much less than the annual standard of 30 µg/m³ (Rescan 2012a).

Background concentrations from ambient air quality monitoring stations at other remote locations in Nunavut and the Northwest Territories for TSP, PM₁₀, PM_{2.5}, or CO were used to represent Project background for the FEIS. Background concentrations of TSP, PM₁₀, PM_{2.5}, or CO are assumed to be 7.5, 3.8, 3.8, and 100 µg/m³, respectively.

5.1.2 Noise and Vibration

Aside from mineral exploration activities, the noise environment in the Project area is pristine. There are no additional industrial sites or human settlements close enough to the Project to be audible; consequently, only natural sources such as streamflow, wind, precipitation, and wildlife will contribute to background noise levels.

Noise monitoring was conducted in March and June 2012 using sound level meters that were deployed at ten sites at varying distances from Goose Exploration Camp, and the Marine Laydown Area. The locations were selected to characterize the range of baseline conditions in the region, based on their proximity to known deposits and sensitive wildlife receptors. The time periods were chosen to encompass winter and summer conditions, and to include the critical bird nesting period and a portion of the caribou migration in June. Monitoring was undertaken for 24 hours at each location. Natural background noise sources recorded included birds, animals, insects, precipitation and winds. Anthropogenic sources recorded included heavy machinery and aircraft (Rescan 2013a).

In general, the June monitoring period had higher noise levels than the March monitoring period due to the fact that during the June monitoring period more non-anthropogenic noise sources, such as birds and insects, were recorded than during the March monitoring period. The highest noise levels were measured at stations which were situated at the Goose exploration camp, which is to be expected due to the noise generated by anthropogenic sources during exploration.

The levels measured are comparable to estimated baseline levels for quiet, rural areas as given in the Health Canada guidance, which considers a quiet rural area with day-night sound levels due to human-made sounds to be below 45 A-weighted decibels (dBA) (Health Canada 2011). Only a single monitoring location experienced noise levels greater than 45 dBA during both monitoring periods.

Noise data collected in 2012 was reflective of pristine background noise conditions as well as exploration camp noise conditions. Data compares well with background studies done in other pristine

areas, where Equivalent Sound Levels (L_{eq}) values can range from 9 to 22 dB(A), depending on proximity to noise sources, wind speed and snow cover (Menge, Ross, and Ernenwein 2002). There are no significant nearby anthropogenic sources and, as such, these baseline levels are considered representative of the noise environment across the modelled area.

There are no significant anthropogenic sources of vibration within the study area and therefore baseline vibration monitoring was not carried out.

5.1.3 Climate and Meteorology

The Project area is located near the northern boundary of the North American Continent in the vicinity of the Arctic Circle. The climate in the area is characterized by extremes. The Project area experiences relatively low amounts of precipitation, but due to sub-zero temperatures for the majority of the year, also experiences high snow accumulation. Summer is a season of nearly perpetual sunlight, while winter is dominated by night, twilight and extreme cold. Due to the relative absence of obstructions to impede the wind (e.g., trees, buildings, mountains), wind speeds are generally high.

Project specific meteorological baseline data collection commenced in August 2004 at the Goose meteorological station. A meteorological station is also located in southern Bathurst Inlet and baseline data is available episodically from 2001 to present. This station continues to be operational to date. A micro-meteorology station (micro-met) has been installed seasonally in Goose Lake in 2012 and 2013 to gather data to calculate site specific evaporation rates. Long-term meteorological data are collected at Environment Canada - Meteorological Service of Canada (EC-MS) meteorological stations. EC-MS operates meteorological stations in the West Kitikmeot Region of Nunavut. The closest stations which are currently operating are Lupin CS and Kugluktuk A and CS meteorological stations. The stations recorded temperature, precipitation, wind speed and direction, snow depth, solar radiation, and evaporation.

The temperatures recorded at the Goose station was similar with annual average air temperatures ranging from -11.5°C to -6.6°C . The mean monthly air temperatures ranged from -33.0°C to 14.5°C . In terms of annual average air temperatures, data from the Back River Project area and EC-MS regional stations show that 2005, 2006, 2010 and 2011, 2012 and 2013 were warmer than climate normal, and 2004, 2006, 2007, 2008 and 2009 were similar to climate normals. The daily average maximum temperatures at the Goose meteorological station over the period was 29.8°C occurring in July 2007. The minimum temperature was -45.5°C occurring in January 2012. The climate normal record maximum temperature was 34.9°C which occurred at the EC-MS operated Kugluktuk station in July 1989 and the record low extreme minimum temperature was -49.0°C which occurred in January 1987 at the EC-MS Lupin A station.

The precipitation gauges on the meteorological stations record summer rainfall and included winter precipitation and evaporation pans starting in 2012. During the 2006 to 2014 monitoring period, summer monthly rainfall ranged from 0 mm (September 2006) to 102 mm (August 2008). The summer total rainfall between June and September ranged from 4 mm (2006) to 211 mm (2008). When comparing the summer rainfall for the months with available data to data from the regional stations for the same period, the precipitation is generally similar; therefore, annual precipitation at the Goose meteorological station can be inferred from the regional station data. Based on data from regional meteorological stations during the 2004 to 2014 reporting period, total annual precipitation ranged from a low of 112 mm in 2011 to a high of 344 mm in 2007 mm (Rescan 2014).

An analysis of the effect of climate change on mean climate parameters is presented in Appendix V4-3B: Climate Change Predictions - Model Variation Report. The model results show that the annual mean temperature will increase about 5.3°C over the next century. The average predicted

increase is 2.0°C, 3.7°C, and 5.3°C for the 2020s, 2050s, and 2080s, respectively. This will increase annual mean temperatures to approximately -8.6°C, -6.9°C, and -5.4°C, respectively. This is similar to the observed temperature increase of 1.3 to 3°C from approximately 1950 to 2005 (ACIASC 2005). These predictions compare well with those presented by other studies. The IPCC state that for 2100, the projection for Northern Canada is approximately a 5°C to 6°C increase in temperature relative to 1980-1999 temperatures (IPCC 2007). Lemmen et al (2008) predict that mean annual temperature may increase in Canada's North by approximately 2.0°C for the climate normal period 2010 to 2030 and by approximately 6.0°C for the climate normal period 2070 to 2100, compared to 1961 to 1990 baseline.

5.2 TERRESTRIAL ENVIRONMENT

5.2.1 Geology and Permafrost

The Project is located at the intersection of three geological provinces in the West Kitikmeot Region of Nunavut. The majority of the Project (the Goose Property) extends over the northeastern corner of the Slave Geologic Province. The eastern limits of the Project are underlain by the Churchill Geologic Province. The Marine Laydown Area (MLA) are underlain by Lower to Middle Proterozoic sedimentary rocks of the Kilohigok Basin, part of the Bear Geologic Province. Glacial material deposited after the Quaternary Wisconsin Glaciation covers much of the Archean geological provinces. Glacial deposits are predominantly comprised of moraine type deposits (glacial till), which mostly consist of sand and variable amounts of silt. There is a large glacial moraine in the south-eastern portion of the Project area, which is approximately 200 km long and extends in a north-east direction.

Gold mineralization is typically structurally controlled at the Goose Property, although mineralization can diffuse into surrounding greywacke and mudstone. Gold mineralization is most often associated with sulphide minerals, particularly arsenopyrite, and visible gold is found almost exclusively in zones with abundant arsenopyrite. Other sulphide minerals (pyrite and pyrrhotite) are typically enriched in a halo in the BIF and greywacke around the arsenopyrite-rich ore zones. The mafic dikes have very low sulphide contents and are devoid of gold mineralization.

The Project is located within the continuous permafrost region of western Nunavut. A seasonally thawed active layer is present immediately beneath ground surface, with a mean maximum depth of approximately 2 m. Subsurface temperatures are perennially below 0°C at depths up to approximately 500 m below ground surface, except beneath some surface waterbodies. Open taliks are present beneath surface waterbodies with depths exceeding 1.3 m. Through taliks that connect to the deep groundwater are inferred to be present beneath waterbodies with widths greater than 200 m at the Goose Property PDA. Cryopegs are inferred to be present at the base of the permafrost and adjacent to deep talik, as the groundwater beneath the permafrost has been shown to be hyper-saline. The basal cryopeg at the Goose Property is estimated to be 100 m thick.

5.2.2 Landforms and Soils

The Project is located in an area dominated by gently undulating or rolling landscapes with numerous kettle lakes connected by streams. Terrain elevation ranges between 300 and 700 metres above sea level (masl) and slope gradients rarely exceed 7%. Uplands are typically covered by morainal materials (51% of the total PDA) deposited on Precambrian, sedimentary, metamorphic or intrusive rocks. Glaciofluvial (14%), organic (6.4%), marine (8.5%) and lacustrine (1.1%) deposits are less common. Exposed bedrock occurs over 2.6% of the PDA. The thickness of mineral soils overlaying bedrock (overburden) is the highest in plains and very gently sloping areas (average of 10.6 m) and decreases in rolling and undulating landscapes (average of 4.8 m).

A number of distinct landform types, including eskers, morainal rocky ridges, and boulder fields exist throughout the terrestrial RSA. Cold climate is also associated with several soil phenomena. Thermokarst typically occurs in wetlands as a system of very irregular hummocks and hollows, which form as a result of frost heaving and ice accumulation on the bottom of organic horizons. Frostboils are typically circular (1 to 3 m in diameter) upwellings of mud that are created by frost heaving. The Project is located within continuous permafrost. The presence of permafrost and annual cycles of freezing and thawing results in poor development of soils. About 2/3 of the inspected soils have been classified as Static Cryosols and 1/3 as Turbic Cryosols.

Baseline soil samples were collected at 51 sites within the LSA and 20 sites outside of the LSA but within the RSA in 2012. Most soils have a low proportion of coarse fragments (below 30%) and low surficial stoniness (below 15%). Most soils are moderately coarse (loam, sandy loam, fine sandy loam). Mineral soils in the terrestrial RSA are predominantly acidic (median pH is 5.9, range from 4.7 to 6.8). While in general soil metal concentrations in the LSA do not exceed CCME guidelines.

5.2.3 Vegetation and Special Landscape Features

The regional distributions of ecosystems were characterized within a Regional Study Area (RSA) by using two independent satellite-derived classifications. The terrestrial RSA was the same for vegetation and wildlife VECs. In total, twenty-nine unique ecosystems overlap the terrestrial RSA. These have been generalized into broad ecosystem classes reflecting similarities in ecological conditions. Together, the Bedrock-Sparse and Tundra-Heath classes comprise 60% of the terrestrial RSA.

Terrestrial ecosystem mapping (TEM) and rare plant surveys were conducted in 2012 within the 134,370-ha vegetation and terrestrial wildlife LSA. Vegetated ecosystems, constituting 73% of the LSA, are dominated by mesic tundra, dry-sparse tundra, and moist shrub-dominated tundra. The mesic tundra association, comprising nearly one-third of the LSA, is characterized by extensive areas dominated by dwarf woody shrub species, with a highly variable component of herbs, graminoids, mosses, and lichens. Sparsely-vegetated ecosystems, constituting nearly 9% of the total LSA, typically occur on thin morainal veneers or exposed bedrock, windswept esker crests, blocky tundra, marine beaches and other barren sites that limit vegetation establishment. Non-vegetated ecosystems, constituting approximately 18% of the LSA, are dominated by freshwater lakes and ponds. Special landscape features, identified for their importance as wildlife habitat or potential to support rare plant species, include esker complexes, cliffs, bedrock outcrop and lichen-dominated ecosystems, riparian ecosystems, wetland ecosystems, and marine beaches and old beach heads. A total of 890 plant species identifications were made during the TEM and rare plant field surveys within the LSA and RSA. The largest species group in the identified flora is that of the vascular plants, followed by the macrolichens. 90 rare plant species were identified and were mainly found close to the shoreline of Bathurst Inlet throughout the LSA and RSA. No invasive plant species were found in the LSA during the 2012 field surveys.

5.2.4 Caribou

The Project is located within the range of three barren-ground caribou herds. The most important is the Bathurst caribou herd, which uses habitat within the RSA, primarily during post-calving and occasionally during spring migration. The Ahiak herd (also known as the Queen Maud herd) has also been observed in the RSA, primarily during the late summer, fall and winter but also during spring migration. The Dolphin and Union herd is named after the Dolphin and Union Strait which this herd crosses each spring and fall to summer on Victoria Island. The southern extent of the winter range on the mainland likely overlaps with the Marine Laydown Area.

The range and movements of caribou herds have been studied by the governments of NU and NWT using radio and GPS collars. Satellite collars are fitted on female caribou which report their location every few hours or days. Satellite collar data collected since 1996 for the Bathurst herd and since 2001 for the Ahiak and Dolphin and Union herds was used to map the distribution and movement of caribou herds on a seasonal basis and assess overlap with the Project.

In addition, regional and local-scale data on caribou have been collected in the RSA since 2007 using aerial surveys, motion-triggered cameras and habitat mapping. This combined approach provided valuable data on the locations, and movements of caribou herds during the spring and fall migrations and during calving and post-calving periods in relation to the Project.

Aerial surveys were conducted in 2007 (five surveys), 2008 (three surveys) and 2010 (three surveys) using standard aerial census techniques for large mammals. These surveys were timed to occur in the spring, calving, post-calving and fall periods for caribou. Surveys were conducted along pre-determined transect lines within the RSA; transect lines were parallel at a distance of eight km apart. Sixty motion-triggered cameras were deployed in 2012 and 2013 to monitor when caribou used the RSA and to examine the use of landscape features identified by Inuit IQ as being preferred by caribou; such as eskers, river crossings or hilltops for insect relief.

Collaring data indicate that Bathurst herd caribou are found predominantly in and around the RSA during the mid-summer months. Bathurst caribou winter below the tree line in Nunavut and the NWT. During spring migration, caribou move quickly north to the calving grounds between the Hood and Burnside Rivers. The Project is located on the eastern edge of the migration route to the calving grounds and approximately 100 km to the south-east of the calving grounds. During post-calving and summer, caribou leave the calving grounds and move south and south-east to the summer grounds. Some of these caribou move through the RSA, predominantly to the south and west of the Project.

The Ahiak herd also occurs in the Project area during certain seasons based on the results of collar data. Ahiak caribou are found in the RSA primarily during the summer and early fall, but may be found in the RSA during winter and spring at low densities. Ahiak caribou winter both above and below the treeline, generally southeast of the Project. The northern edge of the winter range overlaps the Project location. During spring migration, some caribou move through the RSA as the Project is located at the western edge of the spring migration range. Calving is conducted approximately 250 km northeast of the Project in the Queen Maude Gulf, outside of the RSA. The Ahiak caribou move southwest to their summer range which overlaps the RSA between mid-July and the end of August (Rescan 2013). A smaller portion of collared Ahiak caribou remain in the southern portion of the RSA during the fall and throughout the winter.

Collar data for Dolphin and Union caribou indicate that this herd has potential to interact with the RSA during winter only. A low number of collared caribou used the northern RSA; it is possible that un-collared caribou (males and juveniles) may use the RSA during the winter season especially in the northern portion of the RSA near the MLA; however in the winter of 2014/2015, only two animals were identified using remote cameras. Dolphin and Union caribou calve and summer on Victoria Island prior to their fall migration. In the fall, the herd migrates to the southern coast of Victoria Island for the rut, before migrating back across sea ice between October and late November to over-winter on the mainland. Dolphin and Union caribou are likely present at low densities in the northern extent of the RSA, near the Marine Laydown Area in the winter. The Dolphin Union caribou herd uses the ice to cross Coronation Gulf on their spring and fall migration to and from Victoria Island (Gunn 2005).

Data from aerial surveys reported few caribou in the RSA during calving, with low numbers of caribou reported during the post-calving and summer periods. Six medium-sized groups (> 100) with the largest

group recorded at 300 individuals were observed west of the RSA. Caribou observed during aerial surveys conducted in the RSA were likely Bathurst caribou during the post-calving period, Ahiak caribou during late summer, and likely Dolphin and Union caribou during spring surveys in March in the northern portion of the RSA.

Data from motion-triggered cameras support the data from satellite collars on the timing of caribou occurring in the RSA. Hundreds of caribou, most likely belonging to the Ahiak herd, were recorded in the southeast sector of the RSA during the summer period in July and August. The Dolphin and Union caribou herd has a minimal chance to interact with habitat in the RSA during the period when cameras were out on the tundra, so it is likely that this herd was not detected by motion-triggered cameras in the RSA.

5.2.5 Grizzly Bear

Barren-ground grizzly bears inhabit the northern edge of the grizzly bear range in North America. Arctic habitats have relatively low plant productivity and as a result, barren-ground grizzly bears use large home ranges and exist at low densities compared to other grizzly bear populations in more productive ecosystems. Average home range sizes vary from 2,100 km² for females to 7,245 km² for males, and home ranges of individuals overlap more than they do in southern latitudes (McLoughlin, Ferguson, and Messier 2000).

Populations of barren-ground grizzly bear in the central Canadian Arctic are structured into three spatially distinct groups, located in the Kugluktuk region, Bathurst Inlet region, and North Slave region (McLoughlin, Cluff, and Messier 2002a). Grizzly bears in the terrestrial RSA are part of the Bathurst Inlet population cluster and there is no official estimate on grizzly bear population size for the West Kitikmeot region of Nunavut. However, a crude estimate of 800 grizzly bears was determined for a 200,000 km² portion of the northwestern mainland of Nunavut, which includes the terrestrial RSA (Ross 2002). This estimate assumed a density of four bears per 1,000 km² based on grizzly bear densities in nearby areas (Ross 2002).

Three types of baseline surveys have been conducted for grizzly bears in the RSA: population-estimation using DNA mark-recapture, den surveys, and incidental observations. The DNA-based mark-recapture program was conducted over two years; 2012 and 2013 in an area of approximately 17,300 km² surrounding the Project location. The survey included a 120 cell grid of 12 × 12 km cells. Each cell contained a baited post to attract bears which would investigate the post and leave hairs on barbed wire wrapped around the post. The posts were checked seven times during the summer, every 9 to 12 days. Bears were identified from their DNA in the hairs and a population estimate calculated from the proportion of bears that return to the posts during the summer. In 2012, 111 bears were identified in the study area (61 in the RSA) with the highest numbers of bears on the lower reaches of the Western River (> 10 bears), along the Back River and on the large eskers 10 to 15 km west and southwest of George Exploration Camp. These numbers indicate approximately twice the density of grizzly bears in the Project area relative to the assumed density previously thought (Ross 2002). Results from 2013, and the combined population estimate will be included in the FEIS.

Den surveys for wolf and fox dens were conducted in June and July between 2007 and 2013 along eskers, stream banks, low hills, and other likely denning areas. Grizzly bear dens were recorded incidentally when observed. In 2007 and 2011, no dens were recorded during den surveys; however, two grizzly dens were observed incidentally during breeding bird surveys. In 2012, two additional grizzly bear dens were observed, one during den surveys and the other incidentally.

Eleven grizzly bears were observed incidentally in 2007. In 2010, four grizzly bears were observed during aerial surveys for caribou and muskox. In 2011, two female grizzly bears with two young cubs each were observed. In addition, a total of 19 adults and 16 cubs were observed incidentally during the baseline studies conducted in 2012 and the 60 remote cameras deployed in the RSA during 2012 captured an additional 85 unique observations. The majority of incidental observations of grizzly bears were concentrated near Bathurst Inlet and in the Western River watershed.

5.2.6 Muskox

The global range of muskox extends across most Arctic islands, northern Greenland, and most of the Canadian tundra, including the Kitikmeot region of Nunavut (Gunn 2003). Overall, in Nunavut and the NWT, the number of muskox was estimated at 134,000 to 144,000 individuals in 2001. The Government of Nunavut estimates that there are 19 populations totalling approximately 50,000 muskox within the Kitikmeot Region (Dumond 2006).

In 2005 the number of muskox between northeast Contwoyto Lake and southwestern Bathurst Inlet, an area that includes the RSA, was estimated at 604 ± 225 animals (Dumond 2007) down from $3,400 \pm 460$ animals in 1986 (Gunn 1990). Muskox that occur within the RSA are referred to as the central mainland population. Muskox are found throughout the region at relatively low densities (Gunn 1990; Dumond 2007). Average summer home range size is 223 km^2 and they move an average of 2.6 km/day (Reynolds 1998).

Field data for muskox were collected during aerial surveys for caribou in 2007, 2008 and 2010. Surveys followed pre-determined parallel transect lines that were spaced 8 km apart within the RSA. In 2007, five aerial surveys were conducted in May, June, early July, late July, and September and a total of 50 muskox were observed on transects with an additional 82 observed off transect ($> 500 \text{ m}$ from the plane). In 2008, two adults were observed during the May survey and two during the July survey and an additional 98 muskox (84 adults and 14 young) were observed incidentally. In 2010, aerial surveys were conducted in May, June, and July and a total of 53 muskox were observed with an additional 34 muskox recorded off transect. Each aerial survey typically observed 2 to 3 groups of muskox. In addition to aerial surveys, three muskox were observed incidentally in the RSA in 2011, and ten separate incidental observations totaling 114 muskox were observed in the RSA in 2012 (Rescan 2013). Typically, a group was observed each year on the low hills to the west of Bathurst inlet, while the other 1 to 2 herds were observed at various locations in the southern portion of the RSA. Productivity (calves and juveniles per adult) of muskox herds observed was very low, frequently with 1-2 calves per 20-30 adults in the spring.

5.2.7 Wolverine/Furbearers

Arctic furbearers in the Kitikmeot region include wolverines, wolves, red and Arctic foxes, and Arctic ground squirrels. Wolverines and grey wolves are two species representative of furbearers in the environmental assessment with wolves acting as a proxy for foxes (both canids).

Wolverines are members of the mustelid family, which includes weasels, badgers, and marten. Like other mustelids, wolverines are carnivorous, and are both scavengers and predators on a wide range of prey (COSEWIC 2003). Very large home ranges and low population densities are characteristic of this solitary species (Persson, Wedholm, and Segerstrom 2010; Inman et al. 2012). In Nunavut, wolverines have very large territories ranging from 100 km^2 for an adult female to over 600 km^2 for an adult male (Feldhamer, Thompson, and Chapman 2003). Wolverine populations in the central Arctic appear to be stable, though recent estimates are lacking (COSEWIC 2003). The total population size of wolverines in Nunavut is estimated at 2,000 to 2,500 individuals (COSEWIC 2003; Slough 2007).

The grey wolf is the largest member of the *Canis* genus and was once abundant over much of North America and Eurasia; however, its range has contracted due to habitat destruction and hunting. The

wolf is still widespread throughout much of northern Canada, including the West Kitikmeot region of Nunavut. Populations are stable or increasing within their Canadian range, except in northern Alberta and some parts of the NWT (Hayes 1995; Frame 2008). Wolf reproductive success and population size are largely regulated by the availability of caribou.

Three types of baseline surveys have been conducted for wolverine and furbearers in the RSA including: i) population-estimation using DNA mark-recapture for wolverines; ii) carnivore den surveys; and iii) incidental observations. The DNA-based mark-recapture program was conducted over two years; 2012 and 2013 in two areas approximately 2,000 km² each, surrounding the Project location. In 2012 and 2013, a 35 km by 35 km survey grid, divided into 49 cells (5 km × 5 km) was located between Goose and the George Exploration Camp. An additional grid consisting of 50 cells (5 km × 5 km) was centered around the proposed MLA during 2013. A baited post was located within each cell and re-baited during three checks (approximately 10 days between checks) during March and April. A total of 12 individuals were detected in 2012, including 4 females and 8 males. Only one male wolverine was detected during other wolverine surveys conducted in Nunavut or the NWT and results indicate that the Project area supports a moderately sized wolverine population. A formal population estimate will be made after analysis of the 2013 samples and included in the FEIS.

Carnivore dens surveys were conducted in the RSA via low level aerial surveys in esker and glacial-fluvial habitat in 2007, 2011, 2012, and 2013 to identify dens that are active and to identify resident carnivore species using the RSA. No wolverine dens were observed during the aerial surveys in the RSA; however, in 2012 two active wolverine dens were found incidentally within rocky boulder habitat in the RSA. One of these dens was active in 2013. In 2007, five active wolf dens were recorded with pups observed at four of the dens in the RSA. No wolf dens were found in 2011, and those revisited from the 2007 surveys were unoccupied. In 2012, two active wolf dens were found both greater than 25 km from proposed infrastructure.

Incidental observations of wolverine have been recorded in the RSA between 2001 and 2013. Nearly 20 incidental observations of wolves and pups have been recorded between 2007 and 2012.

Thirty remote cameras located in the RSA in 2012 recorded 51 observations of wolverine between March and April and 74 observations of wolves totalling 92 individuals between late-May/early June to late-August. Several of these detections are likely repeated observations of individuals at the same or multiple cameras.

5.2.8 Migratory Birds

Migratory birds including waterbirds and upland breeding birds travel long distances to breed on the Arctic tundra during the short summer season. Migratory birds and their nests are protected under the Canadian *Migratory Birds Convention Act* (1994), the *Canada Wildlife Act* (1985), and the *Nunavut Wildlife Act*.

Aerial surveys have been conducted for waterbirds between 2007 and 2013 in five grids in the terrestrial RSA during staging and breeding periods. Survey grids, measuring 16 km by 16 km of parallel transects separated by 2 km, were located surrounding the Goose Property and at representative control sites. In 2011 the grids were surveyed at the Goose Property, and in 2012 and 2013 grids at the Goose Property and control sites were surveyed. Surveys were conducted by helicopter following established survey protocols developed by the Canadian Wildlife Service and the United States Fish and Wildlife Service (CWS and USFWS 1987).

A total of 24 waterbird species belonging to several species groups including ducks (dabbling and diving), geese, swans, loons, terns/gulls, cranes, jaegers, and grebes were detected during waterbird

surveys conducted in the terrestrial and marine RSAs (see Section 5.4.6 of this Chapter) between 2007 and 2012. Of the species recorded, five species of conservation concern listed as “Sensitive” in Nunavut (CESCC 2010) were observed including, long-tailed duck, Arctic tern, glaucous gull, common eider, and king eider.

A much greater number of flocks and birds were observed during staging periods in the survey blocks near the Goose Property. Flocks of birds were well distributed on waterbodies in this area, with the highest abundance of geese observed in the fall of 2012 within 2 km of Goose Lake and Propeller Lake.

Waterbird breeding surveys were conducted during the summer (June and July), when resident birds are laying eggs and rearing young. Very few breeding birds were observed. Long-tailed duck pairs were the most commonly observed, and the majority of pairs occurred in the survey blocks near the Goose Property Area. Confirmed breeding has been documented for some species in the terrestrial RSA including Canada goose, northern pintail, and sandhill crane. Canada geese were the most commonly detected.

Upland breeding birds are ground-nesting species that include migratory songbirds and shorebirds, and resident ptarmigan. Surveys for upland breeding birds were conducted in 2007, 2011, 2012, and 2013 using the methods established for the Program for Regional and international Shorebird Monitoring (PRISM) and point counts to identify what species are present (including listed species), and to determine territory densities and habitat associations. The numbers and locations of the surveyed PRISM plots were stratified in the RSA in different habitat types. Thirty PRISM plots were surveyed in 2011, 54 in 2012, and 8 in 2013. In addition, 60 point count surveys were conducted in 2013 near the MLA.

Twenty-one upland breeding bird species (10 songbirds, 9 shorebirds, and 2 ptarmigan) were observed in the RSA during PRISM surveys. Ten of these are listed as “Sensitive” in Nunavut due to concern for long term population declines or require special attention or protection to prevent them from becoming at risk. The 10 Sensitive species are: American golden-plover, American pipit, American tree sparrow, dunlin, Harris’s sparrow, hoary redpoll, least sandpiper, red-necked phalarope, semipalmated sandpiper, and white-crowned sparrow. Songbirds were detected on average five times more often than shorebirds and ptarmigan. Breeding evidence was confirmed for nine species. The Lapland longspur was the most commonly detected species, and combined with the savannah sparrow, made up approximately 78% of all songbird territories recorded. The American tree sparrow was the most common “Sensitive” species recorded.

Three distinct habitat communities were noted for songbirds. One community, which includes the savannah sparrow, is primarily associated with wet habitat types such as wetlands and sedge meadow. A second community, including the American tree sparrow and white-crowned sparrow was associated with moist habitats with tall shrubs, and a third group of birds was associated with dry, upland, heath habitat including species such as the horned lark, American pipit and Harris’s sparrow. Shorebird species, except the American golden plover, were observed more often associated with moist and wet habitat. Ptarmigan were predominantly observed in dry and moist habitat types.

5.2.9 Raptors

Raptors are top predators and are often considered ideal indicator species because their health and reproductive success often reflect the size and health of the populations of prey populations. Raptors migrate north to breed on cliffs and tundra areas.

Nine species of raptors are expected to occur in the Kitikmeot Region, and have been documented in the RSA. Five of these species nest on steep cliff ledges including the peregrine falcon, golden eagle, bald eagle, gyrfalcon, and rough-legged hawk (Poole and Bromley 1988). Common ravens are passerines

(a perching bird), but are considered to be “functional raptors” since ravens compete with raptors for nesting sites on cliffs (Poole and Bromley 1988). Three raptors are ground nesting species: short-eared owl, snowy owl, and northern harrier.

Raptor surveys were conducted in the RSA between 2007 and 2013 following standard methods (RIC 2001). Helicopter surveys were flown at > 50 m away from cliffs nests at 30 to 80 km/hr. Nest sites were surveyed twice - in late May to locate occupied nests, and in July to determine nesting success and breeding productivity. Surveys recorded raptor species, number of birds, chicks, or eggs, UTM locations of nests, and potential territories. Ground nesting raptors were surveyed during ground-based surveys for upland breeding birds. Habitat information was also collected to describe raptor nesting habitat within the RSA.

All nine raptor species and common raven were detected during raptor surveys and incidentally. Breeding was detected in the RSA for all five raptor species of conservation concern in Nunavut (golden eagle, gyrfalcon, rough-legged hawk, peregrine falcon, and short-eared owl). The surveys conducted in 2007, covering the majority of the RSA, indicated that the greatest concentration of nests occurred in the central and northern portions of the RSA, but a number were also located between Goose and George exploration camps, and along the Western River valley east of the Goose Property. The productivity (proportion of nests that produce young) of raptor nests varied widely from year to year. Of the nests observed in 2007, peregrine falcons were the most commonly detected, but productivity was poor; only 7% of nests were productive in August. The second year of survey, 2011, was a very poor year for raptor reproduction. A survey in early June, 2011, observed 11 occupied nests of 13 that were previously surveyed within 30 km of Goose Property in 2007. None of these nests belonged to peregrine falcon. None of the occupied nests were productive in 2011. An additional eight nest sites were located in the study area, but none of them occupied. One nest belonging to the ground-nesting short-eared owl was detected during upland breeding bird surveys.

5.3 FRESHWATER ENVIRONMENT

5.3.1 Surface Hydrology

The Project is located within the watershed boundaries of the Ellice River Watershed, Back River Watershed, and the Western River Watershed. The majority of proposed infrastructure at the Goose Property lies within the Ellice River Watershed, which flows northwest and enters the ocean on the west side of Bathurst Inlet. The Back River Watershed is located south of the Goose Property Potential Development Area (PDA) and flows east eventually entering the Arctic Ocean south of Gjoa Haven.

Baseline hydrology data are available for the Goose Property LSA from 2010 to 2015. Surface hydrology is governed by the Arctic nival regime where peak flow discharges during the spring, shortly after air temperature rises above freezing. In small basins, these high flows can last as little as a few days. Peak flow typically occurs immediately after ice break-up in lakes and channel reaches, especially in the smaller basins. Due to the presence of permafrost, small streams do not receive groundwater contributions, and flow discharges from these basins may cease after freshet until the late summer rains begin. For rivers draining larger watersheds, the freshet peak may be delayed relative to smaller drainages as snowmelt from upper portions of the watershed is routed through the drainage network. Precipitation events in the late summer and early fall may lead to a second hydrographic peak, but this is generally of lower magnitude than the freshet peak. Channel freeze-up typically occurs between late October and early November. In smaller drainage basins, stream channels typically freeze to their bottom, with zero flow occurring in winter. In very large catchments and larger lake outlets, flow energy and water turbulence may sufficiently maintain streamflow and prevent downstream reaches from freezing completely.

5.3.2 Limnology and Bathymetry

Limnological and bathymetric information have been collected in the Project area since 1994, with extensive baseline studies focusing on the Goose Property LSA from 2010 to 2014. Lakes are generally small and shallow, ranging between 5 and 500 ha in surface area and less than 10 m in maximum depth. Lakes shallower than 2 m are usually frozen to the bottom during the winter months. Lakes are usually well mixed from the surface to the sediments during the open-water season due to wind-driven forcing. Some gradients in temperature and density may occur in deeper lakes or in ice-covered lakes in winter, although this is uncommon. The water clarity of lakes is generally high, despite the potential for wind-driven mixing to the sediments. Water temperatures in lakes and streams tend to follow the Arctic climate, with greatest temperatures observed in August at the height of the short summer.

5.3.3 Groundwater

The Project lies within the continuous permafrost zone of the continental Canadian Arctic, and as such groundwater is present deep below the continuous permafrost layer (e.g., > 400 m below surface). Water present in the active layer above the permafrost, which is thawed during the summer only, can interact with surface waters in general. There is minimal connection between the surface active-layer and deep groundwater flow regimes due to the presence of the thick low-permeability permafrost. The deep sub-permafrost groundwater is hydraulically connected with the surface water and the active layer via open taliks (also called through-taliks) beneath large lakes, such as below Goose Lake. Structural features in the bedrock, such as the northwest-southeast trending faults commonly found at the Goose Property, may act as preferential flow pathways for groundwater in taliks and beneath the permafrost. In general, the deep groundwater flows from higher elevation large lakes to lower elevation large lakes, therefore the flow direction can be inferred from the surface elevation of the large lakes that overlie open taliks. Site-specific groundwater data were collected annually from 2012 to 2015 within the Goose Property PDA. Thermistor strings, vibrating wire piezometers, borehole packer testing, and a Westbay well have been used to characterise the groundwater environment. The Westbay well, installed adjacent to the Umwelt deposit in 2013, has been used to conduct groundwater quality sampling. Preliminary results of groundwater sampling indicate that the deep groundwater is more saline than seawater, with total dissolved solid concentrations of 47,000 mg/L and higher, and has elevated levels of chloride and select trace metals. Westbay Well groundwater data analysis will help project the water quality that will seep in to the underground mines and be managed as part of the overall Site Water Monitoring and Management Plan (Volume 10, Chapter 7).

5.3.4 Freshwater Water Quality

Comprehensive baseline water quality data are available from the area from 2010 to 2013, and 2015, with historical information available for specific areas from 1993, 1997, 2006-2007. The water of lakes and streams is typical of pristine Arctic surface waters, with low concentrations of anions, suspended material, nutrients, and most metals.

Results from site-specific data indicate that lakes in the area have slightly acidic to neutral pH waters. Dissolved oxygen concentrations averaged 10.0 mg/L (ranged between 7 mg/L and 12 mg/L) in Goose LSA lakes. Dissolved oxygen saturation levels followed a similar trend, ranging from 85 to 100%.

Lakes are very clear with low turbidity values, and generally have low nutrient concentrations (e.g., ammonia and nitrate are considerably lower than the CCME guidelines). Based on the CCME recommended trigger ranges for total phosphorus, most lakes would range from ultra-oligotrophic to mesotrophic.

Metal concentrations in lakes are generally low, and tend to be lower in the summer than in winter. Metal concentrations are below CCME guidelines for the protection of freshwater quality life, with the

exceptions of cadmium and copper. These metals can show naturally elevated concentrations, sometimes near or just above the CCME guidelines, depending on the location and season of sampling. Aluminum, iron, lead, and nickel concentrations were rarely greater than CCME guidelines in a subset of Project lakes proximate to deposits and proposed activities (e.g., Goose, Echo, and Rascal lakes).

The Project area streams are generally low-metal environments, with metal concentrations varying both spatially and temporally with some instances of elevated concentrations. Naturally elevated copper concentrations were observed in several Project streams (e.g., Goose OF and Propeller OF), and were likely related to the presence of metal-bearing minerals in the particular stream watershed.

5.3.5 Freshwater Sediment Quality

Baseline sediment quality data are available from the area from 2007 to 2013, and 2015. The sediment of lakes and streams is typical of pristine Arctic freshwater systems.

Results from site-specific data indicate that sediments tended to be moderately to slightly acidic. The organic content of the sediments in both lakes and streams tended to be low. Lake sediments were composed of silt and sand particles, with the larger gravel and the smaller clay particles generally comprising < 15% of the total. Stream sediments tended to be dominated by larger sand and gravel particles.

Lake sediments have naturally elevated metal concentrations that are often greater than CCME guidelines for arsenic, cadmium, chromium, copper, and/or zinc. The majority of lakes that have been sampled have sediment arsenic concentrations greater than the CCME interim sediment quality guideline (ISQG), and many lakes have sediment arsenic concentrations greater than the CCME probable effect level (PEL) guideline.

Stream sediments have naturally elevated metal concentrations that are often greater than CCME guidelines for arsenic, cadmium, chromium, and copper. Similar to lakes, stream sediment arsenic concentrations are naturally elevated.

5.3.6 Freshwater Fish/Aquatic Habitat

Baseline aquatic biota data are available from the area from 2007 to 2015. Some historical information is also available from 1990 and 1997. Baseline fish habitat data have been collected in the Goose Property LSA from 2010 to 2015. More than 30 streams have been characterized in the Goose Property LSA.

The aquatic biota of lakes and streams is typical of pristine Arctic freshwater systems. The long cold winters, large spring freshet, and short summer all contribute to low overall primary production and low primary producer biomass in lakes and streams. In systems with strong seasonal dynamics and low productivity, consumers tend to be closely coupled to the primary producers and the local environment, and can show substantial variation between years and locations. Lake zooplankton and lake and stream benthic invertebrate communities all showed considerable variation, consistent with the close coupling between trophic levels and the strong local effects. Site-specific baseline information has characterized healthy and robust communities of benthic invertebrates.

Within the Goose LSA, there are permanent barriers to fish migration along the stream between Pond A and Giraffe Lake and along the stream between Umwelt Lake and Goose Lake. Habitat quality for rearing and spawning Arctic Grayling (*Thymallus arcticus*) is generally best in the reaches immediately upstream and downstream of lakes. High quality habitat is present at Rascal Outflow within the stream connecting Rascal and Goose lakes. This stream contains small cobble and gravel that supports Arctic Grayling spawning and rearing, as well as providing a migratory corridor between lakes with overwintering habitat.

Large lakes such as Propeller, Goose and Big Lakes provide the majority of year-round fish habitat for locally abundant fish species such as Lake Trout (*Salvelinus namaycush*) and Arctic Grayling within the LSAs. These deep lakes have sufficient oxygenated water to sustain fish populations during the ice-covered season. In contrast, shallow lakes (< 2 m) and streams freeze completely during the winter and are unavailable as overwintering habitat.

5.3.7 Freshwater Fish Community

Goose Lake is the lake most central to proposed infrastructure for the Goose Property. This lake, along with many other lakes and streams in the immediate area, has been surveyed for fish from 1997, and 2007 to 2015. Fish have been present in all lakes that have been sampled to date. However, some of the shallow ponds are not fish-bearing due to their shallow depth and ephemeral connectivity to other waterbodies.

For the Goose Property, lake and stream freshwater fish communities consist of nine species, with Lake Trout and Arctic Grayling being the most numerous. The species that have been found in lakes by site-specific baseline studies include Lake Trout (*Salvelinus namaycush*), Round Whitefish (*Prosopium cylindraceum*), Lake Cisco (*Coregonus artedii*), Longnose Sucker (*Catostomus catostomus*), Ninespine Stickleback (*Pungitius pungitius*), and Lake Whitefish (*C. clupeaformis*). The species that have been found in streams are Arctic Grayling (*Thymallus arcticus*), Slimy Sculpin (*Cottus cognatus*), and Burbot (*Lota lota*).

Existing concentrations of mercury in tissue samples from Lake Trout and Round Whitefish are below the Health Canada guidelines for human consumption (Rescan 2012d). Lakes from where fish tissue samples have been collected include Llama, Goose, Giraffe, Umwelt, Gander, and Reference B. Fish from all sampled lakes had similar concentrations of metals.

None of the species found to date from the Goose Property are considered endangered, threatened, or listed under Canada's *Species at Risk Act*. There are currently no non-aboriginal recreational fish harvesting activities or commercial fisheries in the Goose Property, or the terrestrial location of the MLA.

5.4 MARINE ENVIRONMENT

5.4.1 Physical Processes

Bathurst Inlet is a deep inlet located along the northern coast of the Canadian mainland, within the territory of Nunavut. The entrance to the inlet is between Cape Barrow (68°01' N, 110°06' W) and Cape Flinders (68°17' N, 108°35' W), and the body extends for over 200 km southwest into the mainland, past the Arctic Circle. The navigable corridor within Bathurst Inlet is generally very deep, with soundings between 100 and 200 m for most of the inlet. However several sills are located along the channel which can rise to depths above 50 m.

Consolidated first-year sea ice (1.5 to 2 m average thickness) usually covers Bathurst Inlet from October to June, and ice break-up usually occurs in the first few weeks of July. Tidal elevations are very weak in the region, with maximum amplitudes below 0.5 m.

Site-specific physical oceanographic information has indicated that the water column consists of a strongly stratified two-layered pycnocline structure with a 15 to 20 m warm, fresh and oxygenated top layer above a colder, saltier and lower oxygen bottom layer (Rescan 2008, 2012). Water circulation generally followed a two-layered positive estuarine flow with surface waters moving towards Coronation Gulf and the deep water moving into Bathurst Inlet. The estuarine flow is driven primarily from horizontal pressure gradients generated by the combined freshwater inputs of several rivers located

along the inlet, such as the Western River situated at the head of the inlet or the Hiukitak River that flows into Gordon Bay. Significant variability could also occur in both current speeds and directions at all times, due to the strong influence of winds on the water column. Average velocities in southern Bathurst Inlet were less than 10 cm/s in the bottom layer, while in the top layer they ranged from 20 to 60 cm/s with maximum recorded magnitudes reaching over 90 cm/s during strong wind events.

Maximum surface significant wave heights were estimated at roughly 2 m for the study region. Most currents were linked to wind-driven forcing; calculated tidal currents were generally almost negligible.

5.4.2 Marine Water Quality

Baseline water quality data are available from southern Bathurst Inlet from 2007, 2008, and 2012 to 2013. Historical information is also available from 2001.

The water of southern Bathurst Inlet is typical of pristine Arctic marine waters, with low concentrations of nutrients, suspended solids, and metals. Nutrients are higher in the winter and lower or depleted in the summer when they are being used by phytoplankton. Nitrate concentrations are near or below detection limits in the summer, while phosphorus concentrations are still measureable in surface waters (> 0.01 mg P/L). Southern Bathurst Inlet is considered oligotrophic based on phytoplankton biomass levels.

Metal concentrations in southern Bathurst Inlet are generally below the CCME guidelines for the protection of marine aquatic life and often undetectable. Near-shore sites near river outflows or in regions of shallow bathymetry sometimes have elevated levels of suspended material and metal concentrations. Metals which have been found to be naturally elevated above CCME marine guidelines in a small subset of samples include cadmium, chromium, and mercury.

5.4.3 Marine Sediment Quality

The sediment quality in Bathurst Inlet has been sampled in 2001, 2002, 2007, 2010, 2012, and 2013. Sampling near the proposed Marine Laydown Area was conducted in 2013. The sediments of Bathurst Inlet are heterogeneous as a result of local physical processes. Sediments ranged from sandy ($>90\%$ sand particles) through loose clay-silt sediments (70% clay with the remainder silt). Sand tends to predominate in the shallower sites (<5 m), with silts and clays become more frequent in the deeper near-shore sites.

Marine sediment metal concentrations are generally below the CCME interim marine sediment quality guidelines. However, near-shore sites with high silt/clay content frequently have naturally elevated concentrations of arsenic, chromium, and copper, with elevated levels of arsenic and copper being the most common. Marine sediment metal concentrations have not been found to be greater than the CCME marine probably effect level guidelines which are higher than the marine interim sediment quality guidelines.

5.4.4 Marine Fish/Aquatic Habitat

Baseline marine fish habitat data and marine aquatic resource data have been collected in the marine RSA in Bathurst Inlet since 2001 and in the marine LSA in 2012 and 2013.

The marine ecosystem in Bathurst Inlet is strongly affected by the physical environment. Winter time productivity in the Inlet is low due to light limitation, but higher in the summer (0.5 to 1.0 $\mu\text{g chl } a/L$). In the spring, the abundant nutrients in the surface waters combined with increased light levels cause a spring bloom, which serves as an important food source for zooplankton and the pelagic food web.

A diverse and robust benthic invertebrate community has been characterized in southern Bathurst Inlet. Benthic invertebrate organisms found to date have included the small bivalves *Macoma* and *Astarte*, which serve as important food sources for fish, as well as polychaetes worms, cumaceans, and amphipods.

Baseline data on marine habitat have been collected in the RSA in Bathurst Inlet since 2001 and in the LSA in 2012 and 2013. The shoreline of the LSA and the southern section of the RSA are dominated by a shallow water shelf, which extends to a depth of approximately 10 m and a distance of 120 m offshore. Beyond this, the bottom descends steeply to depths greater than 40 m. The substrate in the intertidal zone is dominated by cobble and gravel, while deeper areas feature more mud and silt. Based on nearshore surveys and traditional knowledge, potentially important habitat areas for marine and anadromous fish were identified in the LSA and RSA. The outlet of some rivers are important habitat for Arctic Char (*Salvelinus alpinus*), with some of these areas acting as migratory pathways for anadromous Arctic Char. Intertidal gravel beaches and shallow gravel beds are important spawning habitats for Capelin (*Mallotus villosus*).

5.4.5 Marine Fish Community

Fish community data is available for southern Bathurst Inlet from 2001, 2010, and 2012. Site-specific baseline surveys have found 14 fish species in southern Bathurst Inlet, the most numerous of which depended on sampling year and season.

The marine fish community composition reflects the presence of freshwater in the marine system: 13 of the 14 species are associated with low-saline environments during at least one part of their life cycle. Of the 14 fish species captured in southern Bathurst Inlet, the most common included Fourhorn Sculpin (*Myoxocephalus quadricornis*) (which was the most abundant species in 2001 and 2010 surveys), and Capelin (*Mallotus villosus*) (which were the most abundant species in 2012 when sampling coincided with the their spawning period). Pacific Herring (*Clupea pallasii*), Starry Flounder (*Platichthys stellatus*), Arctic Cisco (*Coregonus autumnalis*) and Saffron Cod (*Eleginus gracilis*) made up the remainder of the commonly caught species. None of the captured species are currently considered endangered, threatened, or listed under Canada's *Species at Risk Act*.

Bathurst Inlet does support aboriginal subsistence fisheries with Cod and Arctic Char as the preferred target species for subsistence hunters. Although documented historically, Arctic Char was not caught at any marine site during the site-specific baseline sampling. Non-aboriginal recreational fish harvest in Bathurst Inlet is expected to be low, and there are currently no commercial fisheries harvests reported in Bathurst Inlet.

5.4.6 Seabirds and Seaducks

Migratory birds including waterbirds and upland breeding birds travel long distances to breed on the Arctic tundra during the short summer season. Migratory birds and their nests are protected under the Canadian *Migratory Birds Convention Act* (1994), the *Canada Wildlife Act* (1985) and the Nunavut *Wildlife Act*.

Aerial surveys for waterbirds (seabirds and seaducks) were conducted along the shoreline of Bathurst Inlet in the marine RSA in 2010 and 2013 and in a grid surround the proposed Marine Laydown Area in 2013. Surveys were conducted by helicopter following established survey protocols developed by the Canadian Wildlife Service and the United States Fish and Wildlife Service (CWS and USFWS 1987).

A total of 24 waterbird species belonging to several species groups including ducks (dabbling and diving), geese, swans, loons, terns/gulls, cranes, jaegers, and grebes were detected during waterbird

surveys conducted in the terrestrial and marine RSAs between 2007 and 2012. Of the species recorded, five species of conservation concern listed as “Sensitive” in Nunavut (CESCC 2010) were observed including, long-tailed duck, Arctic tern, glaucous gull, common eider, and king eider.

Staging surveys, conducted in the spring and fall, indicate that large flocks of waterbirds, especially geese, move through the area during these times on their way to their breeding and/or wintering grounds. A greater diversity of ducks was observed during the fall surveys, including flocks of long-tailed duck. Several staging areas were documented in the marine RSA; most notable was the bay directly to the south of the proposed MLA.

Waterbird breeding surveys were conducted during the summer (June and July), when resident birds are laying eggs and rearing young. Very few breeding birds were observed. Canada geese were the most commonly detected. No evidence of breeding was recorded in the marine RSA along the shoreline during either ground surveys or aerial surveys.

5.4.7 Ringed Seals

There are two marine mammals that are resident in the marine RSA in Bathurst Inlet: the ringed seal and the bearded seal. Canadian populations of ringed seals are designated as Not at Risk (COSEWIC 2002b) but are considered a high priority candidate on the Species Specialist Subcommittees’ (SSC) candidate list and the COSEWIC candidate list for reassessment in fall of 2013 (COSEWIC 2012) based on new evidence that climate change poses a serious threat to ringed seals given the expected and extensive loss of sea ice. Canadian populations of bearded seals are designated as data deficient (COSEWIC 2002a) and are listed as mid priority candidates on the SSC candidate list, but have not yet been scheduled for reassessment (COSEWIC 2012). Both ringed and bearded seals represent an important resource for Inuit people although harvests of bearded seals are much smaller. Traditional knowledge of the presence, location, and structure of the breathing holes and subnivean lairs permitted the Inuit hunters to exploit this abundant resource throughout the frozen ice season.

Ringed and bearded seals are dependent on sea ice and snow to survive. They rely on sea ice for extended periods during moulting, and live on sea ice during critical months for breeding, whelping, and nursing. Population size estimates of both ringed and bearded seals are usually conducted in the spring (late May through mid-June) during the moulting season when they are hauled out on the sea ice making them visible during aerial surveys.

Baseline surveys were conducted for seals to determine where seals are using the ice for molting and their population size in the marine RSA that stretches from the southern tip of Bathurst Inlet to the north end of the Kent Peninsula. Aerial surveys for ringed and bearded seals have been conducted in the marine RSA using standard census techniques in Bathurst Inlet in 2007, 2009, 2012, and 2013 coinciding with the peak period of seal haul-out in June during the spring moulting period. The density (uncorrected density) of ringed seals in Bathurst Inlet was consistent between years. The corrected density of ringed seals in the marine RSA using seal count data from 2012 was estimated to be 2.05 seals/km². The density of seals in the southern portion of the RSA near the MLA was lower than that in the northern section of the RSA, however, densities of ringed seals were correlated to ice conditions with highest densities associated with cracked ice and solid ice and the lowest density in areas of high ice deformation and extensive melt water.

Ringed seal pups were observed during aerial surveys conducted in 2012 and 2013. Fewer pups were observed in the southern portion of the RSA relative to the northern portion. In addition, several ringed seal lairs were observed in the northern portion of the RSA west of Omingmaktok during seal surveys conducted in 2013. No lairs were observed in the southern portion of the Inlet (south of Kanuyak Island)

or near the MLA during all years. Furthermore, no lairs were observed in the inlet south of Kingaok during wolverine DNA surveys conducted near the MLA in March and April 2013.

The occurrence of bearded seals in Bathurst Inlet was much lower than ringed seals with only 42 and nine bearded seals observed in 2007 and 2009, respectively. Bearded seals were associated with cracked ice and ice with melt water in areas that were fairly shallow (< 150 m).

5.5 HUMAN ENVIRONMENT

5.5.1 Archaeology and Paleontology

The Archaeological Setting is focused on a Regional Study Area (RSA) defined in Nunavut Archaeologist Permit 2012-12A. Archaeological and paleontological sites in Nunavut are protected under territorial or federal legislation. Archaeological and paleontological sites in Nunavut are protected under Section 51 of the *Nunavut Act* (*Nunavut Archaeological and Palaeontological Sites Regulations*), the *Territorial Land Use Regulations* of the *Territorial Lands Act* and by the *Canada Oil and Gas Operations Act* (*Canada Oil and Gas Geophysical Operations Regulations*).

Permits to conduct archaeological and paleontological research throughout Nunavut are applied for and issued under the *Nunavut Act* (*Nunavut Archaeological and Paleontological Sites Regulations*). In addition, work conducted on Inuit Owned Lands or within the Nunavut Settlement Area should be conducted in accordance with Articles 21 and 33 of the *Nunavut Land Claims Agreement*.

Highly significant paleontological finds have been made in Nunavut (e.g., Ellesmere Island, Axel Heiberg Island) and the Northwest Territories (e.g., Normand Wells); however, to date no fossils have been found by geologists or any other Back River Project field staff working on site. Based on the age of the rock units (Archean Age) and its close affinity with volcanic/pyroclastic rocks as well as subsequent metamorphism (Lambert 2005), it is not expected to find visible indications of fossils in rocks in the study area.

The Project area is within the lands traditionally used by the Copper Inuit, who are ethnographically defined as a group of the Central Eskimo. The territory of the Copper Inuit includes: portions of Victoria and Banks Islands; the Barrenlands south to Back River; Beechey Lake west to Contwoyto Lake; and extends from Wise Point, west of the Coppermine River and east to Perry River (Damas 1984). Early explorations of the area in and around the RSA were conducted by Samuel Hearne (1770 and 1772), John Franklin (1819-1822), George Back (1833-1834) and Vilhjalmur Stefansson and the Canadian Arctic Expedition (1910 and 1913 to 1918).

Previous archaeological research in the Arctic indicates that the earliest archaeological materials from this region date to approximately 3,500 BP and are associated with the Pre-Dorset culture (3,800 to 2,700 BP) (McGhee 1996). Artifacts from later cultural traditions including the Dorset (2,700 to 1,000 BP), Thule (1,100 to 200 BP), and Taltheilei (2,600 to 200 BP) are also expected within the RSA.

Previous archaeological studies in the region began as part of the Danish 5th Thule Expedition in 1921-1924 (Mathiassen 1927). During the 1970s geologist Fred Campbell reported on archaeological sites recorded while conducting work for the Geological Survey of Canada (Campbell 1975, 1977). In 1978, David Morrison conducted a survey of southern Bathurst Inlet and recorded 61 archaeological sites (Morrison 1978, 1979). In 2004 Darren Keith and Andrew Stewart conducted an oral history and archaeological study of a caribou hunting camp site (*Tahikaffaaluk*) at the north end of Bathurst Lake (Keith and Stewart 2005). Additional archaeological investigations have been conducted as part of site-specific baseline work for this Project (Rescan 2012c, Rescan 2013b), the George Lake area by Bertulli

(1991), the Goose Lake area by Fedirchuk (1997), the BIPR Project (Fedirchuk 2001, Blower 2003, Tischer 2010) and the Hackett River Project (Rescan 2008).

There are 269 known archaeological sites within the RSA. Of the 269 sites 172 are prehistoric, 39 are historic, 26 are multicomponent sites with both prehistoric and historic features or artifacts, and 34 are of undetermined antiquity. Within the RSA there are 4 burials, 124 campsites, 36 resource gathering sites, 38 lithic workshops, 33 lithic reduction sites, 5 lithic isolated tool sites, 4 lithic isolated finds (debitage), 17 markers (cairns or inuksuk), 1 quarry site, 2 faunal tool sites, 3 historic artifact scatters, and 1 historic isolated find. Of the 269 sites, 83 contain both artifacts and features, 97 contain only features, and 89 contain only artifacts. Artifacts attributable to specific cultural traditions have been identified at 22 of the 269 sites with 19 having artifacts indicative of the Pre-Dorset, one of the Dorset tradition, and two from the Taltheilei tradition.

There are 170 known archaeological sites within the LSA. Of the 170 sites 121 are prehistoric, 16 are historic, 17 are multicomponent sites with both prehistoric and historic features or artifacts, and 16 are of undetermined antiquity. Within the LSA there are no burials, 80 campsites, 26 resource gathering sites, 29 lithic workshops, 19 lithic reduction sites, 5 lithic isolated tool sites, 3 lithic isolated finds (debitage), 5 markers (cairns or inuksuk), 1 faunal tool sites, 1 historic artifact scatters, and 1 historic isolated find. Of the 170 sites 51 contain both artifacts and features, 59 contain only features, and 60 contain only artifacts. Artifacts attributable to specific cultural traditions have been identified at 17 of the 170 sites with 12 having artifacts indicative of the Pre-Dorset, 1 of the Dorset tradition, and 2 from the Taltheilei tradition.

5.5.2 Socio-economics

The socio-economic LSA consists of the communities of Bathurst Inlet (known as Kingaok), Omingmaktok (also known as Bay Chimo), Cambridge Bay (also known as Iqaluktuuttiaq), and Kugluktuk (previously known as Coppermine), while the RSA is expanded to also include the eastern Kitikmeot communities of Gjoa Haven (also known as Uqsuqtuuq), Taloyoak (previously known as Spence Bay), and Kugaaruk (previously known as Pelly Bay). The communities of Omingmaktok and Bathurst Inlet are no longer occupied year round and do not offer typical municipal services such as retail, health and education services. As such, baseline studies focused on the five Kitikmeot communities that are populated year round.

The population of the Kitikmeot Region is estimated to have increased by about 25% between 2001 and 2011. The region's population increased from 4,816 in 2001 to 5,361 in 2006 (an 11.3% increase), and rose another 12.1% to 6,012 in 2011 (Statistics Canada 2012). The Kitikmeot communities range in size from approximately 771 residents in Kugaaruk to 1,608 residents in Cambridge Bay. All Kitikmeot communities have experienced substantial population growth over the past two decades and have a notable portion of the population 15 years of age and under (from a low of 28.7% of the population in Cambridge Bay to 41.6% in Kugaaruk; Statistics Canada 2012).

Approximately 32% of the potential labour force in the Kitikmeot Region (i.e., those aged 15 years and older) had some form of post-secondary education. This proportion increases to approximately 44% among those aged 25 years and older. However, overall, education levels were relatively low in 2006 as approximately 61% of Kitikmeot residents are without a high school diploma, as compared to 57% of Nunavummiut and 24% of Canadians. Attainment levels for apprenticeship and trade certifications ranged from almost one quarter of the population in Kugaaruk (22%) to just over one tenth (12%) of the population in Cambridge Bay (Statistics Canada 2007).

The life expectancy of Nunavummiut at birth is lower than other Canadians (by approximately 10 years) and has decreased in recent years, whereas the life expectancy of Canadians as a whole generally

continues to increase each year (Statistics Canada 2012). Other notable issues linked to community health in Nunavut are food security, well-being, housing, crime, health behaviours (e.g., smoking and substance abuse), as well as mental health and suicide. These issues interact and collectively contribute to the overall health and well-being of communities in Nunavut.

The Kitikmeot Region has a mixed economy, focusing on public sector services, private sector market economies, and traditional activities. Formal economic sectors of particular importance include: government administration, health care and social services, education, retail, construction, transportation, tourism services, arts and crafts, and mineral exploration and development (Statistics Canada 2007). The service sector is the foundation of local economies in the Kitikmeot Region, accounting for about 80% of employment. In contrast, primary and secondary industries, including resource-based industries and construction, account for about 20% of local employment (Statistics Canada 2007). With the exception of Cambridge Bay, the Kitikmeot communities reported median individual incomes below the Nunavut average, ranging from approximately \$18,336 in Kugluktuk to only \$15,744 in Taloyoak (Statistics Canada 2007).

Private sector businesses prominently include accommodation and retail, as well as a range of smaller-scale goods and service providers in each community. Cambridge Bay, and to a lesser extent Kugluktuk, stands out as a community where the private sector has a more important role in the economy. Typical local businesses in Kitikmeot communities include retail (Co-op and Northern Stores), a hotel, and construction and contracting services, among others.

5.5.3 Land Use

The land use RSA was selected to provide broad-scale information on land use characteristics and patterns, and includes the communities of Bathurst Inlet, Omingmaktok, Kugluktuk, and Cambridge Bay. The land use LSA is defined as the area of land and water that encompasses the Project and is consistent with the largest wildlife boundaries (wildlife terrestrial RSA and marine RSA).

In 2012, there were 65 active exploration projects in Nunavut, including 22 in the Kitikmeot Region and 18 near the communities of Bathurst Inlet, Cambridge Bay, and Kugluktuk. This is a reduction from 95 active exploration projects in the Kitikmeot in 2011, including 35 near the project RSA. Currently, there are no active mines in the Kitikmeot Region (Nunavut Geoscience 2012). To help manage development, the NTI has adopted several policies related to exploration and mining, including a general mining policy in 1997, a uranium policy in 2007, and a reclamation policy in 2008 (INAC 2010). There are two main types of land title and tenure within Nunavut - Inuit Owned Land (IOL) and Crown lands. The Back River Project properties are located on both IOL and Crown land.

The Nunavut Planning Commission (NPC) has developed a draft Nunavut Land Use Plan (NLUP) for all areas of Nunavut that are outside of municipal boundaries. The draft NLUP provides guidance for resource use and development and contains goals, objectives, and policies for land use planning in Nunavut. Land use designations include: protecting and sustaining the environment, encouraging conservation planning, building healthier communities, encouraging sustainable development, and mixed use (NPC 2014).

There are both cultural and commercial land uses in the vicinity of the Project. Cultural land use is guided by a longstanding relationship of reciprocity and respect between Inuit people and their environments. Commercial land use consists primarily of sport hunting, tourism, mineral exploration, and transportation and shipping. Tourism and recreation activities in the land use RSA include hiking, hunting, fishing, boating, canoeing, kayaking, dog sledding, cross-country skiing, and snowmobile riding (Nunavut Tourism 2011). While the area is geographically difficult to access, hunting, trapping, fishing,

and camping does take place throughout the RSA. Muskox, caribou, wolf, and wolverine are among the species people in the Kitikmeot Region rely upon, with caribou being the most harvested terrestrial mammal. Fishing occurs throughout the RSA and is not limited to specific areas (Rescan 2012b).

The traditional economy is largely focused on cultural and subsistence land use including non-commercial hunting, fishing, trapping, and gathering. Subsistence harvesting reduces the need for store-bought food and other household items. Participation in the subsistence economy remains high and includes the majority of Kitikmeot residents (H. Priest and Usher 2004). Animals are harvested for personal consumption and are shared with others through informal networks. Participation in harvesting activities and country food consumption are linked to food security as well as Inuit culture and community well-being (Rescan 2012b).

Within the land use LSA, subsistence activities are mainly conducted by residents of Omingmaktok, Bathurst Inlet, and Cambridge Bay. Kugluktuk land users reported the majority of their land use takes place west of the LSA. Caribou, wolf, and wolverine were the most commonly harvested species within the LSA. Located within the LSA, Beechy Lake is a common destination for land users from Bathurst Inlet, Omingmaktok, and Cambridge Bay. Fishing takes place throughout Bathurst Inlet and on surrounding lakes. Species of focus include Arctic Char, lake trout, whitefish, cod, wolffish, and Arctic grayling. There are many commonly used travel routes throughout the LSA (Rescan 2012b).

5.5.4 Country Foods

Country foods are animals, plants, and fungi used by humans for nutritional or medicinal purposes that are harvested through hunting, fishing, or gathering of vegetation. These foods are an important part of a healthy diet, have medicinal qualities, and are of high cultural and traditional importance. The quality of country foods is directly related to the quality of the surrounding environmental media and chemicals accumulated from the environment may be present in the edible tissue portions of the country foods. The potential for adverse effects to human health due to chemicals present in country foods depends on the concentration of the chemical, which type and part of the country food is eaten, life stage of the consumer, quantity of food consumed, and frequency of consumption.

A country foods baseline risk assessment was completed for the Project. The country foods LSA was selected to include areas that may be influenced by future Project-related activities, and included the Goose Property, Marine Laydown Area, and a 1-km buffer zone along winter ice road corridors.

Country foods were assessed under baseline conditions to determine the risk to human health due to the incidental consumption of contaminants of potential concern (COPCs) in these foods. The country foods included a large terrestrial mammal (caribou, *Rangifer tarandus*), a small terrestrial mammal (Arctic ground squirrel, *Spermophilus parryii*), a bird species (Canada goose, *Branta canadensis*), fish (e.g., lake trout, *Salvelinus namaycush*), a shellfish species (bay mussel, *Mytilus trossulus*), a marine mammal (ringed seal, *Phoca hispida*), and berries (bog cranberry, *Vaccinium vitis-idaea* and bog blueberry, *Vaccinium uliginosum* combined).

Based on the review no significant risks to the health of human consumers of country foods were identified due to incidental ingestion of metals present in the foods. People in the area can continue to eat caribou, Arctic ground squirrels, Canada geese, lake trout, ringed seals (muscle and blubber tissue), bay mussels, and berries (bog blueberry and bog cranberry) at the consumption rates used in the baseline assessment.

6. Potential Effects Assessment

6. Potential Effects Assessment

This chapter provides an overview of the methodology used for the Project-related potential effects assessment and presents summaries of the results of the effects assessments conducted for all Valued Ecosystem Components (VECs) and Valued Socio-economic Components (VSECs). The effects assessments conducted were consistent with the requirements of Section 12.5.2 of the Nunavut Land Claim Agreement (NLCA) and the Nunavut Impact Review Board (NIRB) final *Guidelines for the Preparation of an Environmental Impact Statement* (EIS guidelines [NIRB 2013]) for the Project.

Environmental effects are changes to the current environmental or socio-economic conditions that occur as the result of a project. An effects assessment is the process of identifying and quantifying the effects of a proposed project (i.e., its components and related physical activities) on environmental conditions.

As specified in the EIS guidelines (Section 7, Effect Assessment Methodology), details of public consultation, community engagement, and government engagement are described in *Volume 3: Public Consultation, Government Engagement, and Traditional Knowledge* of this FEIS. In addition, the details of Traditional Knowledge (TK) collection methodology, along with the detailed report generated by the Kitikmeot Inuit Association, Lands and Environment Department (KIA 2012, KIA 2014), are also provided in Volume 3 of this FEIS.

6.1 METHODOLOGY OVERVIEW

This section provides an overview of the methodology used for the Project-related potential effects assessment. Please refer to Volume 9, Chapter 1 for a detailed description of the effects assessment methodology.

Both public consultation and TK were used in multiple areas of the overall assessment methodology. The results of the Inuit Traditional Knowledge of Sabina Gold & Silver Corp., Back River (Hannigayok) Project, Naonaiyaotit Traditional Knowledge Project (NTKP) report (KIA 2012) were used for scoping and refining the potential VEC/VSEC list. Two subsequent reports were available for incorporation into the FEIS: Naonaiyaotit Traditional Knowledge Project - Hannigayok (Sabina Gold & Silver Corp. Proposed Back River Project). Results from Data Gaps Workshops, Final Report (KIA 2014), and Back River Project: Existing and Publically Available Traditional Knowledge from Selected Aboriginal Groups in the Northwest Territories. All three reports can be found in Volume 3 of the FEIS.

The KIA report presents clear maps of valued animal species, environmental components, and traditional land use activities. This information was used to determine if these valued aspects potentially interacted with the proposed Project, and if so, they were included in the VEC/VSEC list. The information in the KIA report was also used to help determine appropriate spatial study areas for baseline data collection and potential effects assessment.

The Project-related potential effects assessment consisted of the following steps:

- establish the Scope of the Effects Assessment, which included the selection of VECs and VSECs and defining spatial and temporal boundaries;
- identify potential interactions with the Project and VECs/VSECs;
- characterize the potential effects;

- identify mitigation and management measures to eliminate or reduce potential effects;
- characterize residual effects (those effects predicted to remain after the application of mitigation and management measures); and
- determine the significance of residual effects.

6.1.1 Scope of the Assessment and Selection of VECs/VSECs

The scope of the EIS is determined as part of the NIRB process. NIRB consulted with the public and interested parties in the Kitikmeot Region and Yellowknife in February of 2013 (as well as ongoing information and correspondence) to determine the scope of the EIS. A “Public Scoping Meetings Summary Report” was issued by NIRB in March of 2013, and the “Final Scope List for the NIRB’s Assessment of the Back River Project” can be found as Appendix B in the EIS guidelines.

The scope of NIRB’s assessment is based on the requirements of Section 12.5.2 of the Nunavut Land Claims Agreement (NLCA), NIRB’s 10 Minimum EIS Requirements, and the Back River Project Proposal which was submitted on June 15, 2012.

The selection of potential VECs and VSECs was based on the NIRB scoping process which involved consultation with all potentially affected communities. The scoping and refining of the potential VEC/VSEC list was based on Sabina-led public consultation (where a potential list of VECs/VSECs was presented to the communities for feedback and input), the TK report (KIA 2012, KIA 2014), consultation with regulatory agencies, and regulatory considerations. The final list was provided to NIRB for inclusion in the draft EIS guidelines, so that they were available for review and comment by all interested parties. The final list as indicated in the Sabina submission of April 8, 2013 for the final EIS guidelines are the VECs/VSECs included in this FEIS.

Table 6.1-1 presents the final VEC/VSEC list used in the FEIS. It should be noted that all proposed VECs/VSECs from the NIRB guidelines are included in Supporting Volumes 4 through 8, regardless of whether they were selected for VECs/VSECs or Subjects of Note. Those selected for VECs/VSECs were subjected to an effects assessment, while those selected for Subjects of Note have all of the requested information provided in the supporting volume.

6.1.2 Assessment Boundaries

The following general spatial boundaries are used in the FEIS:

- **Project Footprint** - includes all physical structures, disturbed areas, and activities that comprise the Project.
- **Potential Development Area (PDA)** - The PDAs included potential Project footprints plus a buffer where infrastructure may shift within. For some effect assessment’s the PDS was used.
- **Local Study Area (LSA)** - The LSA includes the Project footprint area plus additional area depending on the VEC/VSEC. The definition of the LSA provided in the glossary of the EIS guidelines is as follows: That area where there exists the reasonable potential for immediate effects due to project activities, ongoing normal activities, or to possible abnormal operating conditions.
- **Regional Study Area (RSA)** - The RSA includes the LSA plus additional area depending on the VEC/VSEC. The definition of the RSA provided in the glossary of the EIS guidelines is as follows: The area within which there is the potential for indirect or cumulative biophysical and socio-economic effects.

Table 6.1-1. Valued Ecosystem Component and Valued Socio-economic Component Scoping Process Information

Subject Area	Potential VEC/VSEC of the Project Identified from Revised Draft Guidelines (NIRB, March 2013)	Anticipated Ecosystemic and Socio-economic Impacts of the Project from Final Scope (NIRB, March 2013)	Potential Interaction with Project	Consultation with Communities ¹ and TK Information ²	Consultations with Regulatory Agencies ³ and Regulatory Considerations ⁴	VEC, VSEC, or Other ^{5,6} within EIS
Atmospheric Environment	Air quality	Air quality	Yes	Few or no comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Atmospheric VEC - Air Quality
	Climate and meteorology	Climate and meteorology	Yes	Few or no comments expressed	Few or no comments expressed Low regulatory considerations	Subject of Note *Climate change will be included in Individual Assessment Areas
	Noise and vibration	Noise and vibration	Yes	Few or no comments expressed	Few or no comments expressed Moderate regulatory considerations	Atmospheric VEC - Noise and Vibration
Freshwater Environment	Water quantity	Water quantity	Yes	Few or no comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Freshwater VEC - Water Quantity
	Hydrogeology	Hydrogeology	Yes	Few or no comments expressed	Few or no comments expressed Low regulatory considerations	Subject of Note
	Groundwater quality	Groundwater quality	Yes	Moderate to significant comments expressed	Few or no comments expressed Low regulatory considerations	Subject of Note
	Surface water quality	Surface water quality	Yes	Moderate to significant comments expressed	Few or no comments expressed Moderate regulatory considerations	Freshwater VEC - Water Quality
	Sediment quality	Sediment quality	Yes	Few or no comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Freshwater VEC - Sediment Quality
	Aquatic ecology	Aquatic ecology	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Included in Individual Assessment Areas
	Aquatic biota: representative fish as defined in the <i>Fisheries Act</i> , benthic invertebrates, other aquatic organisms	Aquatic biota including representative fish as defined in the <i>Fisheries Act</i> , aquatic macrophytes, benthic invertebrates and other aquatic organisms	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Included in Individual Assessment Areas
	Habitat including fish habitat as defined in the <i>Fisheries Act</i>	Habitat including fish habitat as defined in the <i>Fisheries Act</i>	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Freshwater VEC - Fish Habitat
	Commercial, recreational and Aboriginal fisheries as defined in the <i>Fisheries Act</i>	Commercial, recreational and Aboriginal fisheries as defined in the <i>Fisheries Act</i>	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Freshwater VEC - Arctic Grayling
	Commercial, recreational and Aboriginal fisheries as defined in the <i>Fisheries Act</i>	Commercial, recreational and Aboriginal fisheries as defined in the <i>Fisheries Act</i>	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Freshwater VEC - Lake Trout
Marine Environment	Seabirds	Seabirds	Yes	Few or no comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Marine VEC - Marine Seabirds
	Marine ecology	Marine ecology	Yes	Few or no comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Included in Individual Assessment Areas
	Marine water quality	Marine water and sediment quality	Yes	Few or no comments expressed	Few or no comments expressed Moderate regulatory considerations	Marine VEC - Water Quality
	Marine sediment quality	Marine water and sediment quality	Yes	Few or no comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Marine VEC - Sediment Quality
	Marine biota including fish and Species at Risk	Marine biota including fish and benthic flora and fauna	Yes	Few or no comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Included in Individual Assessment Areas
	Marine habitat	Marine habitat	Yes	Few or no comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Marine VEC - Fish Habitat
	Commercial, recreational and Aboriginal fisheries as defined in the <i>Fisheries Act</i>	Commercial, recreational and Aboriginal fisheries as defined in the <i>Fisheries Act</i>	Yes	Few or no comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Marine VEC - Arctic Char
	Marine wildlife (marine mammals)	Marine wildlife	Yes	Few or no comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Marine VEC - Ringed Seals

(continued)

Table 6.1-1. Valued Ecosystem Component and Valued Socio-economic Component Scoping Process Information (continued)

Subject Area	Potential VEC/VSEC of the Project Identified from Revised Draft Guidelines (NIRB, March 2013)	Anticipated Ecosystemic and Socio-economic Impacts of the Project from Final Scope (NIRB, March 2013)	Potential Interaction with Project	Consultation with Communities ¹ and TK Information ²	Consultations with Regulatory Agencies ³ and Regulatory Considerations ⁴	VEC, VSEC, or Other ^{5,6} within EIS
Terrestrial Environment	-	Terrestrial and marine species at risk	Yes	Few or no comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Included in Individual Assessment Areas
	Terrestrial ecology	Terrestrial ecology	Yes	Moderate to significant comments expressed	Few or no comments expressed Low regulatory considerations	Included in Individual Assessment Areas
	Landforms and soils	Landforms and soils	Yes	Few or no comments expressed	Few or no comments expressed Low regulatory considerations	Subject of Note; Terrestrial VEC - Special Landscape Features
	Permafrost and ground stability	Permafrost and ground stability	Yes	Few or no comments expressed	Moderate to significant comments expressed Low regulatory considerations	Subject of Note
	Geological Features (Geology and Geochemistry)	Geological features including discussion of geology and geochemistry	Yes	Few or no comments expressed	Few or no comments expressed Low regulatory considerations	Subject of Note
	Vegetation	Terrestrial vegetation	Yes	Few or no comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Terrestrial VEC - Vegetation
	Representative terrestrial mammals to include caribou, caribou habitat and behaviour	Representative terrestrial mammals to include caribou, caribou habitat migration and behaviour, muskoxen, wolverine, grizzly bears, polar bears, wolves and less conspicuous species that may be maximally exposed to contaminants	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Terrestrial VEC - Caribou
	Muskox		Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Terrestrial VEC - Muskox
	Wolverine		Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Terrestrial VEC - Wolverine/Furbearers
	Polar Bears		No	-	-	-
	Brown Bears (brown and grizzly)		Brown No	Moderate to significant comments expressed	Few or no comments expressed Moderate regulatory considerations	Terrestrial VEC - Grizzly Bears
	Wolves		Yes	Moderate to significant comments expressed	Few or no comments expressed Moderate regulatory considerations	Terrestrial VEC - Wolverine/Furbearers
	Less conspicuous species that maybe be maximally exposed to contaminants	Wildlife migration routes and crossings	Yes	Moderate to significant comments expressed	Few or no comments expressedModerate regulatory considerations	Terrestrial VEC - Wolverine/Furbearers
	-		Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Low regulatory considerations	Included in Individual Assessment Areas
	Raptors		Yes	Few or no comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Terrestrial VEC - Raptors
	Migratory Birds		Yes	Few or no comments expressed	Moderate to significant comments expressed Significant regulatory considerations	Terrestrial VEC - Migratory Birds
Human Environment	Employment	Employment	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Low regulatory considerations	Human VSEC - Employment
	Land use and mobility	Land use	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Human VSEC - Subsistence Economy and Land Use
	Food security	Food security	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Human VSEC - Subsistence Economy and Land Use
	Food security	Food security	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Human VSEC - Country Foods / Human Health
	Language	Language	Yes	Few or no comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Subject of Note
	Cultural and community harvesting	Cultural and commercial harvesting	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Moderate regulatory considerations	Human VSEC - Subsistence Economy and Land Use

(continued)

Table 6.1-1. Valued Ecosystem Component and Valued Socio-economic Component Scoping Process Information (completed)

Subject Area	Potential VEC/VSEC of the Project Identified from Revised Draft Guidelines (NIRB, March 2013)	Anticipated Ecosystemic and Socio-economic Impacts of the Project from Final Scope (NIRB, March 2013)	Potential Interaction with Project	Consultation with Communities ¹ and TK Information ²	Consultations with Regulatory Agencies ³ and Regulatory Considerations ⁴	VEC, VSEC, or Other ^{5,6} within EIS
Human Environment (cont'd)	Non-traditional land use and resource use	Non-traditional land use and resource use	Yes	Few or no comments expressed	Few or no comments expressed Moderate regulatory considerations	Human VSEC - Subsistence Economy and Land Use
	Archaeology	Archaeology	Yes	Moderate to significant comments expressed	Few or no comments expressed Moderate regulatory considerations	Human VSEC - Archaeology
	Palaeontology	Palaeontology	Yes	Few or no comments expressed	Few or no comments expressed Low regulatory considerations	Subject of Note
	Cultural Resources	Cultural	Yes	Few or no comments expressed	Few or no comments expressed Moderate regulatory considerations	Human VSEC - Archaeology
	Family and community cohesion	Family and community cohesion	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Low regulatory considerations	Human VSEC - Health and Community Well-being
	Potential indirect effects of project on frequency and types of crime incidents	-	Yes	Few or no comments expressed	Moderate to significant comments expressed Low regulatory considerations	Included in Individual Assessment Areas
	Community infrastructure and public service, including housing	Community infrastructure and public services	Yes	Few or no comments expressed	Moderate to significant comments expressed Low regulatory considerations	Human VSEC - Health and Community Well-being
	Economic development and opportunities	Economic development opportunities	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Low regulatory considerations	Human VSEC - Economic Development
	Contracting and business opportunities	Contracting and business opportunities	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Low regulatory considerations	Human VSEC - Business Opportunities
	Benefits and revenues (tax, royalties, etc.)	Benefits and revenues (tax, royalties, etc.)	Yes	Few or no comments expressed	Moderate to significant comments expressed Low regulatory considerations	Subject of Note
	Education and training	Education and training	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Low regulatory considerations	Human VSEC - Education and Training
	Population demographics	Population demographics	Yes	Few or no comments expressed	Moderate to significant comments expressed Low regulatory considerations	Subject of Note
	Individual and community wellness	Individual and community wellness	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Low regulatory considerations	Human VSEC - Health and Community Well-being
	Health and safety including employee and public safety	Health and safety including employee and public safety	Yes	Moderate to significant comments expressed	Moderate to significant comments expressed Low regulatory considerations	Human VSEC - Health and Community Well-being

Notes:

¹ Community consultation information reflects information from Back River Project consultations up to February 2013.

² TK Information refers to the contents of the Inuit Traditional Knowledge of Sabina Gold & Silver Corp: Back River (Hannigayok) Project, Naonaiyaotit Traditional Knowledge Project (NTKP) (KIA 2012).

³ Government engagement information reflects information from Back River Project consultations up to February 2013.

⁴ Regulatory considerations are a high level view of the legislation in place to address potential impacts.

⁵ Table entries labelled as "Included in Individual Assessment Areas" refer to topics that will be addressed in context, within one or more other assessments

⁶ Table entries labelled as "Subject of Note" refer to unique topics addressed as a subsection within a specific assessment.

The specific LSAs and RSAs for each VEC and VSEC are provided as maps in the Supporting Volumes 4 through 8 (Volume 4: Atmospheric Environment; Volume 5: Terrestrial Environment; Volume 6: Freshwater Environment; Volume 7: Marine Environment; and Volume 8: Human Environment). Additional information for each study area specific to each VEC and VSEC is also provided in Volumes 4 through 8.

Section 7.5.2 of the EIS guidelines requires that the following Project phases have defined temporal boundaries: construction, operation, maintenance, temporary closure, final closure, and post-closure periods, including planned exploration.

The temporal boundaries for the Project phases were defined as follows:

- Mobilization and Construction phase: 4 years;
- Operational phase: 10 years;
- Reclamation and Closure phase: 8 years;
- Post-closure phase: 5 years;
- other potential phases:
 - Temporary Closure, also termed Care and Maintenance: several weeks to several years,
 - Exploration: included in Construction and Operational phases.

As required in Section 7.5.2 of the EIS guidelines, rationale and justification for the spatial boundaries used for each VEC and VSEC is provided in the Supporting Volumes 4 through 8 (Volume 4: Atmospheric Environment; Volume 5: Terrestrial Environment; Volume 6: Freshwater Environment; Volume 7: Marine Environment; and Volume 8: Human Environment).

6.1.3 Identification of Potential Interactions with Project and VECs/VSECs

The first step was to identify the potential interactions between the Project and the VECs and VSECs. Table 1.2-3 in Volume 9, Chapter 1, presents a matrix showing various components of the Project by Phases along with the VECs and VSECs. This matrix was completed based on professional judgement and experience at other similar projects in Nunavut and the Northwest Territories, and was based on the initial matrix provided in the Project Description.

6.1.4 Characterization of Potential Effects

If an interaction was identified between the Project and a VEC/VSEC, then that potential effect was described to the extent possible using quantitative, semi-quantitative or qualitative techniques. For some VECs or VSECs, modelling was used to predict and characterize aspects of the interactions. The specific methods used for each VEC and VSEC are described in the Supporting Volumes 4 through 8 (Volume 4: Atmospheric Environment; Volume 5: Terrestrial Environment; Volume 6: Freshwater Environment; Volume 7: Marine Environment; and Volume 8: Human Environment).

For each potential effect on a VEC or VSEC, the nature of that effect was characterized in as much detail as possible, and using some of the attributes that would later be used to describe the significance of any residual effects, such as magnitude, geographic extent, duration, frequency, reversibility, resiliency, ecological context, and probability. A discussion of any shortcomings or uncertainty in the characterization was also included.

6.1.5 Identification of Mitigation and Management Measures

Mitigation and management measures were identified and described that could eliminate or minimize the potential effects of the Project on a VEC/VSEC. Mitigation measures that are identified for use are

considered to be technically, environmentally, and economically feasible. Key approaches to avoid, reduce, control, eliminate, offset, or compensate potential effects include:

- **Optimizing Alternatives:** Preventing or reducing adverse environmental effects by changing an aspect of the Project (e.g., choosing a different location for a waste rock storage area).
- **Design Changes:** Preventing or reducing adverse environmental effects by redesigning aspects of the Project (e.g., reducing total volume of tailings at surface by maximizing in pit disposal).
- **Best Achievable Control Technology (BACT):** Eliminating, minimizing, controlling, or reducing adverse effects through the use of proven and economically achievable technological applications (e.g., heat recovery from diesel-fire power generation).
- **Management Practices:** Eliminating, minimizing, controlling, or reducing adverse effects on VECs and VSECs through management practices (e.g., managing water intake requirements to avoid adversely affecting water levels and hence fish/aquatic habitat).
- **Follow-up Monitoring and Adaptive Management:** Monitoring the implementation of mitigation measures where uncertainty exists, and adjusting mitigation based on monitoring results (e.g., Wildlife Mitigation and Monitoring Plan).
- **Compensation:** Offsetting remaining effects that cannot be prevented or reduced through remedial or compensatory actions, so that the net effect on the community or ecosystem is neutral or beneficial (e.g., Conceptual Fish Offsetting Plan, enhancement of other social/economic/cultural benefits).
- **Enhancement:** Providing measures to enhance a beneficial effect. Enhancement generally applies to socio-economic effects.

For each of the VECs and VSECs, a description was provided of any mitigation or management measures that could be used to eliminate or reduce potential negative interactions with the Project.

The measures included in the detailed Volumes 4 through 8 of the FEIS are measures that have been shown to work in other similar situations in the Arctic. Sabina is committed to implement these effective mitigation measures and to use adaptive management approaches to ensure mitigation measures are optimized.

6.1.6 Characterization of Residual Effects

If the proposed mitigation measure(s) were not sufficient to eliminate a potential effect, a residual effect was identified. If the implementation of mitigation measures completely eliminated a potential effect, then the effect was not carried forward, and no additional analysis was undertaken.

Detailed characterization was conducted for VEC/VSECs for which a residual effect was predicted in order to assess how significant the effect will be. Wherever possible, these studies included quantitative methods. Where data are lacking, professional judgment was used to determine the extent of potential effects. The methodologies and underlying assumptions and data limitations are presented in the detailed Volumes 4 through 8.

6.1.7 Determining the Significance of Residual Effects

The significance of residual effects of the Project is based on a comparison of the current environment (as documented by comprehensive baseline studies; see Chapter 5 of this volume) without the Project with the predicted state of the environment with the Project, after mitigation measures are applied. Identified Project-related residual effects were described using the defined attributes direction,

magnitude, geographic extent, duration, frequency, reversibility, resiliency, ecological context, and probability (refer to Table 1.2-4 of Volume 9 for further details) along with attributes outlined in the EIS guidelines. The ratings assigned to the attributes, along with the likelihood of occurrence, were used to determine the overall significance rating of a residual effect.

Definitions of each of the attributes may be VEC/VSEC specific and may vary accordingly. Where available, quantitative thresholds (e.g., freshwater aquatic life guidelines or ambient air criteria), are used to assist with evaluating the significance of residual effects. Other assessment end-points, such as the ability to meet or impair land and resource management planning objectives may also be used to assist in the determination of significance.

The definition of significance determination included in the EIS guidelines (NIRB 2013) is as follows: “Impact significance is based on comparing the predicted state of the environment with and without the Project and expressing a judgment as to the importance of the changes identified.”

NIRB directed that the EIS shall present the residual effects assessment of the Project so that the reader can clearly understand the real consequences of the Project, the degree of mitigation of effects, and which effects cannot be mitigated or compensated for.

NIRB also directed that the dynamic change of ecosystems and their components be considered in determining significance.

The overall significance of an effect is derived from the experience and professional judgment of the environmental practitioners who prepared the assessment, considering the rankings of the contributing attributes of significance. While substantially based on professional judgment, the following are general rules of thumb applied in determining significance:

- If the magnitude of the effect is low, then the predicted effect is “not significant,” recognizing that magnitude includes consideration of sensitive species, habitats or populations. If effects on measurable components such as air or water quality meet applicable performance criteria, standards or guidelines, then the magnitude of the effect is negligible to moderate, and therefore the prediction will be for an effect that is “not significant.”
- If the geographic extent of the effect is confined to the Project footprint or LSA, then the predicted effect is likely to be “not significant.”
- If the extent of a negative socio-economic effect is limited to individuals who also receive a corresponding positive benefit, then the predicted effect is likely to be “not significant.”
- If the effect has a moderate to high reversibility, the predicted effect is likely to be “not significant.”
- If the duration of the effect is short term (e.g., mobilization and construction period only) then the effect prediction is also likely to be “not significant.”

6.2 ATMOSPHERIC ENVIRONMENT

As part of the scoping process, air quality and noise and vibration were selected as VECs. Meteorology and climate was considered a Subject of Note and all required information noted in the EIS guidelines is included in the FEIS.

All VECs were assessed over spatial and temporal scales. Spatially, potential effects were evaluated within a Local Study Area (LSA) and a larger Regional Study Area (RSA). Two LSAs were selected for the

atmospheric VECs, encompassing the area around the Goose PDA, with boundaries of approximately 10 km in all directions from infrastructure, and also a smaller LSA around the Marine Laydown Area (MLA). The atmospheric RSA was the same as that used for the terrestrial wildlife RSA and covered 12,620 km² and includes a buffer of approximately 10 km around the LSAs. All potential Project effects were considered during the Mobilization and Construction, Operations, Reclamation and Closure, and Post-closure Project phases.

Specific legislation was considered during the assessment, including appropriate federal and territorial objectives/standards. The following standards and objectives were used for the air quality assessment: Nunavut Ambient Air Quality Standards (Government of Nunavut 2011), 2020 Canadian Ambient Air Quality Standards (CCME 2012), National Ambient Air Quality Objectives (CCME 1999) and British Columbia Air Quality Standards (PM₁₀ and acid deposition) (BC MOE 2009; BC MOE 1979). For dust deposition WHO Air Quality Guidelines for Europe (WHO 2000) were used. The noise criteria were based on the following documents: Alberta Noise Directive 038 (EUB 2007), Health Canada (2010) Useful Information for Environmental Assessment (Section 6: Noise Effects), WHO (1999) Guidelines for Community Noise and US EPA (1974) Information on levels of environmental noise requisite to protect public health and welfare with an adequate margin of safety.

6.2.1 Air Quality

Activities associated with the Project have the potential to generate emissions of criteria air contaminant (CACs) and also lead to dust and acid deposition. The main sources of emissions associated with the project are stack emissions, vehicle exhaust emissions, fugitive dust emissions from vehicles travelling on unpaved roads, emissions associated with blasting and aircraft emissions. Eight air quality indicators (nitrogen oxide (NO_x as NO₂), sulphur dioxide (SO₂), carbon monoxide (CO), total suspended particulates (TSP) matter, particulate matter (PM₁₀), respirable particulate matter (PM_{2.5}), dust deposition and acid deposition) were included in the assessment and an air quality modelling study was conducted to characterize the highest concentrations of each air quality indicator within the atmospheric LSA. Volatile Organic Compounds (VOCs) and ozone (O₃) were scoped out of the assessment due to emission rates that are considered not significant.

The assessment described the mitigation and management activities planned to reduce or eliminate potential effects on air quality. Mitigation measures included: energy efficiency measures, measures to reduce fuel use, the use of water or dust suppression fluids to reduce dust from unpaved roads, transported material and equipment in the crushing facility, and the use of emission control systems such as wet scrubbers, baghouses, and filters. For the anticipated peak activity year, the modeling study predicted that concentrations of dust deposition would be below the objectives/standards at all locations and the acid deposition exceedances were contained within the PDAs. The remaining six air quality indicators (TSP, SO₂, CO, NO₂, PM_{2.5}, and PM₁₀) showed exceedances outside the PDA, and thus would remain as residual effects after mitigation.

The six residual effects are predicted to be of moderate magnitude and limited to the LSA, and to be reversible within the life span of the Project. The residual effects would be attributed to emissions of dust from open-pit mining activities, in particular unpaved road dust generated on site. Contingent on the implementation of mitigation measures outlined in the Air Quality Monitoring and Management Plan (Volume 10, Chapter 17), the significance of residual effects for air quality is predicted to be Not Significant.

6.2.2 Noise and Vibration

Construction and operation of the Project will introduce noise and vibration sources largely in the form of construction equipment, haul vehicles, blasting and vehicle and aircraft traffic. A review of the

potential Project interactions with noise and vibration identified nine potential effects that may occur; seven potential effects on humans and two potential effects on wildlife. These nine potential effects are: sleep disturbance (humans), interference with speech communications (humans), complaints (humans), high annoyance (humans), noise-induced rattling (humans), noise-induced hearing loss (humans), cosmetic and structural damage of buildings (humans), loss of habitat (wildlife) and disturbance (wildlife).

The assessment described the mitigation and management activities planned to reduce or eliminate potential effects on noise and vibration. Mitigation measures included: ensuring equipment is fitted with appropriate mufflers and silencers, limiting activities such as blasting and take-off and landing of aircraft to certain times of the day, and housing stationary sources in building or using enclosures, berms, acoustic screening and shrouding. The results of quantitative noise modelling for the peak activity year show that predicted noise levels are below the criteria for interference with speech communications (humans), complaints (humans), high annoyance (humans), noise induced rattling (humans) and noise induced hearing loss (humans). Similarly, there are not expected to be any cosmetic and structural damage of buildings (humans) effects from Project-generated vibration. However, noise levels are predicted to exceed relevant criteria for loss of habitat (wildlife) and disturbance (wildlife) at various identified receptors due to construction and operation activities, blasting, road traffic and aircraft movements. In addition, noise levels from mine construction and operations are predicted to temporarily exceed the sleep disturbance (humans) criteria at the proposed location of the Goose camp. Therefore, three potential effects would remain as residual effects after mitigation: sleep disturbance (humans), habitat loss (wildlife) and disturbance (wildlife). Residual effects of the Project on wildlife are included in the terrestrial wildlife chapters (Volume 5, Chapters 5 to 10).

The predicted residual effect of the Project on noise and vibration (sleep disturbance for humans) is limited to within the Project footprint, with a moderate magnitude as noise levels are predicted to exceed the criteria for sleep disturbance by less than 5 dBA, and reversible within the life span of the Project. Contingent on the implementation of mitigation measures outlined in the Noise Abatement Plan (Volume 10, Chapter 18), the significance of this residual effect is predicted to be Not Significant.

6.3 TERRESTRIAL ENVIRONMENT

As part of the scoping process the following terrestrial components were selected as VECs: vegetation and special landscape features, caribou, grizzly bear, muskox, wolverine and furbearers, migratory birds, and raptors. Geology, permafrost, and landforms and soils were considered Subjects of Note and all required information noted in the EIS guidelines is included in the FEIS.

Potential effects on terrestrial and wildlife VECs were evaluated spatially within a Local Study Area (LSA) and a larger Regional Study Area (RSA). The terrestrial LSA covered 1,344 km² and included the Goose PDA, which contain all proposed Project infrastructure for the Goose Property Area, the MLA PDA, the winter ice roads PDAs, and a buffer (1 to 1.5 km) surrounding the outer boundary of the PDAs and roads. The terrestrial RSA encompasses the LSA, and a 35 km buffer on either side of all proposed Project infrastructure and winter ice road corridors between the two PDAs and covers approximately 12,620 km². All potential Project effects were assessed during the Mobilization and Construction, Operations, Reclamation and Closure, and Post-closure Project phases, with a focus on a “worst-case” scenario approach whereby the phase or phases with the largest effect on the VEC are discussed. Where residual effects of the Project on a VEC were anticipated, a cumulative impact assessment was also conducted that evaluated the combined effects of the Back River Project with other existing and reasonably foreseeable industrial projects and human activities. Specific legislation was considered during the assessment, including the *Species at Risk Act* (SARA), the *Migratory Birds Convention Act*, and the *Nunavut Wildlife Act*.

The following presents summaries of the primary Project activities that are anticipated to interact with the terrestrial VECs, mitigation measures, and effects assessment for each terrestrial VEC.

6.3.1 Vegetation and Special Landscape Features

Potential Project effects on the VEC vegetation and special landscape features included the direct loss or degradation of vegetation or special landscape features. These potential effects were characterized by using the indicators diversity, productivity, and resiliency. The mitigation and management measures designed to eliminate or minimize potential Project effects on vegetation and special landscape features include: minimizing the Project footprint, using winter ice roads, and reducing fugitive dust where possible.

Following the application of mitigation and management measures, two residual effects were identified: vegetation loss and special landscape feature loss. These residual effects are a result of the assumption that the entire PDAs would be lost. In reality, the area of vegetation/special landscape feature loss will be much less as it will be confined to the final footprint of the Project. The magnitude of the anticipated residual effects is expected to be low, the duration long term, the frequency is once but continuous/permanent, and the residual effects would be confined to within the PDA. The residual effects were assumed to be irreversible; however there may be some recovery after closure. Contingent on the implementation of mitigation measures outlined in the Air Quality Monitoring and Management Plan (Volume 10, Chapter 17) and the Site Water Monitoring and Management Plan (Volume 10, Chapter 7), the significance of residual effects for vegetation and special landscape features is predicted to be Not Significant.

6.3.2 Caribou

Potential Project-related effects on the VEC caribou included Project activities that could alter the following indicators: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction to waste, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20) including the potential of work restrictions.

Following the application of mitigation and management measures, three residual effects were identified: habitat loss, disturbance due to noise, and reduction in reproductive productivity. The magnitude of all three of the residual effects is expected to be low, the duration medium term (confined to the life of the Project) with the exception of habitat loss within specific areas of the Project footprint which would be long term. The effects would be sporadic in nature, and confined to within the Project footprint for habitat loss, the LSA for noise disturbance, and potentially the RSA for reduction in reproductive productivity. The residual effects are also anticipated to be reversible with the exception of habitat loss within specific areas of the Project footprint. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), the significance of residual effects for caribou is predicted to be Not Significant.

6.3.3 Grizzly Bear

Potential Project-related effects on the VEC grizzly bear included Project activities that could alter the following indicators: habitat loss, disturbance due to noise (e.g., displacement from areas of habitat), disruption of movement, direct mortality and injury, indirect mortality, attraction to waste, exposure

to contaminants, and reduction in reproductive productivity. Winter ice roads were excluded from the assessment as grizzly bears are hibernating when these roads are constructed and used. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

Following the application of mitigation and management measures, four residual effects were identified: habitat loss, disturbance due to noise, attraction, and reduction in reproductive productivity. The magnitude of all four of the residual effects is expected to be low, the duration medium term (confined to the life of the Project) with the exception of habitat loss which will be long term within specific areas of the Project footprint, sporadic in nature, and confined to within the Project footprint for habitat loss and attraction, and the LSA for noise disturbance, and potentially the RSA for reduction in reproductive productivity. The residual effects are also anticipated to be reversible with the exception of habitat loss within specific areas of the Project footprint. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), the significance of residual effects for grizzly bear is predicted to be Not Significant.

6.3.4 Muskox

Potential Project-related effects on the VEC muskox included Project activities that could alter the following indicators: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction to waste, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

Following the application of mitigation and management measures, three residual effects were identified: habitat loss, disturbance due to noise, and reduction in reproductive productivity. The magnitude of all three of the residual effects is expected to be low, the duration medium term (confined to the life of the Project) with the exception of habitat loss within specific areas of the Project footprint which would be long term. The effects would be sporadic in nature, and confined to within the Project footprint for habitat loss, the LSA for noise disturbance, and potentially the RSA for reduction in reproductive productivity. The residual effects are also anticipated to be reversible with the exception of habitat loss within specific areas of the Project footprint. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), the significance of residual effects for muskox is predicted to be Not Significant.

6.3.5 Wolverine/Furbearers

Potential Project-related effects on the VEC wolverine and furbearers included Project activities that could alter the following indicators: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction to waste, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

Following the application of mitigation and management measures, four residual effects were identified for wolverine: habitat loss, disturbance due to noise, attraction, and reduction in reproductive productivity, and two residual effects were identified for wolves: habitat loss and disturbance. The magnitude of all of the residual effects for both wolverine and wolves is expected to be low, the duration medium term (confined to the life of the Project) with the exception of habitat loss within specific areas of the Project footprint which would be long term. The effects would be sporadic in nature, and confined to within the Project footprint for habitat loss and attraction, the LSA for noise disturbance, and potentially the RSA for reduction in reproductive productivity. The residual effects are also anticipated to be reversible with the possible exception of habitat loss within specific areas of the Project footprint. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), the significance of residual effects for wolverine and furbearers is predicted to be Not Significant.

6.3.6 Migratory Birds

Potential Project-related effects on the VEC migratory birds included Project activities that could alter the following indicators: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction to waste, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include minimizing the Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste and chemical handling measures to avoid attracting wildlife to wastes and contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

Following the application of mitigation and management measures, two residual effects were identified for migratory birds: habitat loss, and disturbance. The magnitude of both of the residual effects is expected to be low, the duration medium term (confined to the life of the Project) for disturbance and long term for habitat loss within specific areas of the Project footprint. The effects would be sporadic in nature, and confined to within the Project footprint for habitat loss, and to the LSA for disturbance. The residual effects are anticipated to be reversible with the exception of habitat loss within specific areas of the Project footprint. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), the significance of residual effects for migratory birds is predicted to be Not Significant.

6.3.7 Raptors

Potential Project-related effects on the VEC raptors included Project activities that could alter the following indicators: habitat loss, disturbance due to noise, disruption of movement, direct mortality and injury, indirect mortality, attraction to waste, exposure to contaminants, and reduction in reproductive productivity. Mitigation and management measures that will be in place to eliminate or minimize the potential effects include minimizing the Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste management and chemical handling measures to avoid attracting wildlife, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

Following the application of mitigation and management measures, five residual effects were identified: habitat loss, disturbance, direct mortality and injury, attraction, and reduction in reproductive productivity. The magnitude of all five of the residual effects is expected to be low, the duration medium term (confined to the life of the Project) with the exception of habitat loss which would be long term within specific areas of the Project footprint. The effects would be sporadic in nature, and confined to within the Project footprint for habitat loss and attraction, and the LSA for disturbance, direct mortality and injury, and reduction in reproductive productivity. The residual effects are also

anticipated to be reversible or reversible with effort for attraction, with the possible exception of habitat loss within specific areas of the Project footprint. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), the significance of residual effects for raptors is predicted to be Not Significant.

6.4 FRESHWATER ENVIRONMENT

As part of the scoping process the following freshwater components were selected as VECs: surface hydrology, freshwater water quality, freshwater sediment quality, freshwater fish/aquatic habitat, and freshwater fish communities. Groundwater, limnology and bathymetry were considered Subjects of Note and all required information noted in the EIS guidelines is included in the FEIS.

Potential effects on VECs were evaluated spatially within Local Study Areas (LSA) for the Goose Property and larger Regional Study Area (RSA) that contained the LSA. The Goose Property LSA covered 365 km² and included the Goose PDA and mostly followed the boundaries of the Propeller and Big watersheds. The Goose Property RSA is 6,815 km², and includes parts of the Ellice River and Back River Watersheds. All potential Project effects were assessed during the Mobilization and Construction, Operations, Reclamation and Closure, and Post-closure Project phases. Specific legislation that was considered during the assessment included the *Fisheries Act* and the *Species at Risk Act* (SARA). Canadian Council of Ministers of the Environment (CCME) water and sediment quality guidelines for the protection of freshwater aquatic life were used in the water and sediment quality assessments.

The following presents summaries of the primary Project activities that are anticipated to interact with the freshwater VECs, mitigation measures, and effects assessment for each freshwater VEC.

6.4.1 Hydrology

Potential Project effects on the hydrology VEC included site water management activities (including water withdrawal from lakes, water diversions and storage, modification of natural drainages, and lake dewatering) and winter ice road construction and maintenance. The potential effects from these activities were assessed using two indicators which were streamflows and lake volumes. The mitigation and management measures designed to eliminate or reduce the potential effects on surface hydrology included: following DFO protocols for winter water withdrawal; confinement of infrastructure to local watersheds; management of non-contact, contact, and saline water; and following DFO's measures to avoid causing harm to fish and fish habitat.

Subsequent to the application of mitigation and management measures, two residual effects were identified: alteration of streamflows, and alteration of lake volumes. The magnitude of the anticipated residual effects is expected to be low, the duration medium term (confined to the life of the Project), continuous in nature, and confined to within the PDAs or LSAs. The residual effects are also anticipated to be reversible. Contingent on the implementation of mitigation measures outlined in the Site Water Monitoring and Management Plan (Volume 10, Chapter 7), the significance of residual effects for hydrology is predicted to be Not Significant.

6.4.2 Freshwater Water Quality

Potential Project-related effects on the freshwater water quality VEC included Project activities that could alter the following indicators for water quality: pH, TSS, nutrients, metals, hydrocarbons, BOD, chlorine, and cyanide. Ten potential effects were identified for the VEC freshwater water quality as a result of the Project: construction and decommissioning activities; winter ice roads; site contact water; mine contact water; water use; quarries and borrow pits; explosives; fuels, oils, and PAH (polycyclic aromatic hydrocarbons); treated sewage discharge; and dust deposition. Mitigation and management

measures will be in place to control these pathways, and therefore minimize or eliminate potential Project effects on the freshwater water quality VEC. The Site Water Monitoring and Management Plan (Volume 10, Chapter 7) along with Project design features such as using geochemically suitable material for roads and pads will eliminate or reduce potential effects to freshwater water quality.

Following the application of mitigation and management measures, four residual effects were identified: sediment introduction to surface waters as a result of mobilization and construction, and decommissioning; water quality changes due to site contact water; water quality changes due to mine contact water; and water quality changes due to explosives. Using the thresholds identified for the key indicators, the magnitude of the anticipated residual effects is expected to be either low or medium, sporadic in nature, and confined to within the freshwater LSA. The residual effects are also anticipated to be reversible. Contingent on the implementation of mitigation measures outlined in the Site Water Monitoring and Management Plan (Volume 10, Chapter 7) and the Aquatic Effects Management Plan (AEMP; Volume 10, Chapter 19), the significance of residual effects for freshwater water quality is predicted to be Not Significant.

6.4.3 Freshwater Sediment Quality

Potential Project-related effects on the freshwater sediment quality VEC included Project activities that could alter the following indicators for sediment quality: particle size, nutrients and organic carbon, metals, and hydrocarbons. Eight potential effects were identified for the VEC freshwater sediment quality as a result of the Project: mobilization, construction, and decommissioning; site contact water; mine contact water; quarries and borrow pits; explosives; fuels, oils, and PAH; treated sewage discharge; and dust deposition. Potential effects were characterized using key indicators and quantitative thresholds for potential effects as well as experience from other Northern projects and best professional judgement. Mitigation and management measures will be in place to control these pathways, and therefore minimize or eliminate potential Project effects on the freshwater sediment quality VEC. The Site Water Monitoring and Management Plan (Volume 10, Chapter 7) along with mitigation measures to avoid erosion will eliminate or reduce potential effects to freshwater sediment quality.

Following the application of mitigation and management measures, four residual effects were identified: sediment introduction to freshwater sediments as a result of mobilization and construction, and decommissioning; sediment quality changes due to site contact water; sediment quality changes due to mine contact water; and sediment changes due to explosives. The magnitude of the anticipated residual effects is expected to be low (with the exception of *medium* magnitude for mine contact water arsenic concentrations), sporadic in nature, and confined to within the freshwater LSA. The residual effects are also anticipated to be reversible. Contingent on the implementation of mitigation measures outlined in the Site Water Monitoring and Management Plan (Volume 10, Chapter 7) and the Aquatic Effects Management Plan (AEMP; Volume 10, Chapter 19), the significance of residual effects for freshwater sediment quality is predicted to be Not Significant.

6.4.4 Freshwater Fish/Aquatic Habitat

The assessment of potential Project-related effects on freshwater fish/aquatic habitat involved the direct effects of Project activities on the physical habitat of freshwater fish. Potential indirect effects are addressed as part of the freshwater water quality and sediment quality assessments. Freshwater fish/aquatic habitat may be affected by Project activities in two ways: 1) serious harm occurring through a loss or reduction of fish habitat by permanent alteration or destruction (PAD); or 2) through changes to water and sediment quality arising from the deposition of deleterious substances. The primary mitigation measure for freshwater fish/aquatic habitat is to protect habitat necessary for life stages of freshwater fish by limiting the amount of water withdrawn from each waterbody. In addition, water will be recycled where possible to reduce the demand for water

withdrawals. Another key mitigation measure is the Project design of siting infrastructure to avoid fish bearing water and, wherever feasible, to avoid encroaching on freshwater fish habitat by adhering to a 31 m setback from all water. The waste rock storage areas have been located to avoid fish-bearing waters. Unavoidable losses of fish habitat (e.g., loss of Llama Lake due to Llama Open Pit) will be compensated through the implementation of a Fish Offsetting Plan. Therefore, no residual effects are anticipated on the VEC freshwater fish/aquatic habitat.

6.4.5 Freshwater Fish Community

Potential Project-related effects on the VEC freshwater fish community focused on the two abundant freshwater or anadromous fish species in the LSAs, Lake Trout and Arctic Grayling. The main potential Project-related effect to these species is direct mortality with subsequent decreases in population abundance. In addition to such direct effects, individual fish health and indirect mortality could be potentially affected by Project-related activities through the contamination of water or sediment, as well as through contaminants bioaccumulating in fish through trophic interactions with primary and secondary producers. A hydrodynamic model was developed in order to predict arsenic concentrations in Goose Lake and led to the conclusion that no anticipated significant adverse effects on the fish community of Goose Lake are expected. The following potential Project activities could contribute to the direct mortality and decreased population abundance of Lake Trout or Arctic Grayling: Project infrastructure (lake dewatering, winter ice roads, and Project footprint), water withdrawal, and blasting with explosives. Direct mortality of Lake Trout and Arctic Grayling is anticipated as result of lake dewatering for Project infrastructure in Llama and Umwelt lakes. Reduced population abundance of Arctic Grayling is anticipated for the population of Goose Lake as a result lost spawning and rearing habitat in its southern tributaries.

As a result of mitigation, management, and balancing all fish bearing habitat losses with the Fish Offsetting Plan, there are no residual effects anticipated on the VECs Lake Trout and Arctic Grayling. The primary mitigation measures to avoid potential effects on Lake Trout and Arctic Grayling are setting maximum limits to water withdrawal to protect sensitive fish habitat and siting Project infrastructure (WRSAs, camp, and plant site) to avoid fish bearing waters. Where direct mortality is anticipated and population abundance declines are predicted, losses to fisheries productivity will be fully compensated by establishing a Final Fisheries Offsetting Plan. The plan would be approved by DFO as a condition of the Authorization required for the development of the Back River Project.

6.5 MARINE ENVIRONMENT

As part of the scoping process, the following marine components were selected as VECs: marine water quality, marine sediment quality, marine fish/aquatic habitat, marine fish communities, seabirds/seaducks, and ringed seals. Marine physical processes were considered a Subjects of Note and all required information noted in the EIS guidelines is included in the FEIS.

Potential effects on VECs were evaluated spatially within a Local Study Area (LSA) and a larger Regional Study Area (RSA). The marine LSA covered 32 km² and included the water portion of the PDA for the MLA as well as the over-water portion of the winter ice road across Bathurst Inlet (~14 km) to the Nunavut mainland. The marine RSA covered 3,000 km² and included the marine LSA plus all of Bathurst Inlet as far north as Omingmaktok. All potential Project effects were assessed during the Mobilization and Construction, Operations, Reclamation and Closure, and Post-closure Project phases. Specific legislation that was considered during the assessment included the *Fisheries Act*, the *Species at Risk Act* (SARA), the *Migratory Birds Convention Act*, and the *Nunavut Wildlife Act*. Canadian Council of Ministers of the Environment (CCME) water and sediment quality guidelines for the protection of marine and estuarine life were used in the water and sediment quality assessments.

The following presents summaries of the primary Project activities that are anticipated to interact with the marine VECs, mitigation measures, and effects assessment for each marine VEC.

6.5.1 Marine Water Quality

Potential Project effects on the marine water quality VEC included shipping activities; sediment introduction to water as a result of mobilization and construction, and reclamation; site contact water; winter ice roads; explosives; fuels, oils, and polycyclic aromatic hydrocarbons (PAHs); treated discharges; and dust deposition. The potential effects from these activities were assessed based on their potential interaction pathways with the marine environment, including runoff, contact and physical effects (shipping), treated discharge, and aerial deposition. The mitigation and management measures designed to control these pathways, and therefore minimize or eliminate potential Project effects on the marine water quality VEC included: minimizing vessel speeds and restricting vessels to deeper waters, using geochemically suitable material for roads and pads, adhering to regulatory guidelines for treated discharges, and using best management practices for the storage, transport, and use of fuels, explosives, and hazardous materials as well as for dust suppression and incineration.

Following the application of mitigation and management measures, three residual effects were identified: marine water quality changes due to shipping (propeller wash), sediment introduction to marine waters as a result of mobilization and construction, and reclamation, and marine water quality changes due to site contact water. The magnitude of the anticipated residual effects is expected to be low, the duration short to medium term (confined to the life of the Project), sporadic in nature, and confined to within the marine LSA. The residual effects are also anticipated to be reversible. Contingent on the implementation of mitigation measures outlined in the Aquatic Effects Management Plan (AEMP; Volume 10, Chapter 19) and the Site Water Monitoring and Management Plan (Volume 10, Chapter 7), the significance of residual effects for marine water quality is predicted to be Not Significant.

6.5.2 Marine Sediment Quality

Potential Project effects on marine sediment quality shared the same pathways and mitigation and management measures as outlined for marine water quality. The primary pathways between the Project activities and the marine sediment quality VEC were identified as runoff, contact and physical effects (shipping), discharge, and aerial deposition. The same mitigation and management measures would be applied as described above in the marine water quality section.

Following the application of mitigation and management measures, three residual effects were identified: marine sediment quality changes due to shipping (propeller wash), sediment introduction to the marine environment as a result of mobilization and construction, and reclamation activities, and marine sediment quality changes due to site contact water. The magnitude of the anticipated residual effects is expected to be low, the duration short to medium term (confined to the life of the Project), sporadic in nature, and confined to within the marine LSA. The residual effects are also anticipated to be reversible. Contingent on the implementation of mitigation measures outlined in the Aquatic Effects Management Plan (AEMP; Volume 10, Chapter 19) and the Site Water Monitoring and Management Plan (Volume 10, Chapter 7), the significance of residual effects for marine sediment quality is predicted to be Not Significant.

6.5.3 Marine Fish/Aquatic Habitat

The assessment of potential Project-related effects on marine fish/aquatic habitat involved the direct effects of Project activities on the physical habitat of marine fish. Potential indirect effects are addressed as part of the marine water quality and sediment quality assessments. Project activities that have the potential to directly affect marine fish/aquatic habitat include shipping effects and the project infrastructure footprint (Lightering Barge Terminal, one water intake pipe, and one discharge pipe).

Mitigation measures to eliminate or reduce potential effects to the marine fish/aquatic habitat include limiting the amount of in-water construction, following DFO's Measures to Avoid Causing Harm to Fish and Fish Habitat, enforcing speed limits for ships navigating through the RSA, and implementing measures to eliminate or reduce potential effects to water quality and sediment quality. Following the application of mitigation and management measures, two residual effects were identified: effect on Marine Fish/Aquatic Habitat due to the in-water footprint of the Lightering Barge Terminal; and effect due to the in-water footprint of the construction of the intake and discharge pipes. The magnitude of the anticipated residual effects are expected to be negligible, the duration medium term (confined to the life of the Project), sporadic in nature, and confined to the footprint of the works. The residual effects will be immediately reversible due to recolonization of benthic invertebrates requiring no intervention. The probability of these residual effects occurring is likely; however, they are predicted to be Not Significant.

6.5.4 Marine Fish Community

Potential Project effects on the VEC marine fish community focused on Arctic Char and include potential direct mortality from in-water construction of pipes and the barge terminal, population effects from introduced species carried by ballast water, vessel propeller wash, and underwater noise from shipping activities. Mitigation measures to eliminate or reduce potential effects to the marine fish community include limiting the amount of in-water construction, eliminating ballast water exchange, and enforcing speed limits for ships navigating through the RSA.

Following the application of mitigation and management measures, one residual effect was identified: effects of shipping noise on marine Arctic Char populations. The magnitude of the anticipated residual effect is expected to be low, the duration medium term (confined to the life of the Project), sporadic in nature (3 to 5 ships per open-water season, depending on the Project phase), and confined to the marine RSA. The residual effect will be reversible as it will end when shipping associated with the Project ends. Contingent on the implementation of mitigation measures outlined in the Aquatic Effects Management Plan (AEMP; Volume 10, Chapter 19), the Shipping Plan (Volume 10, Chapter 15), and the Noise Abatement Plan (Volume 10, Chapter 18), the significance of the residual effect for marine fish communities as assessed for Arctic Char is predicted to be Not Significant.

6.5.5 Seabirds and Seaducks

Two types of Project-related activities were evaluated for potential effects to the VEC seabirds and seaducks, including shipping and Construction and Operation activities at the MLA. Mitigation measures have been implemented to minimize or eliminate the effects of the Project on seabirds and seaducks. For example, the seabird and seaduck staging areas identified during the baseline surveys were included in Project design to avoid these sensitive habitats. These areas will be avoided by developing pre-determined flight paths, when possible, to provide horizontal and vertical buffer distances from staging birds. A flight altitude of 650 m will also be maintained above known staging areas where it is safe to do so. Aircraft landing and take-offs will avoid staging areas for the safety of humans and wildlife.

Consideration of the mitigation and management activities planned to reduce potential Project effects on seabirds and seaducks resulted in the identification of two residual effects after mitigation: disturbance (e.g., noise) and reduced reproductive productivity. These residual effects were expected to be of moderate to low magnitude, of medium duration (confined to the life of the Project), sporadic in nature, confined to within the marine RSA, and reversible. The residual effects were rated as Not Significant, contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Management Plan (Volume 10, Chapter 20).

6.5.6 Ringed Seals

Two types of Project-related activities were evaluated for potential effects to the VEC ringed seals, including shipping and Construction and Operation activities at the MLA (e.g., aircraft and traffic on winter ice roads that overlap marine areas). Mitigation measures will be implemented to minimize or eliminate the effects of the Project on ringed seals. Shipping for the Project will be conducted during the open-water periods only when ringed seal density in the marine LSA and RSA is anticipated to be very low. Activities occurring at the MLA are expected to be during the open-water shipping period and during the winter when the winter ice roads are operational (December through March). These time periods correspond to periods when seals are not in the vicinity of the LSA or southern RSA (south of Kingaok). Therefore, the Project is not predicted to result in any residual effects on ringed seals.

6.6 HUMAN ENVIRONMENT

As part of the scoping process, the following human environment components were selected as VSECs: archaeological sites, economic development, business opportunities, employment, education and training, health and community well-being, non-traditional land and resource use, subsistence economy and land use, and country foods. Paleontological sites, human health risk assessment, and environmental risk assessment were considered Subjects of Note and all required information noted in the EIS guidelines is included in the FEIS.

Potential effects on VSECs were evaluated spatially within a Local Study Area (LSA) and a larger Regional Study Area (RSA). LSAs and RSAs are separately defined for archaeology, socio-economics, land use, and country foods. For archaeology, the LSA consisted of a 5 km buffer around all Project infrastructure, and the RSA was the same as the terrestrial RSA. For socio-economics, the LSA consisted of west Kitikmeot region communities, and the RSA was expanded to include eastern Kitikmeot communities and Yellowknife. For land use, the LSA consisted of a 5 km buffer around Project infrastructure and the RSA was the combined area of the terrestrial and marine RSAs. For country foods, the LSA was the maximum boundary of the atmospheric and terrestrial LSA, and the RSA was the combined boundary of the terrestrial and marine RSA. All potential Project effects were assessed during the Mobilization and Construction, Operations, Reclamation and Closure, and Post-closure Project phases.

The following presents summaries of the primary Project activities that are anticipated to interact with the human environment VSECs, mitigation measures, and effects assessment for each VSEC.

6.6.1 Archaeology

Potential Project-related effects on the VSEC archaeological sites included the disturbance of archaeological sites. During construction, Project activities that could have potential effects on archaeological sites include: clearing and grading for roads and pipeline rights-of-way; clearing, grading, and excavation for foundations and building footings; earth moving and blasting for mine construction; and tailing and waste rock deposition. Residual effects are anticipated to sites located within 50 m of the site infrastructure and the road rights-of-way. These sites have a high probability of being directly affected from disturbance due to ground altering activity by construction. Archaeological sites between 50 m and 1,000 m from Project developments have the potential to be indirectly affected during construction and operations through increased human presence in the area.

There are 170 known archaeological sites within the LSA. There are 64 sites in the LSA within 1,000 m of Project developments that may be impacted either directly or indirectly by the Project. Of the 64 sites within 1,000 m 38 are between 150 m and 1,000 m and are considered to be at low risk of indirect impacts during construction and operations. There are five sites between 50 and 150 m from Project developments and are considered to be at moderate risk of indirect impact through increase human

presence during construction and operations. The 21 archaeological sites within 50 m of Project developments are considered to be at high risk of direct impact during construction.

Typically, site avoidance through Project design is the recommended management option and the Project has been designed to minimize effects on archaeological sites. Archaeological site locations were considered during Project design and where possible were avoided. The use of temporary winter ice roads further limits potential effects to archaeological sites by reducing overland traffic. However, where avoidance is not possible, mitigation of archaeological sites will be conducted prior to construction activities. Any archaeological sites not previously recorded that are discovered during construction, operations, and closure will be inspected by the Project archaeologist, documented, and reported to the Government of Nunavut, Department of Culture and Heritage using the “Chance Find Procedure”. These sites will be subject to the same level of management and mitigation afforded to the currently known archaeological sites outlined above.

With avoidance and/or mitigation implemented, residual effects on known archaeological sites are anticipated to be Not Significant.

6.6.2 Socio-economics

The assessment of potential effects of the Project on socio-economics considers five VSECs: 1) economic development; 2) business opportunities; 3) employment; 4) education and training; and 5) health and community well-being. A total of 10 potential effects were identified, resulting in seven positive residual effects, two negative residual effects, and one effect with both positive and negative residual effects. Positive residual effects were described but were not evaluated for significance or carried in to potential cumulative or transboundary effects assessment. Negative residual effects were further evaluated for determination of significance, and were also included in potential cumulative and transboundary effects assessments.

Economic Development

Project activities have the potential to result in positive changes to economic growth, diversity, and performance. The economic impacts of the Project are a result of direct procurement and workforce employment, which are expected to also have indirect and induced effects to employment, personal income, GDP, and government revenues. The Business Development Plan and Human Resources Plan detail enhancement measures that together aim to increase the benefits of the Project on local and regional development (see Volume 10, Chapters 24 and 28). Benefits will be enhanced through experience with the Project, support for local Inuit and northern businesses, capacity building, and community investment.

Overall, increases to economic diversity are anticipated as a result of the Project and are characterized by: increased local employment, increased incomes, and spending; Project-related expenditures (locally, regionally) with existing businesses located in the Kitikmeot and across Nunavut, increasing the financial resources available to existing businesses; the addition of new businesses or expansion of existing businesses within the Kitikmeot Region that provide goods or services previously unavailable; and/or the development of, or additional investment in, Inuit-owned businesses. Increased economic growth, diversity, and performance are expected to have a positive residual effect on the VSEC economic development. As the residual effect was determined to be positive, the effect was not carried through for further cumulative or transboundary assessment.

Business Opportunities

The Project has the potential to result in changes in the growth and diversity of Inuit and northern businesses. This effect is defined as the potential for new businesses and the ability of existing

businesses to expand or diversify and as a result of local Project procurement and the expenditure of Project-related income of workers. Measures to enhance business opportunities are detailed in the Business Development Plan (Volume 10, Chapter 24).

Project activities that are anticipated to promote growth and diversity among Inuit and northern businesses include: provision of contract and sub-contract opportunities, specifically the procurement of goods and services from local suppliers; and contribution to personal incomes, increasing the purchasing power of local residents. The expected increase in local business activity itself is expected to bring about an increase in capital investment (e.g., investment in the expansion of businesses or the creation of new businesses) in anticipation of the Project. Local businesses will be presented with opportunities to bid on Project work, facilitated by the Project through mitigation and management measures established to maximize the benefits of contracting opportunities and the local sourcing of goods and services. Changes to the growth and diversity of Inuit and northern business are anticipated to have a positive residual effect on the VSEC business opportunities. As the residual effect was determined to be positive, the effect was not carried through for further cumulative or transboundary assessment.

Employment

The Project is expected to affect the VSEC employment through: 1) changes to employment and income levels; 2) changes to the capacity of the labour force; and 3) changes to competition for local labour. Mitigation and management measures that focus on training, recruitment, and retention have been developed to enhance the participation of local Inuit in Project employment and are detailed in the Human Resources Plan (Volume 10, Chapter 28). The strategies to enhance Project effects on employment include: a Labour Relations Strategy; a Preferential Recruitment Strategy; a Workforce Training Strategy; and a Workforce Transition Strategy. The targeted recruiting of Inuit employees is expected to reduce the higher than average unemployment rates. The Project will also inform local businesses, organizations, and hamlets of their hiring requirements and procurement practices in advance of the implementation of Construction and Operation and will collaborate to reduce any adverse effects of increased competition for local labour.

Overall, the employment and income effects of the Project are highly beneficial and have the potential to enable increased standards of living for Kitikmeot families. Direct Project employment and procurement are expected to increase the capacity of the labour force, specifically the skills and experience of Kitikmeot workers. Increased capacity is predicted to lower unemployment rates, promote economic growth, and enhance ability of the regional workforce to support future projects. Changes in income and employment levels, as well as changes in the capacity of the labour force, are anticipated to have positive residual effects on the VSEC employment.

Direct Project employment and procurement may cause negative changes to local competition for labour. That is, the Project creates the potential for individuals currently employed in the Kitikmeot Region to leave their current employment for mine-related employment. However, most Kitikmeot residents employed elsewhere are not expected to leave their current employment to obtain work with the Project. The Project also serves to increase the skills and experience of the local labour force, over time increasing the availability for local employers. In sum, the residual effect of changes to competition for local labour is assessed as being of low magnitude and limited to the socio-economic LSA communities. The duration was determined as medium term (confined to the life of the Project), the equity neutral, and the frequency sporadic. Finally, the effect is determined to be reversible, and a moderate probability and medium confidence are provided. The residual effect is rated as Not Significant.

Education and Training

The potential effects of the Project on education and training include changes to the demand for education and training, and changes to youth attitudes and behaviours toward education and training. Sabina expects to partner with local governments, educational institutions, Inuit organizations, and other mine proponents to contribute to the creation of a regional training facility or additional mine employment training programs at the Nunavut Arctic College. Further discussion of community investment is provided in the Community Involvement Plan (Volume 10, Chapter 26). The Workforce Training Strategy, as defined in the Human Resources Plan (Volume 10, Chapter 28), specifies actions to enhance the benefits of Project employment within the local communities by developing strategic partnerships; contributing to local programs and training initiatives; providing in-house training and career development; employment of an Inuit Employment and Training Coordinator; and engaging youth through mentorship programs.

In sum, changes to the demand for education and training, as well as changes in youth attitudes toward education and training, are predicted to have positive residual effects on the VSEC education and training. The assessment concluded that the Project would have positive effects on the VSEC education and training.

Health and Community Well-being

The effects of the Project on Health and CWB are anticipated to be both positive and negative and include: changes to the life skills of those employed with the Project; changes to individual and family spending; and changes to family/household function. Engagement in economic productive work, the management of finances, and responsibility associated with employment are expected to assist with or support decision making and increase life skills. Enhancement measures have been developed to promote the retention of positive Project effects locally including those aimed to increase the number of Inuit employed (e.g., EFAP, financial management counselling) as detailed in the Human Resources Plan (Volume 10, Chapter 28).

The Project is anticipated to increase the life skills of individuals who obtain Project-related employment, resulting in a residual positive effect on the VSEC Health and CWB.

Both positive and negative residual effects are predicted on Health and CWB due to changes to individual and family spending. Should local residents that obtain employment with the Project choose to spend their increased incomes unproductively (e.g., on gambling, drugs, and alcohol) and engage in negative social behaviours, this will have a negative effect on CWB. However, income used to improve standards of living (e.g., improvements to housing, food security) coupled with the other numerous positive effects associated with Project employment have the potential to result in substantial increases to CWB. Changes to individual and family spending, whether negative or positive, were determined as moderate in magnitude, short to medium term in duration and neutral in equity. This residual effect was expected to occur mainly within the socio-economic LSA but may extend to the RSA. This residual effect is reversible and has a sporadic frequency. Overall, negative changes to individual and family spending are determined to be Not Significant. This finding is moderately probable and is supported by a medium level of confidence. Overall, changes to family and household structure are expected to result in a negative residual effect. The magnitude of this negative residual effect is considered low as it is estimated to affect a relatively small number of households. The residual effect is reversible, medium term in duration, continuous in frequency, and neutral in equity. The geographic extent of this residual effect is expected to remain within the LSA but may extend to the RSA. Overall, negative changes to family and household structure are determined to be Not Significant. This finding is moderately probable and is supported by a high level of confidence.

6.6.3 Land Use

The assessment of potential effects of the Project on land use considers two VSECs: 1) non-traditional land and resource use; and 2) subsistence economy and land use. A total of three potential effects were identified acting on the second VSEC, and one potential effect was identified acting on the first VSEC. All of the potential effects were identified as negative residual effects. Negative residual effects were further evaluated for determination of significance.

Non-traditional Land and Resource Use

The only interaction between the Project and non-traditional land and resource use is predicted for ecotourism activities potentially affected by: changes in access to land and resources; changes to the experience of the natural environment; and changes to the abundance and distribution of resources. More specifically, there is one operator, the Bathurst Inlet Lodge, known to sometimes use an area adjacent to the Marine Laydown Area (MLA) within the land use LSA, as well as other areas within the RSA, during the summer season. There are several best practice management and mitigation measures in place which serve to reduce potential adverse effects of the Project, while maximizing the potentially beneficial outcomes as they relate to non-traditional land and resource. The management and mitigation measures can be found in both built-in Project design components, as well as specific additional measures that were developed based upon identified needs. Mitigation has been identified as it specifically applies to noise and vibration, and air quality in the Noise Abatement Mitigation and Monitoring Program, within the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), as well as the Air Quality Monitoring and Management Plan (Volume 10, Chapter 17).

The effects assessment identified one residual adverse effect of the Project on the VSEC non-traditional land and resource. This residual effect is predicted to be geographically limited to the land use LSA, primarily in the vicinity of the MLA, and be low in magnitude affecting a small number of users with currently very limited use. This residual effect is characterized as medium-term in duration (confined to the life of the Project), sporadic in frequency, and is reversible with effort. Finally, geographic extent is limited to Project footprint but extends to areas within the northern portion of the land use LSA. Overall, this residual effect is rated as Not Significant and likely to occur. A high level of confidence is provided.

Subsistence Economy and Land Use

Subsistence economy and land use is potentially affected by: changes in access to land and resources; changes to the experience of the natural environment; and changes to the abundance and distribution of resources. There are several management and mitigation measures in place which serve to mitigate impacts to the subsistence economy, including mitigation by Project design, best practice management measures, and monitoring. Subsistence land use activities will also be facilitated through the provision of the worker rotation schedule, fly-in/fly-out Project operation, and support of land users and the development of land use knowledge. Mitigation has been identified as it specifically applies to noise and vibration, and air quality in the Noise Abatement Mitigation and Monitoring Program within the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20) and the Air Quality Monitoring and Management Plan (Volume 10, Chapter 17). Ongoing communication with local individuals and communities will be facilitated by regular public meetings and meeting with the Cambridge Bay and Kugluktuk Community Advisory Groups (CAGs). Feedback will be obtained from mine employees, local land users, the community HTOs and hamlets, as well as from the CAGs themselves in order to provide ongoing updates and make adjustments to management practices as needed.

After the implementation of mitigation and management measures, three residual effects on the VSEC economy and land use were identified: changes in access to land and resources, changes to the

experience of the natural environment, and changes to the abundance and distribution of resources. The residual effects are anticipated to be moderate in magnitude, and reversible. Each residual effect is expected to be of medium term (confined to the life of the Project) and will be confined to either the Project footprint or the LSA. Overall, the negative residual effects on the VSEC subsistence economy and land use are rated as Not Significant, likely to occur and a high level of confidence is provided. In addition, the benefits of the Project may serve to maintain traditional subsistence land use to a greater extent than would be possible without the economic growth and employment income associated with the Project.

6.6.4 Country Foods

Country foods are animals, plants, and fungi used by humans for nutritional or medicinal purposes that are harvested through hunting, fishing, or gathering of vegetation (Health Canada 2010). These foods are an important part of a healthy diet, have medicinal qualities, and are of high cultural and traditional importance. People obtaining country foods by hunting, trapping, and collecting berries, mushrooms, and medicinal plants from the country foods LSA, and by fishing inside and downstream of the country foods LSA can be affected by the quality of the country foods they consume.

The quality of country foods is directly related to the quality of the surrounding environmental media (e.g., soil, water, and vegetation). Chemicals accumulated from the environment may be present in the edible tissue portions of the country foods consumed by people. The potential for adverse effects in human consumers due to chemicals present in country foods depends on the concentration of the chemical, which type and portion of the country food is eaten (e.g., roots or leaves, muscle tissue or liver), life stage of the consumer (e.g., toddler or adult), quantity of food consumed, and frequency of consumption.

There are no permanent residents living in the country foods LSA; however, some seasonal and temporary use of the area does occur (see Land Use, Volume 8, Chapter 4). Inuit whose main food source is from harvesting country foods are potentially occasional users of the area (even though the area is infrequently used) and, therefore, are the focus of the assessment.

There are a number of Contaminants of Potential Concern (COPCs) that may be present in the country foods LSA during the life of the Project including compounds used in mineral processing, chemicals found in treated sewage effluent or blasting residues, and fuels. In addition, by-products of combustion such as PAHs, dioxins, and furans may also be present due to the operation of vehicles or incinerators. These potential contaminants were assessed and potential effects were characterized in a qualitative manner taking into consideration mitigation and management strategies, and using best professional judgment. Metals occur naturally in the country foods LSA, sometimes at concentrations exceeding guideline limits (particularly in soil), due to natural physical and geological processes. Because the proposed Project is a metal mine and metal concentrations in the environment are most likely to change as a result of Project development, metals were selected for quantitative evaluation of their potential to affect the quality of country foods. Extensive mitigation and management measures will be in place to minimize or eliminate potential effects on environmental media (air, water, sediment, soil, and vegetation) and country foods themselves (fish and wildlife). These are detailed in Volume 4 (Atmospheric Environment), Volume 5 (Terrestrial Environment), Volume 6 (Freshwater Environment), Volume 7 (Marine Environment), and Volume 10 (Management Plans).

Based on the country foods baseline screening level assessment results, consumption of country foods from the country foods LSA were shown to not present health risks from the selected COPCs to local human consumers under baseline conditions. Based on the qualitative and quantitative results of the effects assessment, the quality of country foods is not expected to change substantially from baseline

conditions. No residual effects were identified and no health effects to human consumers of country foods are expected as a result of the Project activities or infrastructure during any phase of the Project. The overall effect of the Project on the VEC country foods is Not Significant.

6.7 TRANSBOUNDARY POTENTIAL EFFECTS

One of the NIRB's 10 minimum EIS requirements is to include a transboundary impact analysis. The requirement states that "where relevant, an EIS must include an assessment of all significant adverse ecosystemic or socio-economic transboundary effects." There have been no significant residual effects identified for the Project. However, all non-significant residual effects were subjected to a transboundary analysis. The following sections provide a summary of the transboundary analyses.

6.7.1 Atmospheric Environment

For the VECs air quality and noise/vibration, residual effects will be a localized phenomenon. As the Project residual effects were confined to the air quality LSA or Project footprint, which reside entirely within Nunavut, there were no potential for transboundary effects.

6.7.2 Terrestrial Environment

For the VEC vegetation and special landscape features, the Project residual effects were confined to the PDAs which reside entirely within Nunavut, so there was no potential for transboundary effects.

For the VEC caribou, the cumulative effects assessment spatial boundary included a portion of the Northwest Territories for both the Bathurst herd and the Beverly herd. The geographical boundary used for the potential cumulative effects assessment was based on the post-calving and summer seasonal ranges of the Bathurst herd and the summer and winter ranges of the Beverly herd. As such, the potential transboundary effects are accounted for in the cumulative effects assessment and are predicted to be Not Significant. Please refer to Chapter 8 of this volume for a summary of the caribou cumulative effects assessment, or to Volume 5 Chapter 5 for the detailed assessment.

For the VEC grizzly bear, the cumulative effects assessment spatial boundary included a portion of the Northwest Territories for grizzly bears and is anticipated to be the largest area that any one grizzly bear may be able to interact with the Project. As such, the potential transboundary effects are accounted for in the cumulative effects assessment and are predicted to be Not Significant.

For the VEC muskox, the cumulative effects assessment spatial boundary included a portion of the Northwest Territories for muskox and is anticipated to include the largest straight line distance that a muskox may be able to interact with the Project. As such, the potential transboundary effects are accounted for in the cumulative effects assessment and are predicted to be Not Significant.

For the VEC wolverine, wolverine that may interact with the Project are not anticipated to travel into the Northwest Territories, thus transboundary effects for wolverine are not anticipated. The cumulative effects assessment spatial boundary for wolves included a portion of the Northwest Territories. As such, the potential transboundary effects are accounted for in the cumulative effects assessment and are predicted to be Not Significant.

For the VEC migratory birds, the zone of influence of Project-related effects on migratory birds is expected to be limited to within the Project PDAs. As the PDAs reside entirely within Nunavut, there was no potential for transboundary effects.

For the VEC raptors, the zone of influence of Project-related residual effects on raptors is expected to be limited to within a 12 km radius from the Project infrastructure which corresponds to the maximum

expected home range of breeding raptors. This geographical area resides entirely within Nunavut, and therefore no potential transboundary effects are expected.

6.7.3 Freshwater Environment

For the VECs surface hydrology, freshwater water quality, sediment quality, and fish community, residual effects are predicted to be confined to within the freshwater LSA. As the freshwater LSA resides entirely within Nunavut, there were no potential for transboundary effects.

For the VEC freshwater fish/aquatic habitat, no residual effects are anticipated as a result of the Project, and therefore there are no Project-related effects that could have transboundary effects.

6.7.4 Marine Environment

For the VECs marine water quality, sediment quality, and fish community, residual effects are predicted to be confined to within the marine LSA. As the marine LSA resides entirely within Nunavut, there were no potential for transboundary effects.

For the VEC marine fish/aquatic habitat, no residual effects are anticipated as a result of the Project, and therefore there are no Project-related effects that could have transboundary effects.

For the VEC seabirds/seaducks, the Project residual effects were confined to the marine RSA, which resides entirely within Nunavut. Therefore there was no potential for transboundary effects.

For the VEC ringed seals, no residual effects are anticipated as a result of the Project, and therefore there are no Project-related effects that could have transboundary effects.

6.7.5 Human Environment

For the VSEC archaeological sites, due to the spatially localized nature of archaeological sites there are no transboundary effects from the Project.

For socio-economics, the VSECs economic development, business opportunities, and education/training all had positive Project-related residual effects. Positive residual effects were not included in a potential cumulative effects assessment or transboundary analysis.

For the socio-economic VSEC employment, the predicted residual adverse effect was further assessed as part of the potential cumulative effects assessment (CEA). The geographic boundary for the CEA was expanded to include those projects and human activities in the Kitikmeot and NWT considered to have potential effects within the socio-economic RSA that are relevant to current residents. The residual cumulative effect was determined as unlikely and Not Significant with a medium level of confidence. As this residual cumulative effect is unlikely, the potential transboundary implications are negligible. Special consideration was given to potential transboundary effects to employment and businesses within the socio-economic RSA. The transboundary effects assessment concluded that competition for local labour is not expected to be substantial outside the Kitikmeot Region but is rather anticipated to provide desired employment. The transboundary effects of the Project were determined as positive and therefore not further characterized.

For the socio-economic VSEC health and community well-being, the residual effects of the Project are expected to be most relevant to small northern communities. Both Project-related residual effects are expected to be negligible outside the Kitikmeot Region. Special consideration was given to potential transboundary effects to health systems in the NWT as a result of Project reliance on medical services. The Project is not expected to have transboundary effects on the health system in the NWT due to the

fly-in/fly-out operation of the Project and the provision of required medical services at the Project site. Project employees are expected to continue to utilize health services in their home communities and will have access to health services at the Project site as required. Only in emergency situations would NWT health services be utilized.

For the land use VSEC non-traditional land and resource use, a potential cumulative effects assessment (CEA) was conducted because a negative residual Project effect was predicted. The geographic boundary for the land use CEA was expanded to include those projects and human activities in the western Kitikmeot considered to have potential effects within the land use RSA that are relevant to current land use activities. Overall, this residual cumulative effect is rated as Not Significant. The residual cumulative effects of the Project on non-traditional land use do not extend beyond the boundaries of the Nunavut Settlement Area (NSA) and therefore, cannot result in transboundary effects.

For the land use VSEC subsistence economy and land use, a potential cumulative effects assessment was conducted because negative residual Project effects were predicted. As noted earlier, the geographic boundary for the land use CEA was expanded to include those projects and human activities in the western Kitikmeot considered to have potential effects within the land use RSA that are relevant to current land use activities. Overall, the three residual cumulative effects are each rated as Not Significant and likely to occur. Kitikmeot region land users did not report travel outside the NSA for the purpose of subsistence harvesting. As a result, the Project is not expected to result in transboundary effects on subsistence land users.

For the VSEC country foods, no residual effects were identified and no health effects to human consumers of country foods are expected as a result of the Project activities or infrastructure during any phase of the Project. As there are no anticipated Project residual effects, there are no potential transboundary effects.

6.8 SUMMARY OF RESIDUAL EFFECTS AND SIGNIFICANCE

Table 6.8-1 provides a summary of all of the identified Project-related residual effects on the VECs and VSECs. There have been no significant residual effects identified as a result of the proposed Back River Project.

Table 6.8-1. Summary of Project-related Residual Effects and Significance

Description of Residual Effect	Significance Criteria			Likelihood of Occurrence			Overall Significance Rating		
	Direction	Magnitude	Duration	Frequency	Geographic Extent	Reversibility	Probability	Confidence	Significance
Air Quality									
TSP	Negative	Moderate	Medium	Continuous	Local	Reversible	Likely	High	Not Significant
PM ₁₀	Negative	Moderate	Medium	Continuous	Local	Reversible	Likely	High	Not Significant
SO ₂	Negative	Moderate	Medium	Continuous	Local	Reversible	Likely	High	Not Significant
NO ₂	Negative	Moderate	Medium	Continuous	Local	Reversible	Likely	High	Not Significant
CO	Negative	Moderate	Medium	Continuous	Local	Reversible	Likely	High	Not Significant
PM _{2.5}	Negative	Moderate	Medium	Continuous	Local	Reversible	Likely	High	Not Significant
Noise and Vibration									
Increased Noise Levels at Onsite Human Receptors	Negative	Moderate	Medium	Sporadic	Project Footprint	Reversible	Likely	High	Not Significant
Vegetation and Special Landscape Features									
Vegetation Loss	Negative	Low	Long	Once	Footprint	Irreversible	Likely	Medium	Not Significant
Special Landscape Feature Loss	Negative	Low	Long	Once	Footprint	Irreversible	Likely	Medium	Not Significant
Caribou									
Habitat Loss	Negative	Low	Long	Sporadic	Footprint	Irreversible	Likely	Medium	Not Significant
Disturbance due to Noise	Negative	Low	Medium	Sporadic	Local	Reversible	Likely	High	Not Significant
Reduction in Reproductive Productivity	Negative	Low	Medium	Sporadic	Regional	Reversible	Unlikely	Medium	Not Significant
Grizzly Bear									
Habitat Loss	Negative	Low	Long	Sporadic	Footprint	Irreversible	Likely	Medium	Not Significant
Disturbance due to Noise	Negative	Low	Medium	Sporadic	Local	Reversible	Likely	High	Not Significant
Attraction	Negative	Low	Medium	Sporadic	Footprint	Reversible	Moderate	Medium	Not Significant
Reduction in Reproductive Productivity	Negative	Low	Medium	Continuous	Regional	Reversible	Unlikely	Medium	Not Significant
Muskox									
Habitat Loss	Negative	Low	Long	Sporadic	Footprint	Irreversible	Likely	Medium	Not Significant
Disturbance due to Noise	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	Medium	Not Significant
Reduction in Reproductive Productivity	Negative	Low	Medium	Sporadic	Regional	Reversible	Unlikely	Medium	Not Significant
Wolverine and Furbearers									
Habitat Loss (Wolverine)	Negative	Low	Long	Sporadic	Footprint	Irreversible	Likely	Medium	Not Significant
Habitat Loss (Grey Wolf)	Negative	Low	Long	Sporadic	Footprint	Irreversible	Likely	Medium	Not Significant

(continued)

Table 6.8-1. Summary of Project-related Residual Effects and Significance (continued)

Description of Residual Effect	Significance Criteria			Likelihood of Occurrence			Overall Significance Rating		
	Direction	Magnitude	Duration	Frequency	Geographic Extent	Reversibility	Probability	Confidence	Significance
Wolverine and Furbearers (cont'd)									
Habitat Loss (Wolverine)	Negative	Low	Long	Sporadic	Footprint	Irreversible	Likely	Medium	Not Significant
Habitat Loss (Grey Wolf)	Negative	Low	Long	Sporadic	Footprint	Irreversible	Likely	Medium	Not Significant
Disturbance due to Noise (Wolverine)	Negative	Low	Medium	Sporadic	Local	Reversible	Likely	High	Not Significant
Disturbance due to Noise (Grey Wolf)	Negative	Low	Medium	Sporadic	Local	Reversible	Likely	High	Not Significant
Attraction (Wolverine)	Negative	Low	Medium	Sporadic	Footprint	Reversible	Moderate	Medium	Not Significant
Reduction in Reproductive Productivity (Wolverine)	Negative	Low	Medium	Sporadic	Regional	Reversible	Unlikely	Medium	Not Significant
Upland Birds and Waterbirds									
Habitat Loss	Negative	Low	Long	Sporadic	Footprint	Irreversible	Likely	High	Not Significant
Disturbance due to Noise	Negative	Low	Medium	Sporadic	Local	Reversible	Likely	High	Not Significant
Raptors									
Habitat Loss	Negative	Low	Long	Sporadic	Footprint	Irreversible	Likely	High	Not Significant
Disturbance due to Noise	Negative	Low	Medium	Sporadic	Local	Reversible	Likely	High	Not Significant
Direct Mortality and Injury	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Attraction	Negative	Low	Medium	Sporadic	Footprint	Reversible with Effort	Likely	High	Not Significant
Reduction in Reproductive Productivity	Negative	Low	Medium	Sporadic	Local	Reversible	Unlikely	High	Not Significant
Surface Hydrology									
Change in streamflows	Negative	Low	Medium	Continuous	Local	Reversible	Likely	High	Not Significant
Change in lake volumes	Negative	Low	Medium	Continuous	Footprint	Reversible	Likely	High	Not Significant
Freshwater Water Quality									
Water Quality changes due to mobilization and construction, and decommissioning	Negative	Low	Short	Sporadic	Local	Reversible	Moderate	Medium	Not Significant
Water Quality changes due to Site Contact Water	Negative	Low	Short	Sporadic	Local	Reversible	Moderate	Medium	Not Significant
Water Quality changes due to Mine Contact Water	Negative	Low to moderate	Short to Medium	Sporadic	Local	Reversible	High	High	Not Significant
Water Quality changes due to explosives	Negative	Moderate	Short	Sporadic	Local	Reversible	High	High	Not Significant

(continued)

Table 6.8-1. Summary of Project-related Residual Effects and Significance (continued)

Description of Residual Effect	Significance Criteria			Likelihood of Occurrence			Overall Significance Rating		
	Direction	Magnitude	Duration	Frequency	Geographic Extent	Reversibility	Probability	Confidence	Significance
Freshwater Sediment Quality									
Sediment Quality changes due to mobilization and construction, and decommissioning	Negative	Low	Short	Sporadic	Local	Reversible	Moderate	Medium	Not Significant
Sediment Quality changes due to Site Contact Water	Negative	Low	Short	Sporadic	Local	Reversible	Moderate	Medium	Not Significant
Sediment Quality changes due to Mine Contact Water	Negative	Low to moderate	Short to long	Sporadic	Local	Partially Reversible	Moderate	Medium	Not Significant
Sediment Quality changes due to explosives	Negative	Low	Short	Sporadic	Local	Reversible	Moderate	Medium	Not Significant
Marine Water Quality									
Water Quality changes due to Shipping - Propeller Wash	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Water Quality changes due to mobilization and construction, and decommissioning	Negative	Low	Short	Sporadic	Local	Reversible	Moderate	Moderate	Not Significant
Water Quality changes due to Site Contact Water	Negative	Moderate	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Marine Sediment Quality									
Sediment Quality changes due to Shipping - Propeller Wash	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Sediment Quality changes due to mobilization and construction, and decommissioning	Negative	Low	Short	Sporadic	Local	Reversible	Moderate	Moderate	Not Significant
Sediment Quality changes due to Site Contact Water	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	Moderate	Not Significant
Marine Fish/Aquatic Habitat									
Habitat loss due to in-water footprint of Lightering Barge Terminal	Negative	Negligible	Medium	Sporadic	Footprint	Reversible	Likely	High	Not Significant
Habitat loss due to in-water footprint of intake and discharge pipes	Negative	Negligible	Short	Once	Footprint	Reversible	Likely	High	Not Significant

(continued)

Table 6.8-1. Summary of Project-related Residual Effects and Significance (completed)

Description of Residual Effect	Significance Criteria			Likelihood of Occurrence			Overall Significance Rating		
	Direction	Magnitude	Duration	Frequency	Geographic Extent	Reversibility	Probability	Confidence	Significance
Marine Fish Community (Arctic Char)									
Direct Mortality and Population Abundance: Shipping Noise	Negative	Low	Short	Sporadic	Regional	Reversible	Moderate	Medium	Not Significant
Seabirds and Seaducks									
Disturbance due to Noise	Negative	Moderate	Medium	Sporadic	Regional	Reversible	Likely	High	Not Significant
Reduction in Reproductive Productivity	Negative	Low	Medium	Sporadic	Regional	Reversible	Unlikely	Medium	Not Significant
Archaeology									
Impact to Known Archaeological Sites	Negative	Low	Long	Once	Local	Irreversible	High	High	Not Significant
Impact to Unknown Archaeological Sites	Negative	Low	Long	Once	Local	Irreversible	Low	Medium	Not Significant
Socio-economics									
Changes to Competition for Local Labour (Employment)	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	Medium	Not Significant
Changes to Individual and Family Spending (Community Well-being)	Positive/ Negative	Low	Long	Continuous	Local/ Regional	Reversible	Moderate	Medium	Not Significant
Changes to Family and Household Structure (Community Well-being)	Negative	Low	Medium	Continuous	Local/ Regional	Reversible	Moderate	High	Not Significant
Land Use									
Changes to the Experience of the Natural Environment (Non-traditional Land and Resource Use)	Negative	Moderate	Medium	Sporadic	Local/ Footprint	Reversible with Effort	Likely	High	Not Significant
Changes in Access to Land and Resources (Subsistence Economy and Land Use)	Negative	Moderate	Medium	Sporadic	Local/ Footprint	Reversible with Effort	Likely	High	Not Significant
Changes to the Experience of the Natural Environment (Subsistence Economy and Land Use)	Negative	Moderate	Medium	Sporadic	Local/ Footprint	Reversible with Effort	Likely	High	Not Significant
Changes to Abundance and Distribution of Resources (Subsistence Economy and Land Use)	Negative	Moderate	Medium	Sporadic	Local	Reversible with Effort	Likely	High	Not Significant

7. Mitigation and Adaptive Management

7. Mitigation and Adaptive Management

This chapter provides an overview of the mitigation and adaptive management measures proposed as a result of the Project components interfacing with the environment, and the results of effects assessments, and regulatory requirements.

The FEIS supporting Volumes 4 through 8 provide assessments of each major component of the environment by VEC/VSEC, including social/environmental context, baseline setting, potential effects of the proposed Project (i.e., changes to the environment) and mitigation measures designed to avoid or minimize changes.

The assessments presented in these volumes include an evaluation of the effectiveness of proposed mitigation measures, together with an assessment of the risk of mitigation failure and the potential severity of the consequences, where relevant. In the event that significant uncertainty is identified or if a residual risk remains, the Volume 10 management plans outline details regarding further mitigation measures, contingency plans, and the management and monitoring proposed to ensure that problems with the effectiveness of mitigation measures are detected as soon as practically possible.

Mitigation is a means of eliminating, reducing or controlling the Project's potential adverse environmental or social effects, including compensation for any damage to the environment caused by such effects through replacement, restoration, offset or other means. Mitigation measures such as avoidance, minimization, refinement, and offset were applied as part of Project design or as a means of eliminating or reducing potential negative effects to VECs and VSECs.

Avoidance was one of the key mitigation measures utilized in the design of the proposed Project. Examples of this mitigation measure are locating as much infrastructure as practical (e.g. WRSAs) away from fish-bearing waters to avoid adversely affecting fish habitat and the aquatic environment.

Mitigation measures and corrective and preventative actions will be implemented by mine operations and/or contractors with support from Sabina environmental personnel. This could include the evaluation of measures in place and updates to operational procedures. Communication will be maintained with Inuit organizations, authorizing agencies and the general public in describing any observed adverse effect and required corrective actions.

Sabina will employ a cyclical feedback loop where operations are planned and implemented, by monitoring data and adopting practices that can be adjusted to promptly reduce or eliminate any observed negative effects throughout the life of the Project. Continual use of this iterative process will allow adaptive management decisions to be made on a constant basis, and shall lead to improvements to the environmental and socio-economic management system, as necessary over time.

A table listing the individual monitoring and management plans for various aspects, components, and phases of the Project is included in the Environmental Management Plan (Volume 10, Chapter 1). Each ensuing plan in the volume will assess the likely effectiveness of mitigation measures and associated follow-up mechanisms for adaptive management, including, where appropriate, a risk assessment of those economic or other conditions that might impair the implementation or effectiveness of proposed mitigation or management strategies. These plans also outline how results from monitoring will be used to refine or modify the design and implementation of mitigation measures and operating procedures, and how monitoring results might be included in potential improvements to the implementation of the various components of the Project.

The initial design of monitoring and management plans, data analysis, reporting and integration of results into operational procedures will be carried out by Sabina. This may lead to changes to meet the requirements of other organizations. Sabina will incorporate design elements such as:

- the VECs and VSECs to be monitored, and applicable criteria/thresholds and regulations, including, if relevant, the obligations imposed on contractors by the environmental provisions of their contracts;
- discussion of actions to be taken in case of non-compliance with the law or regulations;
- description of how the efficiency of mitigation measures will be evaluated;
- description of the frequency, duration, and geographic extent of monitoring with justification for each, and identification of personnel who will conduct the collection, analyse and interpretation of data;
- proposed actions in the event that observed results (impacts) differ from those predicted;
- proposed reporting scheme for monitoring results, including format, reporting intervals, and responsible territorial and federal authorities;
- identification of organizations to communicate results of monitoring efforts: Inuit organizations, institutes of public government, territorial and federal authorities; and
- plans for integration of monitoring results with other aspects of the Project, including adjustments of procedures and refinement of mitigation measures.

Sabina plans to use adaptive management measures to address unanticipated adverse environmental effects. Adaptive management is expected to be a valuable tool, if established during the planning phase, for monitoring Project effects and for making adjustments in order to continuously improve and ensure the Project functions as predicted. It is an effective strategy for situations where there is uncertainty with respect to the predicted effects of the Project on the environment.

Monitoring is the fundamental tool in adaptive management that will provide Sabina and evaluators with the information needed to implement change and strive for continuous improvement. Thus monitoring and management are inseparable components to effective adaptive management.

At this stage, the strategy will require further refinement and its development will proceed with the permitting phase of the Project. Monitoring programs developed for the Project will be part of adaptive management.

An example of an adaptive management strategy is provided below for the Fish Offsetting Plan and the water quality monitoring portion of the proposed Aquatic Effects Monitoring Program. Both plans include specific monitoring provisions. Part of these monitoring provisions may include the following:

- measuring the condition of the system with selected indicators (e.g., numbers, size and health of fish populations; water quality in external receiving bodies);
- identification of goals and setting performance criteria and standards (target numbers of fish in compensation habitat; water quality at or below predetermined thresholds);
- development of monitoring plans with adequate detection limits (temporal and spatial coverage) to identify deficiencies; and
- evaluating root causes and the extent of deficiencies to make decisions on what actions to take: do nothing, implement corrective actions, or change the goal.

Should monitoring show or suggest that levels are increasing, adaptive management will include an “alert” level which could reflect a particular parameter is within certain percentage of the guideline level. The alert level could be tied to more monitoring and an “action level” would be declared if the level were to approach another percentage of the guideline. The action level would initiate corrective actions which might include treatment and/or transferring captured seepage. This scenario is presented in a preliminary context only, but it is intended to illustrate how adaptive management would be implemented to address uncertainty and manage Project effects to acceptable levels.

The concept of alert and action levels could be applied to the following:

- predicted water quality in external receiving waterbodies and tributaries;
- success of habitat offsetting programs;
- survival, growth and health of fish in monitoring sites;
- trophic status and capability of target lakes to support and sustain populations; and
- other Project components not just those related to environmental receptors.

As part of an adaptive management process, the Environmental Management Plan (EMP) fully supports changes and updates by providing regular review of the adequacy of the Environment Policy, Monitoring Programs and Operational Controls in light of concerns or other outcomes. Environmental Management System (EMS) elements in the EMP can then be updated as needed based on results, and associated training programs can then be enhanced to improve the level of environmental protection. In this way, continual improvement of the Project EMS and mitigation programs will be realized.

Sabina has provided information on technically and economically feasible measures to mitigate potentially adverse environmental and social effects of the Project. The following sections provide summaries of these measures applicable to the relevant VECs and VSECs.

7.1 ATMOSPHERIC ENVIRONMENT

7.1.1 Air Quality

The main mitigation measures in place to eliminate or reduce potential effects to the VEC air quality include: energy efficiency measures, measures to reduce fuel use, the use of water or dust suppression fluids to reduce dust from unpaved roads, transported material and equipment in the crushing facility, and the use of emission control systems such as wet scrubbers, baghouses, and filters.

7.1.2 Noise and Vibration

The main mitigation measures that will be in place to eliminate or reduce potential effects to the VEC noise and vibration include: ensuring equipment is fitted with appropriate mufflers and silencers, limiting activities such as blasting and take-off and landing of aircraft to certain times of the day, and housing stationary sources in building or using enclosures, berms, acoustic screening and shrouding.

7.2 TERRESTRIAL ENVIRONMENT

7.2.1 Vegetation and Special Landscape Features

The main mitigation measures to eliminate or reduce potential effects to the VEC vegetation and special landscape features include: minimizing the Project footprint, using winter ice roads, and reducing fugitive dust where possible.

7.2.2 Caribou

The main mitigation measures to eliminate or reduce potential effects to the VEC caribou include: minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

7.2.3 Grizzly Bear

The main mitigation measures to eliminate or reduce potential effects to the VEC grizzly bear include: minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

7.2.4 Muskox

The main mitigation measures to eliminate or reduce potential effects to the VEC muskox include: minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

7.2.5 Wolverine/Furbearers

The main mitigation measures to eliminate or reduce potential effects to the VEC wolverine/furbearers include: minimization of Project footprint, noise abatement measures, speed control measures, the use of winter ice roads only, waste management and chemical handling measures to avoid attracting wildlife to waste and avoid exposure to contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

7.2.6 Migratory Birds

The main mitigation measures to eliminate or reduce potential effects to the VEC migratory birds include: minimizing the Project footprint, noise abatement measures, fixed wing and helicopter management, waste and chemical handling measures to avoid attracting wildlife to wastes and contaminants, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

7.2.7 Raptors

The main mitigation measures to eliminate or reduce potential effects to the VEC raptors include: minimizing the Project footprint, noise abatement measures, fixed wing and helicopter management, management and chemical handling measures to avoid attracting wildlife, and the implementation of the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

7.3 FRESHWATER ENVIRONMENT

7.3.1 Hydrology

The main mitigation measures to eliminate or reduce potential effects to the VEC hydrology include: the design of maximum water use volumes for key waterbodies in order to protect critical fish habitat, following DFO protocols for winter water withdrawal, confinement of infrastructure to local watersheds, and following winter ice road construction measures to avoid causing harm to fish and fish habitat.

7.3.2 Freshwater Water Quality

The main mitigation measures to eliminate or reduce potential effects to the VEC freshwater water quality include: intercepting runoff and diverting the water to appropriate facilities, siting infrastructure on appropriate base material to limit permeability, using geochemically suitable material for roads and pads, adhering to regulatory guidelines for treated discharges, using best management practices for the storage, transport, and use of fuels, explosives, and hazardous materials, using best management practices for dust suppression and incineration, recycle and reuse water where possible, and the implementation of the Site Water Monitoring and Management Plan (Volume 10, Chapter 7) and Aquatic Effects Management Plan (Volume 10, Chapter 19).

7.3.3 Freshwater Sediment Quality

The main mitigation measures to eliminate or reduce potential effects to the VEC freshwater sediment quality include: intercepting runoff and diverting the water to the appropriate facilities, siting infrastructure on appropriate base material to limit permeability, discharge outlets will be fitted with diffusers or be located in areas not subject to erosion from outflows, adhering to regulatory guidelines for treated discharges, using best management practices for the storage, transport, and use of fuels, explosives, and hazardous materials, using best management practices for sediment and erosion control, recycle and reuse water where possible, and the implementation of the Site Water Monitoring and Management Plan (Volume 10, Chapter 7) and Aquatic Effects Management Plan (Volume 10, Chapter 19).

7.3.4 Freshwater Fish/Aquatic Habitat

The main mitigation measures to eliminate or reduce potential effects to the VEC freshwater fish/aquatic habitat include: the Project design of siting infrastructure to avoid freshwater fish habitat wherever feasible (the waste rock storage areas have been located to avoid fish-bearing waters), the establishment of maximum water volume uses which have been based on protecting critical life stages of fish in Goose, and Big lakes, and the compensation for unavoidable losses to fish habitat (e.g., loss of Llama Lake due to Llama Open Pit) through the implementation of a Fish Offsetting Plan (Volume 10, Chapter 21) and Aquatic Effects Management Plan (Volume 10, Chapter 19).

7.3.5 Freshwater Fish Community

The main mitigation measures to eliminate or reduce potential effects to the VEC freshwater fish community include: the Project design of siting infrastructure to avoid freshwater fish habitat wherever feasible (the waste rock storage areas have been located to avoid fish-bearing waters), the installation of fish screens meeting DFO specifications on intake pipe, the establishment of maximum water volume uses which have been based on protecting critical life stages of fish in Goose Lake and Big Lake, and the compensation of unavoidable losses of the freshwater fish species Lake Trout and Arctic Grayling (e.g., loss of Llama Lake due to Llama Open Pit) through the implementation of a Fish Offsetting Plan (Volume 10, Chapter 21) and Aquatic Effects Management Plan (Volume 10, Chapter 19).

7.4 MARINE ENVIRONMENT

7.4.1 Marine Water Quality

The main mitigation measures to eliminate or reduce potential effects to the VEC marine water quality include: minimizing vessel speeds and restricting vessels to deeper waters, using geochemically suitable material for roads and pads, adhering to regulatory guidelines for treated discharges, using best management practices for the storage, transport, and use of fuels, explosives, and hazardous materials, using best management practices for dust suppression and incineration, and the implementation of the Site Water Monitoring and Management Plan (Volume 10, Chapter 7) and Aquatic Effects Management Plan (Volume 10, Chapter 19).

7.4.2 Marine Sediment Quality

The main mitigation measures to eliminate or reduce potential effects to the VEC marine sediment quality include: minimizing vessel speeds and restricting vessels to deeper waters, adhering to regulatory guidelines for treated discharges, using best management practices for the storage, transport, and use of fuels, explosives, and hazardous materials, using best management practices for sediment and erosion control, and the implementation of the Site Water Monitoring and Management Plan (Volume 10, Chapter 7) and Aquatic Effects Management Plan (Volume 10, Chapter 19).

7.4.3 Marine Fish/Aquatic Habitat

The main mitigation measures in place to eliminate or reduce potential effects to the VEC marine fish/aquatic habitat include: minimizing the in-water footprint temporally (e.g., the Lightering Barge Terminal is in place only in summer), and minimizing the in-water footprint spatially (no permanent in-water structure associated with the barge terminal), and applying measures to protect water quality and sediment quality.

7.4.4 Marine Fish Community

The main mitigation measures to eliminate or reduce potential effects to the VEC marine fish community include: mitigation measures for water quality and sediment quality, minimizing permanent in-water construction, eliminating ballast water exchange, enforcing speed limits for ships navigating through the RSA, implementing in-water works timing restrictions during spawning migration periods and measures in the Aquatic Effects Management Plan (Volume 10, Chapter 19).

7.4.5 Seabirds and Seaducks

The main mitigation measures to eliminate or reduce potential effects to the VEC seabirds/seaducks include: the avoidance of sensitive seabird and seaduck staging areas in Project design, the avoidance of disturbing these sensitive staging areas by developing pre-determined flight paths, when possible, to provide horizontal and vertical buffer distances from staging birds, a flight altitude of 650 m will also be maintained above known staging areas where it is safe to do so, and aircraft landing and take-offs will avoid staging areas for the safety of humans and wildlife. These specific mitigation and management measures can be found throughout the Project design and in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

7.4.6 Ringed Seals

The main mitigation measures to eliminate or reduce potential effects to the VEC ringed seals include: avoidance of interactions with ringed seals by having shipping occur during the open-water periods only (approximately July to October) when ringed seal density in the marine LSA and RSA is anticipated to be very low; avoidance of interactions with ringed seals as the MLA is expected to be active (December through March) during periods when seals are not in the vicinity of the marine LSA or southern RSA (south of Kingoak). These specific mitigation and management measures can be found throughout the Project design and in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20).

7.5 HUMAN ENVIRONMENT

7.5.1 Archaeology

The main mitigation measures to eliminate or reduce potential effects to the VSEC archaeological sites include: site avoidance through Project design, the use of winter ice roads which reduces overland traffic, mitigation of archaeological sites prior to construction activities if sites are identified as being potentially at risk, and the use of the “Chance Find Procedure” for any sites that may be encountered

that are currently unknown. These specific mitigation and management measures can be found in the Cultural and Heritage Resources Protection Plan (Volume 10, Chapter 27)

7.5.2 Socio-economics

7.5.2.1 Employment

The main mitigation measures to enhance potential effects to the VSEC employment include: a Labour Relations Strategy; a Preferential Recruitment Strategy; a Workforce Training Strategy; and a Workforce Transition Strategy. The targeted recruiting of Inuit employees is expected to reduce the higher than average unemployment rates. The Project will also inform local businesses, organizations, and hamlets of their hiring requirements and procurement practices in advance of the implementation of Construction and Operation and will collaborate to reduce any adverse effects of increased competition for local labour. These specific mitigation and management measures can be found in the Human Resources Plan (Volume 10, Chapter 28).

7.5.2.2 Health and Community Well-being

The main mitigation measures that will be in place to enhance potential effects to the VSEC health and community well-being include: measures aimed to increase the number of Inuit employed (e.g., employee and family assistance program (EFAP), financial management counselling) as detailed in the Business Development Plan (Volume 10, Chapter 24), the Community Involvement Plan (Volume 10, Chapter 26), and the Human Resources Plan (Volume 10, Chapter 28).

7.5.3 Land Use

7.5.3.1 Non-traditional Land and Resource Use

The main mitigation measures to eliminate or reduce potential effects to the VSEC non-traditional land and resource use include: measures designed to eliminate or reduce potential effects to resources such as wildlife and fish. These specific mitigation and management measures can be found in the Air Quality Monitoring and Management Plan (Volume 10, Chapter 17), Noise Abatement Mitigation and Monitoring Program within the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), Site Water Monitoring and Management Plan (Volume 10, Chapter 7), and Aquatic Effects Management Plan (Volume 10, Chapter 19).

7.5.3.2 Subsistence Economy and Land Use

The main mitigation measures to eliminate or reduce potential effects to the VSEC subsistence economic and land use include: the provision of the worker rotation schedule, fly-in/fly-out Project operation, support of land users and the development of land use knowledge, ongoing communication with local individuals and communities by regular public meetings and meeting with the Cambridge Bay and Kugluktuk Community Advisory Groups (CAGs), obtaining feedback from mine employees, local land users, the community HTOs and hamlets, as well as from the CAGs themselves in order to provide ongoing updates and make adjustments to management practices as needed, and mitigation and management measures designed to eliminate or reduce potential effects to resources such as wildlife and fish. These specific mitigation and management measures can be found in the Air Quality Monitoring and Management Plan (Volume 10, Chapter 17), Noise Abatement Mitigation and Monitoring Program within the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), Site Water Monitoring and Management Plan (Volume 10, Chapter 7), and Aquatic Effects Management Plan (Volume 10, Chapter 19).

7.5.4 Country Foods

The main mitigation measures to eliminate or reduce potential effects to the VSEC country foods include: mitigation and management measures to minimize or eliminate potential effects on environmental media (air, water, sediment, soil, and vegetation) and country foods themselves (fish and wildlife). These mitigation measures are detailed in the Air Quality Monitoring and Management Plan (Volume 10, Chapter 17), the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20), Site Water Monitoring and Management Plan (Volume 10, Chapter 7), and Aquatic Effects Management Plan (Volume 10, Chapter 19).

8. Potential Cumulative Effects Assessment

8. Potential Cumulative Effects Assessment

This chapter provides an overview of the methodology used for the potential cumulative effects assessment (CEA) and presents summaries of the results of the cumulative effects assessments conducted for all Valued Ecosystem Components (VECs) and Valued Socio-economic Components (VSECs). The cumulative effects assessments conducted were consistent with the requirements of Section 12.5.2 of the Nunavut Land Claim Agreement (NLCA) and Section 7.11 of the Nunavut Impact Review Board (NIRB) final *Guidelines for the Preparation of an Environmental Impact Statement* (EIS guidelines [NIRB 2013]) for the Project.

The potential for cumulative effects to occur arises when the residual effects of a project affect (i.e., overlap and interact with) the same resource/receptor (VECs and VSECs) that is affected by the residual effects of *other* past, existing or reasonably foreseeable projects or activities.

As per the final EIS guidelines, consideration was given to the following factors when conducting the CEA:

- a larger spatial boundary (RSA rather than LSA);
- a longer temporal scale;
- alternatives analysis;
- consideration of effects on VECs and VSECs; and
- evaluation of significance.

Potential cumulative effects assessments were conducted for each VEC or VSEC that had an identified Project-related residual effect. There were no significant Project-related residual effects identified (see Chapter 6 of this Main Volume), but all non-significant Project-related residual effects were subjected to a potential cumulative effects assessment. The details of all of the assessments can be found in the VEC and VSEC chapters in Supporting Volumes 4 through 8 (Volume 4: Atmospheric Environment; Volume 5: Terrestrial Environment; Volume 6: Freshwater Environment; Volume 7: Marine Environment; and Volume 8: Human Environment).

8.1 METHODOLOGY OVERVIEW

Similar to the Project-related effects assessment methodology, the CEA followed the same steps:

- establish the scope of the CEA, including which past, present, and reasonably foreseeable projects to include, and setting the assessment boundaries;
- identify potential interactions with the Project residual effects and potential residual effects from other past, present, and reasonably foreseeable projects within the assessment boundaries;
- characterize the potential cumulative effects;
- identify mitigation and management measures to eliminate or reduce potential cumulative effects;
- characterize residual cumulative effects (those effects predicted to remain after the application of mitigation and management measures); and
- determine the significance of residual cumulative effects.

Table 8.1-1 presents the past, present, and reasonably foreseeable projects that were considered for the CEA. The spatial boundaries were determined individually for each VEC or VSEC, and consisted of that VEC/VSEC's regional study area (RSA) or a larger geographical boundary (e.g. home range of a wildlife species). The same attributes used to characterize and assess Project-related effects were used for potential and residual cumulative effects. The overall significance rating of any residual cumulative effects was determined using the same methods as for the Project-related residual effects.

An additional aspect of the cumulative effects assessment included considering the future with and without the Back River Project as follows:

- **Future case without the Project** - A consideration of residual effects from all other past, existing, and future projects and activities *without* the Back River Project. This analysis is designed to answer the following question: given the current status of baseline conditions (which already reflects effects from past and existing projects), how significantly will VECs/VSECs be affected by the residual effects from other reasonably foreseeable projects and activities in the absence of the Back River Project?
- **Future case with the Project** - A consideration of all residual effects from past, existing, and future projects and activities *with* the Back River Project. This scenario is designed to answer the question: when combined with other project and activities, does the Back River Project serve to act as a trigger that pushes a VEC/VSEC beyond critical conditions thereby being responsible for creating a significant, adverse cumulative residual effect?

Only potential cumulative effects for the Future case with the Project are characterized and assessed using the same criteria applied in the Project-related effect assessment methodology: direction, magnitude, duration, frequency, geographic extent, reversibility, probability of occurrence, and confidence in the analyses and conclusions. Areas where insufficient data are available to provide an assessment are highlighted, with the potential cumulative effects being described as uncertain in these instances. Using a weight of evidence and relative ranking approach, combined with best professional judgment, any cumulative residual effects were characterized as either significant (S), not significant (N), or positive (P). The evaluation of significance was completed by comparing residual cumulative effects against thresholds, standards, trends or objectives relevant to the VEC/VSEC as defined in each assessment chapter.

8.2 ATMOSPHERIC ENVIRONMENT

8.2.1 Air Quality

A potential cumulative effects assessment was conducted because residual Project effects to air quality were predicted. The Project residual air quality effects are a localized phenomenon confined to, or close to, the atmospheric LSA. There are no reasonably foreseeable projects within the atmospheric LSA and hence there were no projects that could interact with the Back River Project air quality residual effects. No cumulative effects on the VEC air quality are anticipated.

8.2.2 Noise and Vibration

A potential cumulative effects assessment was conducted because a residual Project effect was predicted. The Project residual effect is a localized phenomenon confined to the Project footprint. There are no reasonably foreseeable projects within the Potential Development Area (PDA) or atmospheric LSA and hence there were no projects that could interact with the Back River Project noise residual effect. No cumulative effects on the VEC noise and vibration are anticipated.

Table 8.1-1. Past, Existing, and Reasonably Foreseeable Future Projects with the Potential to Interact with the Back River Project

Phase	Location	Project	Development Type	Company /Organization	Location / Coordinates	Distance to Goose Property	Description	Operational Period	Status
Past	Nunavut	Lupin	Gold mine	Elgin Mining	65°46'N; 111°15'W	226 km	Underground mine and mill, tailings containment	1982 to 2005	Surface infrastructure remains in place - potential for this to be used if the Ulu deposit is developed.
	Nunavut	Jericho	Diamond mine	Shear Diamonds Ltd.	65°59'N; 111°28'W	238 km	Former diamond mine located 255 km SSE of Kugluktuk	2006 to 2008	Currently in care and maintenance. All work on project has been halted.
	Nunavut	Roberts Bay and Ida Bay	Silver mine	Quantum Murray LP	68°10'45"N; 106°33'20"W	321 km	Mine openings, equipment, waste rock and tailings pond	1973 to 1975	Remediation work being coordinated by AANDC. Expected to be complete by 2010
	Northwest Territories	Tundra	Gold mine	Indian and Northern Affairs Canada	64°11'N; 111°33'W	290 km	Underground mine workings, mill, tailings containment	1964 to 1968; re-opened briefly in 1990s	Care and maintenance. Remediation plan is being developed.
	Northwest Territories	Salmita	Gold mine	Giant Yellowknife Mines Limited	64°36'N; 114°21'W	297 km	Underground mine workings	1984 to 1989	Remediated.
Existing	Nunavut	Doris North (Hope Bay Belt)	Gold mine	TMAC Resources	68°09'N; 106°40'W	279 km	Airstrip, accommodation buildings, dock for shipping, tailings facility. Assume 3 one-way trips/year for marine traffic.	Mine site construction 2009 to 2011	Currently in care and maintenance
	Northwest Territories	EKATI	Diamond mine	Dominion Diamond Ekati Corporation (Dominion Diamonds, Chuck Fipke and Stu Blusson)	64°44'N	226 km	Canada's first and largest diamond mine, 310 km. NE of Yellowknife. Open pit and underground. Mine life to 2019. Workforce approximately 1,500.	1998 to 2020; pending extension to 2031 with Jay Project	EKATI Mine is expected to operate until 2020. In 2015, owner Dominion Diamond Corp. is in an environmental review process regarding the potential development of the Jay open pit mining operation, which would supply ore to the existing process plant for approximately 11 years beyond the current projected closure (i.e., until 2031).
	Northwest Territories	Diavik	Diamond mine	Rio Tinto and Dominion Diamonds	64°30'N; 110°20'W	211 km	Canada's largest diamond producer, 300 km NE of Yellowknife. Mine life to 2023. Became all underground mine in 2012. Workforce approximately 1,000.	2003 to 2025	Currently operating
	Northwest Territories	Snap Lake	Diamond mine	De Beers Canada Inc.	63°35'N; 111°15'W	310 km	Canada's first all underground diamond mine. 220 kilometres NE of Yellowknife. Mine life to 2028. Workforce approximately 750.	22 year mine life; 2005 to 2030	Currently operating
Future	Nunavut	George Project	Gold, Silver	Sabina Gold & Silver Corp.	65°55'17"N; 107°27'33"W	60 km	Proposed open pit and underground mining for 4 known deposits. Ore would be transported and processed at Goose Property 60 km to the southeast. Would include waste rock storage, camp for ~200 people, all-weather airstrip. Winter road access and resupply via Bathurst Inlet are included in the Back River Project (Goose Property/MLA/winter roads). Note that marine traffic estimates are included in Back River Project.	estimated < 10 year mine life	Was included in the Back River Project DEIS. Has been removed from the FEIS and is considered a potential future project. No estimated timelines available.
	Nunavut	Bathurst Inlet Port and Road	All-weather road and port facilities (Bathurst Inlet)	BIPR Company	66°50'N; 108°2'W to 65°40'N; 110°40'W	75 km	211 km all-weather road; port facilities for 50,000 tonne ice-vessels and barges. Assume 12 one-way trips/year for marine traffic.	Construction expected to begin in 2017. Operation for 20 years	In NIRB process: updated DEIS to be submitted some time in the future. Project currently on hold.
	Nunavut	Hackett River	Base metal mine; ~25 km spur road to BIPR road	GlencoreXstrata	65°55'N; 108°30'W	94 km	Proposed open pit mine. One of largest undeveloped VMS massive sulphide deposits in the world. 104 km SSW of Bathurst Inlet.Access road from BIPR; estimated construction jobs: 900; estimated mine jobs: 500. Assume 20 one-way trips/year for marine traffic.	estimated 15 year mine life	Pre-feasibility and environmental baseline studies; DEIS submission currently on hold.
	Nunavut	Hope Bay Belt (Phase 2)	Gold Mine-Extension of Doris North Gold Mine	TMAC Resources	68°09'N; 106°40'W	279 km	Proposed gold mines 130 m S of Cambridge Bay; covers the majority of the Hope Bay Greenstone Belt. Estimated mine jobs: 300. Assume 3 one-way trips/year for marine traffic.	~15 years of operation	Project Description submitted 2011; DEIS guidelines issued 2012; TMAC entered into MOU with DIA, March 14, 2013; On October 22, 2015, TMAC notified NIRB that it intends to submit a DEIS for the Phase 2 Hope Bay Belt Project in Q3-2016.
	Nunavut	Izok Corridor Project (with High Lake & Hood River deposits)	Copper, Zinc, Gold, Silver	MMG Resources Inc.	65°27'N; 115°5'W (Izok Lake); 67°22'46"N; 110°50'39"W (High Lake); 67°48'19"N; 110°52'9"W (Dock)	288 km (to Izok Mine and High Lake Mine); 309 km (to Grays Bay Port)	High Lake is 1710 Hectare, copper-zinc-silver-gold property; 190 km ESE of Kugluktuk. Izok is high-grade zinc-copper-lead-silver deposit, 255 km SW of Kugluktuk. Estimated construction jobs: 1,140. Estimated mine jobs: 710. Assume 32 one-way trips/year for marine traffic.	Estimated 14 + years mine life; 7-10 years of closure and reclamation	Feasibility study initiated in 2012; NIRB process suspended while Project Description updated; MMG is examine alternative designs to reduce costs, add value, and improve economic viability of the project, and will provide a revised project description to BIPR by December 2013. Project currently on hold.
	Nunavut	Canadian High Arctic Research Station (CHARS)	Arctic science and technology research	Aboriginal Affairs and Northern Development Canada (Government of Canada)	69°7'1.153"N; 105°4'11.132"W	403 km	Proposed world-class research station in Canada's Arctic. To be located in Cambridge Bay. Estimated science and technology program jobs: 33 full-time, up to 150 seasonal. Assume 5 one-way trips/year for marine traffic.	Design and construction 2011 - 2017. Operations 2017 and onwards	Research station under construction from 2014 to 2017; operating 2017 onward.
	Northwest Territories	Gaucha Kué	Diamond mine	De Beers and Mountain Province	63°30'N; 109°30'W	257 km	Proposed open-pit diamond mine approximately 180 km ENE of Yellowknife, NT. Estimated mine jobs: 360	Estimated 11 year mine life.	Construction started in 2014 and the mine will begin operating in the second half of 2016.
	Northwest Territories	Courageous Lake (Tundra)	Gold mine	Seabridge Gold	64°11'N	290 km	Proposed open pit mine 240 km northeast of Yellowknife. 6.5 million oz. proven and probable reserves. (Positive Preliminary Feasibility Study July 2012)	Prefeasibility	Advanced exploration project; preliminary feasibility study completed in 2012. No immediate development plans are evident.

8.3 TERRESTRIAL ENVIRONMENT

8.3.1 Vegetation and Special Landscape Features

A potential cumulative effects assessment was conducted on vegetation and special landscape features because residual Project effects were predicted (loss within the Project footprint). The reasonably foreseeable Hackett River Project, George Property exploration and mine development, and Bathurst Inlet Port and Road (BIPR) Project would each have spatial and/or temporal overlap with the terrestrial RSA. In addition to the Project residual effect of vegetation loss within the PDAs, approximately 400 hectares of cumulative nibbling loss within the terrestrial RSA could result from development of infrastructure and roads associated with the proposed Hackett River Project, George Property, and BIPR Project. For both effects (vegetation loss and special landscape feature loss), the magnitude of the anticipated cumulative effect is expected to be low (less than 1% of the RSA), the duration long term, the frequency is once but continuous/permanent, and the cumulative effect would be confined to within the project footprints of each project. The significance of the residual cumulative effects for the VEC vegetation and special landscape features is predicted to be Not Significant.

8.3.2 Caribou

A potential cumulative effects assessment was conducted on caribou because residual Project effects were predicted (habitat loss, disturbance, reduction in reproductive productivity). The geographical boundary used for the potential cumulative effects assessment was based on the post-calving and summer seasonal ranges of the Bathurst herd and the summer and winter ranges of the Beverly herd, and included areas within Nunavut and the Northwest Territories. As outlined in the EIS guidelines (NIRB 2013), the Minister of Aboriginal Affairs and Northern Development Canada highlighted the importance of the Bathurst herd caribou in the region and identified the need to conduct a cumulative effects assessment for this herd (letter dated December 17, 2012). There were 10 possible projects (including 4 potential future projects) that could act cumulatively with Project residual effects within the Bathurst herd cumulative assessment area, and multiple possible projects that could act cumulatively with Project residual effects within the Beverly herd cumulative assessment area.

In order to support the potential cumulative effects assessment for caribou, a broad-scale Resource Selection Function model was developed for the Bathurst caribou herd on their post-calving and summer ranges. Results of this model were used to determine where caribou are typically found in their ranges, and what types of habitat they use while on these ranges. The model was also used to derive habitat quality ratings for vegetation to determine the extent of cumulative habitat loss and disturbance to Bathurst caribou on their foraging ranges and the remaining predicted condition of these foraging areas, which have been linked to over-winter calf survival. The magnitude of all three of the residual cumulative effects on both caribou herds is expected to be low, the duration medium term (confined to the life of the Project) with the exception of habitat loss within specific areas of the project footprint, sporadic in nature, confined to local areas for habitat loss and noise disturbance, and potentially the cumulative study area for reduction in reproductive productivity. The residual cumulative effects are also anticipated to be reversible with the possible exception of habitat loss within specific areas of the project footprint. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20) and assuming similar measures for future projects, the significance of residual cumulative effects on caribou is predicted to be Not Significant.

8.3.3 Grizzly Bear

A potential cumulative effects assessment was conducted on grizzly bears because residual Project effects were predicted (habitat loss, disturbance due to noise, attraction, reduction in reproductive productivity). The geographical boundary used for the potential cumulative effects assessment was

based on a buffer around Project infrastructure using the diameter of the largest area within which a grizzly bear can range and still interact with the Back River Project, and included areas within Nunavut and the Northwest Territories. There are eleven potential projects (including four potential future projects) that could act cumulatively with Project residual effects within the cumulative assessment area. The magnitude of all four residual cumulative Project effects on grizzly bears in the cumulative effects boundary is low, the duration medium term (confined to the life of the Project) with the exception of habitat loss within specific areas of the project footprint, sporadic in nature, confined to the local areas for habitat loss and noise disturbance, and potentially the cumulative study area for reduction in reproductive productivity. The residual cumulative effects are anticipated to be reversible with the possible exception of habitat loss within specific areas of the project footprints. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20) and assuming similar measures for future projects, the significance of residual cumulative effects for grizzly bears is predicted to be Not Significant.

8.3.4 Muskox

A potential cumulative effects assessment was conducted for muskox because residual Project effects were predicted (habitat loss, disturbance due to noise, reduction in reproductive productivity). The geographical boundary used for the potential cumulative effects assessment was based on a diameter around the Project using the longest straight line distance travelled by a radio-collared muskox in the west Kitikmeot region and included areas in both Nunavut and the Northwest Territories. There were 12 possible projects (including five potential future projects) that could act cumulatively with Project residual effects within the muskox cumulative effects assessment area. The magnitude of all three of the residual cumulative effects on muskox is expected to be low, the duration medium term (confined to the life of the Project) with the exception of habitat loss within specific areas of the project footprints, sporadic in nature, confined to local areas for habitat loss and noise disturbance, and potentially the cumulative study area for reduction in reproductive productivity. The residual cumulative effects are anticipated to be reversible with the exception of habitat loss within specific areas of the project footprints. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan (Volume 10, Chapter 20) and assuming similar measures for future projects, the significance of cumulative effects for muskox is predicted to be Not Significant.

8.3.5 Wolverine/Furbearers

A potential cumulative effects assessment was conducted because residual Project effects were predicted (habitat loss, disturbance due to noise, attraction, reduction in reproductive productivity). The geographical boundary used for the potential cumulative effects assessment was based on the movement distances defined for wolverine and wolves that interact with the Project. For wolverine this area was identical to the RSA, but also included a buffer around the TCWR connector. For wolves, this area represents the summer ranges of the Bathurst and Beverly caribou herds as wolves follow caribou for prey when they occur within range of the Project. This spatial boundary included areas in Nunavut and the Northwest Territories. There were four possible projects (including two potential future projects) that could act cumulatively with Project residual effects within the wolverine cumulative effects assessment area, and fifteen possible projects (including six potential future projects) that could act cumulatively with Project residual effects within the wolf cumulative effects assessment area. The magnitude of all residual cumulative effects on wolverine and furbearers is expected to be low, the duration medium term (confined to the life of the Project) with the exception of habitat loss within specific areas of the project footprints, sporadic in nature, confined to local areas for habitat loss, disturbance, and attraction, and potentially the cumulative study area for habitat loss and the reduction in reproductive productivity for wolverine. The residual cumulative effects are anticipated to be reversible with the exception of habitat loss within specific areas of the project footprints. Contingent on the implementation of mitigation measures outlined in the Wildlife Mitigation and Monitoring Plan

(Volume 10, Chapter 20) and assuming similar measures for future projects, the significance of cumulative effects for wolverine and furbearers is predicted to be Not Significant.

8.3.6 Migratory Birds

Residual effects of the Project on migratory birds are predicted for habitat loss and disturbance (Volume 5, Sections 9.5.2 and 9.6.2). Most residual Project effects on waterbirds and upland birds are expected to result from habitat loss. Residual Project effects on migratory birds are not expected at the population level, and therefore cumulative effects on migratory birds at the population level are not expected.

8.4 FRESHWATER ENVIRONMENT

8.4.1 Hydrology

A potential cumulative effects assessment was conducted because residual Project effects were predicted (changes in streamflows and lake volumes within the Project footprint or freshwater LSA). Project residual effects are anticipated to be confined to the Project footprint or freshwater LSA. The closest proposed projects that could potentially interact with the Project residual effects are the George and BIPR projects. Given that the Project residual effects to hydrology were confined to catchments within the freshwater LSA, which are separate from the catchments that may be influenced by these other projects, there are no expected cumulative effects on hydrology.

8.4.2 Freshwater Water Quality

A potential cumulative effects assessment was conducted because residual Project effects were predicted, anticipated to be confined to the freshwater LSA. The closest proposed projects that could potentially interact with the Project residual effects are the George and BIPR projects. Given that the Project residual effects were confined to the LSA, there are no expected cumulative effects on freshwater water quality.

8.4.3 Freshwater Sediment Quality

A potential cumulative effects assessment was conducted because residual Project effects were predicted. Project residual effects are anticipated to be confined to the freshwater LSA. The closest proposed projects that could potentially interact with the Project residual effects are the George and BIPR projects. Given that the Project residual effects were confined to the LSA, there are no expected cumulative effects on freshwater water quality.

8.4.4 Freshwater Fish/Aquatic Habitat

A potential cumulative effects assessment was not conducted because there were no residual Project effects anticipated on the VEC freshwater fish/aquatic habitat after the application of mitigation and management measures. As no Project residual effects are anticipated, there are no effects that could act cumulatively with other projects.

8.4.5 Freshwater Fish Community

A potential cumulative effects assessment was conducted because a residual Project effect was predicted (reduction or loss of the Arctic Grayling population downstream of Llama Lake). The Project residual effect is anticipated to be confined to the freshwater LSA. The closest projects that could potentially interact with the Project residual effect are the George and BIPR projects. Given that the Project residual effect was confined to the LSA, there are no expected cumulative effects on freshwater fish community/Arctic Grayling.

8.5 MARINE ENVIRONMENT

8.5.1 Marine Water Quality

A potential cumulative effects assessment was conducted because residual Project effects were predicted to marine water quality. The Project residual effects are expected to be confined to the marine LSA. There are no past, present, or reasonably foreseeable future projects within the marine LSA and therefore no potential cumulative effects on marine water quality are expected.

8.5.2 Marine Sediment Quality

A potential cumulative effects assessment was conducted because residual Project effects to marine sediment quality were predicted, expected to be confined to the marine LSA. There are no past, present, or reasonably foreseeable future projects within the marine LSA and therefore no potential cumulative effects on marine sediment quality are expected.

8.5.3 Marine Fish/Aquatic Habitat

A potential cumulative effects assessment was not conducted because there were no residual Project effects anticipated on the VEC marine fish/aquatic habitat after the application of mitigation and management measures. As no Project residual effects are anticipated, there are no effects that could act cumulatively with other projects.

8.5.4 Marine Fish Community

A potential cumulative effects assessment was conducted because a residual Project effect was predicted (effects of shipping noise on Arctic Char). There are two potential future projects that could act cumulatively with the Project residual effects: the proposed Bathurst Inlet Port and Road Project (BIPR) and the proposed Hackett River Project which would use the same port location as BIPR. If these two proposed projects would proceed, marine Arctic Char would be exposed to noise from shipping within the marine RSA. The total amount of noise that Arctic Char may be exposed to could increase if ships passed close to each other, but the magnitude of the effect is expected to be low, as noise increases would be confined to within approximately 100 m of the ship location and drop to background levels outside of this range. The frequency of noise may increase but would continue to be sporadic. The cumulative effect would cease once shipping activity has ended for the Project, so the cumulative effect would be of medium duration and would be reversible. Assuming that mitigation measures would be in place for future projects similar to what will be in place for the Back River Project, the significance of the residual cumulative effect of shipping noise on Arctic Char is predicted to be Not Significant.

8.5.5 Seabirds and Seaducks

A potential cumulative effects assessment was conducted because residual Project effects were predicted (disturbance, reduction in reproductive productivity). Project residual effects have the potential to interact with the reasonably foreseeable future BIPR and Hackett River projects as they would be located within the marine RSA. The cumulative residual effects were expected to be of low magnitude, of medium duration (confined to the life of the Project), sporadic in nature, confined to within the marine RSA, and reversible. Overall, the significance of the residual cumulative effects is anticipated to be Not Significant and a population level effect on seabirds and seaducks is not expected to occur.

8.5.6 Ringed Seals

A potential cumulative effects assessment was not conducted because there were no residual Project effects anticipated on the VEC ringed seals. As no Project residual effects are anticipated, there are no effects that could act cumulatively with other projects.

8.6 HUMAN ENVIRONMENT

8.6.1 Archaeology

A potential cumulative effects assessment was conducted because residual Project effects on archaeology were predicted. The Project residual effects are expected to be confined to the Project footprint. There are no past, present, or reasonably foreseeable future projects within the Project footprint and therefore no potential cumulative effects on archaeological sites are expected.

8.6.2 Socio-economics

For socio-economics, the VSECs economic development, business opportunities, and education/training all had positive Project-related residual effects. Positive residual effects were not included in a potential cumulative effects assessment or transboundary analysis.

8.6.2.1 Employment

A potential cumulative effects assessment was conducted because a negative residual Project effect to employment in the socio-economic RSA was predicted. The geographic boundary for the cumulative effects assessment was expanded to include those projects and human activities in the Kitikmeot and NWT considered to have potential effects within the socio-economic RSA that are relevant to current residents. There are multiple projects that had the potential to result in cumulative changes to the VSEC employment related to competition for local labour for Kitikmeot residents. The CEA concluded that the development of the Project and one or more additional projects would result in residual negative “changes to competition for local labour”. The residual cumulative effect is expected to be reversible, of low to moderate magnitude, and be of local geographic extent. The duration is determined as medium term (confined to the life of the Project) the equity neutral, and frequency sporadic. The residual cumulative effect is determined as unlikely and Not Significant.

8.6.2.2 Health and Community Well-being

A potential cumulative effects assessment was conducted because negative residual Project effects were predicted (changes to individual and family spending, changes to family and household structure). The geographic boundary for the cumulative effects assessment was expanded to include those projects and human activities in the Kitikmeot and NWT considered to have potential effects within the socio-economic RSA that are relevant to current residents. There are multiple projects that had the potential to result in cumulative changes to the VSEC health and community well-being. The development of one or more additional projects is expected to increase the number of households that may experience a negative outcome as related to changes in both individual and family spending and family and household structure. The residual cumulative effect to individual and family spending is negative, reversible, moderate in magnitude, short to medium term in duration, and neutral in equity. The residual cumulative effect to family and household structure is negative, reversible, low in magnitude, medium term in duration, and neutral in equity. The frequency of each of these residual cumulative effects is continuous and expected to remain mainly within the LSA, although there is potential for the effect to expand to the RSA. The cumulative residual effect on the VSEC health and community well-being is determined to be Not Significant.

8.6.3 Land Use

8.6.3.1 Non-traditional Land and Resource Use

A potential cumulative effects assessment was conducted because negative residual Project effects were predicted (changes in access to land and resources, changes to experience of the natural environment, changes to the abundance and distribution of resources). The geographic boundary for

the land use cumulative study area was expanded to include those projects and human activities in the western Kitikmeot considered to have potential effects within the land use RSA that are relevant to current land use activities. The Project residual effects on non-traditional land and resource use could interact with potential residual effects of multiple projects. The CEA determined the development of the Project and one or more additional projects may result in three adverse residual cumulative effects on non-traditional land and resource use; specifically, changes to the experience of the natural environment. These cumulative residual effects are all characterized as moderate in magnitude, medium term in duration, and reversible. The frequency of the residual cumulative effects are expected to be sporadic and the geographic extent is regional. Overall, the residual cumulative effect on non-traditional land and resource use is rated as Not Significant.

8.6.3.2 *Subsistence Economy and Land Use*

A potential cumulative effects assessment was conducted because negative residual Project effects were predicted (changes in access to land and resources, changes to experience of the natural environment, changes to the abundance and distribution of resources). The geographic boundary for the land use cumulative study area was expanded to include those projects and human activities in the western Kitikmeot considered to have potential effects within the land use RSA that are relevant to current land use activities. The Project residual effects on the VSEC subsistence economy and land use could interact with potential residual effects of multiple Projects. The development of the Project and one or more additional projects could result in adverse residual cumulative effects on subsistence harvesters. The residual cumulative effects are characterized as moderate in magnitude, medium term in duration, and reversible. The frequency of the residual cumulative effects is expected to be sporadic and the geographic extent is the RSA. Overall, the three residual cumulative effects on the subsistence economy and land use are each rated as Not Significant.

8.6.4 **Country Foods**

A potential cumulative effects assessment was not conducted because there were no residual Project effects anticipated on the VEC country foods after the application of mitigation and management measures. As no Project residual effects are anticipated, there are no effects that could act cumulatively with other projects.

8.7 **SUMMARY OF RESIDUAL CUMULATIVE EFFECTS AND SIGNIFICANCE**

Table 8.7-1 provides a summary of all of the identified cumulative residual effects on the VECs and VSECs. There have been no significant residual Project-related effects and no significant residual cumulative effects identified as a result of the proposed Back River Project.

Table 8.7-1. Summary of Cumulative Residual Effects and Significance

Description of Cumulative Residual Effects	Significance Criteria			Likelihood of Occurrence			Overall Significance Rating		
	Direction	Magnitude	Duration	Frequency	Geographic Extent	Reversibility	Probability	Confidence	Rating
Vegetation and Special Landscape Features									
Vegetation Loss	Negative	Low	Long	Once	Footprint	Irreversible	Likely	High	Not Significant
Special Landscape Feature Loss	Negative	Low	Long	Once	Footprint	Irreversible	Likely	Medium	Not Significant
Caribou									
Habitat Loss	Negative	Low	Long	Sporadic	Local	Irreversible	Likely	High	Not Significant
Disturbance due to Noise	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Reduction in Reproductive Productivity	Negative	Low	Medium	Sporadic	Regional	Reversible	Unlikely	Medium	Not Significant
Grizzly Bear									
Habitat Loss	Negative	Low	Long	Sporadic	Local	Irreversible	Likely	High	Not Significant
Disturbance due to Noise	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Attraction	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Reduction in Reproductive Productivity	Negative	Low	Medium	Sporadic	Regional	Reversible	Unlikely	Medium	Not Significant
Muskox									
Habitat Loss	Negative	Low	Long	Sporadic	Local	Irreversible	Likely	High	Not Significant
Disturbance due to Noise	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	Medium	Not Significant
Reduction in Reproductive Productivity	Negative	Low	Medium	Sporadic	Regional	Reversible	Unlikely	Medium	Not Significant
Wolverine and Furbearers									
Habitat Loss (Wolverine)	Negative	Low	Long	Sporadic	Regional	Irreversible	Likely	High	Not Significant
Habitat Loss (Grey Wolf)	Negative	Low	Long	Sporadic	Local	Irreversible	Likely	High	Not Significant
Disturbance due to Noise (Wolverine)	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Disturbance due to Noise (Grey Wolf)	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Attraction (Wolverine)	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	High	Not Significant
Reduction in Reproductive Productivity (Wolverine)	Negative	Low	Medium	Sporadic	Regional	Reversible	Unlikely	Medium	Not Significant
Marine Fish Community (Arctic Char)									
Direct Mortality and Population Abundance: Shipping Noise	Negative	Low	Medium	Sporadic	Local	Reversible	Moderate	Medium	Not Significant

(continued)

Table 8.7-1. Summary of Cumulative Residual Effects and Significance (completed)

Description of Cumulative Residual Effects	Significance Criteria			Likelihood of Occurrence			Overall Significance Rating		
	Direction	Magnitude	Duration	Frequency	Geographic Extent	Reversibility	Probability	Confidence	Rating
Seabirds and Seaducks									
Disturbance due to Noise	Negative	Low	Medium	Sporadic	Regional	Reversible	Likely	High	Not Significant
Reduction in Reproductive Productivity	Negative	Low	Medium	Sporadic	Regional	Reversible	Unlikely	Medium	Not Significant
Socio-economics									
Changes to Competition for Local Labour (Employment)	Negative	Low/ Moderate	Medium	Sporadic	Local	Reversible	Unlikely	Medium	Not Significant
Changes to Individual and Family Spending (Community Well-being)	Positive/ Negative	Moderate	Short/ Medium	Continuous	Local/Regional	Reversible	Moderate	Medium	Not Significant
Changes to Family and Household Structure (Community Well-being)	Positive/ Negative	Low	Medium	Continuous	Local/Regional	Reversible	Moderate	Medium	Not Significant
Land Use									
Changes in Access to Land and Resources (Non-traditional Land and Resource Use)	Negative	Moderate	Medium	Sporadic	Regional	Reversible	Likely	Medium	Not Significant
Changes to the Experience of the Natural Environment (Non-traditional Land and Resource Use)	Negative	Moderate	Medium	Sporadic	Regional	Reversible	Likely	Medium	Not Significant
Changes to Abundance and Distribution of Resources (Non-traditional Land and Resource Use)	Negative	Moderate	Medium	Sporadic	Regional	Reversible	Likely	Medium	Not Significant
Changes in Access to Land and Resources (Subsistence Economy and Land Use)	Negative	Moderate	Medium	Sporadic	Regional	Reversible	Likely	Medium	Not Significant
Changes to the Experience of the Natural Environment (Subsistence Economy and Land Use)	Negative	Moderate	Medium	Sporadic	Regional	Reversible	Likely	Medium	Not Significant
Changes to Abundance and Distribution of Resources (Subsistence Economy and Land Use)	Negative	Moderate	Medium	Sporadic	Local/ Regional	Reversible	Likely	Medium	Not Significant

9. Reclamation and Closure

9. Reclamation and Closure

9.1 OVERVIEW AND SCHEDULE

Mine closure is anticipated to be 13 years and consist of three periods:

- Active Closure [Phase 3, Stage 1] - Project Year 11 - 12, i.e., two (2) years after mining operations cease. During this time, active closure activities such as earth-moving, waste disposal, and rerouting of pipelines will occur. Water treatment will also occur during this time.
- Passive Closure [Phase 3, Stage 2] - Project Year 13 - 18, i.e., six (6) years following the Active Closure stage during which seasonal water treatment and monitoring are the primary activities. A final demobilization and demolition of mine facilities will occur at the end of this stage in Year 18.
- Post-Closure [Phase 4] - Project Year 18+, i.e., a period of time during which confirmatory water quality, stability, aquatic effects, and ecosystem monitoring is conducted in order to ensure closure objectives have been met. This period is expected to be a minimum of five (5) years.

Achieving chemical stability will be a key focus of mine closure. This will include encapsulation of mine wastes (PAG waste rock and tailings) with NPAG waste rock, and the passive filling of open pits and tailings facilities (TFs) with water.

Waste rock storage areas (WSRAs) and the TSF will be covered with NPAG to promote the aggregation of permafrost to encapsulate PAG materials. WSRAs containing PAG will be constructed during Operations so that the waste rock stockpiled is allowed to freeze. This is expected to reduce the generation of adverse water quality runoff. The NPAG cap will raise the height of the active layer in the permafrost to ensure that the PAG waste rock remains permanently frozen.

All pits and TFs will be filled with water. Water treatment will occur year-round during Operations and seasonally in Closure in Goose Main TF. Water will be recirculated with Goose Main TF to improve the overall water quality in the basin in advance of overtopping in Year 18. This is expected to limit acid generation and metal leaching so that the pit water will meet applicable discharge criteria and can be passively discharged to nearby watercourses.

The underground mines will be backfilled as part of mining to ensure underground stability. Once underground mines are exhausted, working will be flooded with water from the Saline Water Pond.

Industry standard reclamation methods will be employed to close out Goose Property and the MLA. Hazardous materials will be collected for off-site disposal including hazardous components of vehicles and equipment (i.e., fuel tanks, gear boxes, and hydraulic oil). Equipment stripped of hazardous components will be disposed of in an on-site landfill. Buildings will be demolished and disposed of in an on-site landfill. Culverts will be removed from roads and the natural drainage restored, but the roads will otherwise remain intact. Any airstrips will remain functional with a gravel surface to support ongoing closure and post-closure monitoring activities. Final closure of the airstrip will be similar to roads.

Equipment and materials at the MLA will be shipped off site for disposal at a designated landfill at either Goose Property or near the port of destination.

The winter ice roads associated with the Project are not expected to require any reclamation, but will be inspected prior to completion of the Active Closure phase to identify any areas of potential physical instability (i.e., erosion).

Logistics is an important consideration in the closure and reclamation of the Project. Due to the relatively high cost to construct and operate the Project's winter ice roads, the closure strategy involves minimizing winter ice road use during Active Closure to the extent possible. Equipment and materials required for mine closure, including the fuel required for the first two years (during which the bulk of earthworks will be carried out), will be brought to site by winter ice road during the final year of Operations or at the start of the Closure phase. Sabina will not look to bring salvageable equipment off-site for resale, as it is expected that the cost of removal will exceed salvage value, when the cost of removing the equipment from site is considered. Instead, equipment and materials will be landfilled on site.

In Project Year 13, once Active closure has been completed at the Goose Property, a "CAT train" will be operated during the winter to remove any materials and equipment (including hazardous wastes) to the MLA. If necessary, the winter ice road could be utilized should the volume of materials be deemed sufficient for its construction. A sealift will visit the MLA the following summer to remove any hazardous materials and other wastes that have been CAT-trained to the MLA.

From this point, for the Passive Closure stage (i.e., Year 13 to Year 18), a smaller crew will occupy a small camp at the Goose Property to oversee seasonal water treatment operations. This camp will be supported entirely by aircraft. After Year 18, when water treatment has achieved the closure objectives, it will be necessary to dispose of the pumping equipment, pipelines, the small fleet of mobile equipment, and the small camp. Any contractor equipment requiring removal from site will be backhauled by air or CAT-trained to the MLA for subsequent sealift off site.

Additional detail regarding mine closure and reclamation measures is provided below. A Mine Closure and Reclamation Plan, is provided in Volume 10, Chapter 29.

9.2 REGULATORY FRAMEWORK REGARDING MINE CLOSURE

The Mine Closure and Reclamation Plan (MCRP) has been developed to conform to all applicable legislation and guideline documents. In addition, all of the closure and reclamation activities are proven technology, having been applied at other Canadian Arctic mine sites, including Nunavut mines.

Financial security is typically posted to the AANDC for water-related closure costs, and the landowner(s) for land-based reclamation activities. The majority of financial security will likely be held by the KIA as the majority landowner for the Project.

9.3 CLOSURE OBJECTIVES

The MCRP is based on the following objectives.

Objective 1: Design the Mine for Closure

This involves identifying the processes and forces that may act upon the mine components after mine closure and reclamation so that they can be factored into the design and operation of the mine. This includes adoption of the objectives outlined by MVLWB/AANDC (2013) as follows:

- Design and construct mine components in such a way that they achieve, or can readily be modified to achieve, the reclamation objectives and closure criteria.

- Determine mine reclamation costs as part of the closure planning and provide adequate security to cover the cost of reclamation over the life of the mine to ensure the closure criteria can be met.
- Include reclamation planning in the development and operation of the mine. This planning will ensure that mine operating activities do not unnecessarily increase the amount of reclamation work or effectively compromise what might otherwise be promising reclamation activities.
- Incorporate progressive reclamation activities into operation of the mine.
- Coordinate among Aboriginal, Federal and Territorial governments; land owners; local communities; regulatory authorities; the mining company; and other impacted parties to ensure that appropriate objectives, closure criteria, and activities are developed.

Objective 2: Achieve Physical Stability

Mine components that will remain after mine closure will be constructed or modified at closure to be physically stable so as to not erode, subside, or move from its intended location under natural extreme events or disruptive forces to which it may be subjected after closure. The objective of physical stability is to not pose a hazard to humans, wildlife, or environment health and safety.

Achieving physical stability includes establishing the conditions Post-Closure that allow for natural re-vegetation so that the land returns to productive use by wildlife. As part of the MCRP, potential revegetation of disturbed sites was reviewed. At this time, active re-vegetation of the site as part of closure is not planned given the cold climate setting of the Project as well as the precedent established for mine closure in Nunavut.

Objective 3: Achieve Chemical Stability

Mine components including wastes remaining after mine closure will be chemically stable. Chemical constituents released from the mine components should not endanger public, wildlife, or impact environmental health and safety. These constituents should not result in the inability to achieve the water quality objectives in the receiving environment and should not adversely affect long-term soil or air quality. If necessary, appropriate long-term management of potentially acid generating/metal leaching materials and any affected waters will be considered.

Objective 4: No Long-Term Active Care

All practical efforts to ensure that Project components that remain after Closure will not require long-term active care will be made. Any Post-Closure monitoring will only continue for a defined period of time. Objective 1, which proposes designing the mine for closure, and Objectives 2 and 3 for physical and chemical stability, will help ensure the achievement of this principle.

Objective 5: Consider Future Use and Aesthetics

The site will be compatible with the surrounding lands once reclamation activities have been completed. Consideration of future use and aesthetics involves the following elements:

- naturally occurring biophysical conditions, including any physical hazards of the area (pre- and post-development);
- characteristics of the surrounding landscape pre- and post-development;
- level of ecological productivity and diversity prior to mine development and intended level of ecological productivity and diversity for post-mine closure;

- local community values and culturally significant or unique attributes of the land; and
- level and scale of environmental impact.

Approach to Inclusion of Community Values

An important aspect of northern mine closure is the incorporation of community perspectives on closure. This is a stated requirement of the NWT Mine Closure Guideline (MVLWB/AANDC 2013). It is also a key element of the NIRB environmental review and the NWB water licensing processes.

In the short term, community perspectives are expected to be gathered during the permitting phase through the public environmental review and water licensing processes. Beyond the permitting phase, communities and workers will become more familiar with the Project through the Construction and Operations phases and will be able to provide input into mine closure through both Sabina's worker and community engagement programs as well as during formal reviews of future Interim MCRPs (part of water licence implementation and renewal).

Discharge Criteria

Thresholds identified in the FEIS will be adopted and applied to mine closure and reclamation. This includes discharges from open pits, TSF, TFs, and waste rock storage areas (WRSAs).

9.4 OPEN PITS

Closure of the open pits will consist of:

- placement of boulder fencing around the pit perimeters to protect people, vehicles or animals from physical hazards such as falling into an open pit;
- removal of select equipment and materials from within the open pits; and
- passive filling of the pits.

The open pits will be passively filled with natural runoff and precipitation such that they can become natural outflow systems. Filling these pits will ensure an adequate water cover over tailings deposited in Umwelt and Goose Main TFs, ensure adequate meromictic conditions in Llama Reservoir, and in all cases minimize exposure of high walls that might pose an acid generating and metal leaching risk.

Passive pit filling times were estimated; based on median hydrological conditions, Umwelt TF will fill by Year 14, Llama Reservoir will fill by Year 13, Goose Main TF will fill by Year 18, and Echo Open Pit will fill by Year 14.

9.5 UNDERGROUND MINE WORKINGS

The underground mines at the Goose Property will be closed out as follows:

- all hazardous wastes will be removed from the undergrounds along with any equipment to be used during the Active Closure stage;
- the mining methods require waste rock backfill to ensure underground stability; however, this is an ongoing component of mining and no additional closure activities are required to ensure long-term underground stability;
- waste rock or concrete will be placed to seal the portals and vent raises of the underground mines; and

- underground workings at Llama, Umwelt, and Goose Main will be flooded with water from the Saline Water Pond.

9.6 WASTE ROCK STORAGE AREAS

Waste rock storage areas will be constructed with side slopes that are expected to be stable over the long-term. PAG and NPAG waste rock will be placed concurrently during Operations such that there is a 5 m cover of NPAG waste rock over PAG waste rock. A disposal plan has been developed that maximizes the placement of NPAG waste rock over final PAG lifts during mine operations by using NPAG waste rock sourced directly from open pits. This approach will minimize the amount of dedicated capping that will be required during Operations (as progressive reclamation) and in the Closure phase. Overburden will be co-disposed in the WRSAs and a portion may also be used for capping material.

As mentioned in Section 9.15, the WSRAs will be fully developed by Year 6; this includes the WRSA placed over the TSF. A small volume of waste rock will be required as backfill in Years 6 to 10 but otherwise, final NPAG waste rock capping can be carried out during the Operations Phase as a progressive reclamation measure.

It is expected that the final WRSAs will be frozen except for an active layer within the NPAG cap. Once the WRSAs are capped and permafrost has aggraded into the PAG rock, water quality is expected to improve to acceptable limits for discharge without treatment. Since the final covers will be applied during the Operations Phase, it will be possible to monitor the aggradation of permafrost and improvements in the quality of runoff through the Operations and Closure phases.

9.7 TAILINGS FACILITIES

The Tailings Storage Facility (TSF) will be closed out by removing tailings discharge infrastructure upon reaching TSF capacity and switching to tailings storage in Umwelt TF. The TSF then becomes a WRSA, and, once the TSF is drained, a 5 m NPAG cover will be progressively placed over the PAG rock placed in the facility. The TSF WRSA will be closed out by completing the NPAG cap and by pumping out the TSF WRSA collection pond into Goose Main TF for treatment. Once the water in Goose Main TF meets closure criteria, pumping infrastructure will be dismantled and landfilled, and the remaining portion of the TSF dam which has not been covered with NPAG waste rock will be breached with flow directed towards Goose Main TF.

The Umwelt Tailings Facility (Umwelt TF) will be closed by actively pumping water during operations into Goose Main TF until the end of Operations. Water quality modelling completed during the FEIS confirmed that, if allowed to flood at closure, water quality in Umwelt TF will meet closure criteria without treatment. As such, during Active Closure, Umwelt TF pumping infrastructure will be dismantled and landfilled, and Umwelt TF will be allowed to flood during the Passive Closure stage. Umwelt TF will be breached at its northwest side at Post-Closure.

Goose Main Tailings Facility (Goose Main TF) will be closed by removing tailings deposition infrastructure during Operations and by actively treating the water in the TF until it meets closure criteria. Goose Main TF will contain water from Umwelt TF, Goose Main TF, and the TSF WRSA pond at Closure. Water will be pumped from Goose Main TF to the water treatment plant (WTP) and treated water will be pumped back into Goose Main TF in a parallel pipeline. Once closure criteria for water quality is met in Goose Main TF, which is expected to be in Year 18, pipeline infrastructure will be dismantled and landfilled, and Goose Main TF will be breached on its northeast side.

Both Umwelt and Goose Main TFs, once they have reached their outflow elevation, will have at least 5 m of water cover which is sufficient to avoid resuspension of tailings.

9.8 BUILDINGS AND EQUIPMENT

The salvage value of equipment and machinery is expected to be limited due to the remoteness of the site. As such, all buildings, machinery, and equipment will be disposed of in an on-site landfill after any hazardous material has been removed. Equipment containing hydrocarbons that cannot be readily cleaned will be removed from site for recycling or disposal at a licensed facility. Above grade concrete structures will be broken and reduced to below grade or at ground surface, or will be covered with waste rock or overburden. Rebar will be cut so that it is flush with the surface of the concrete. Concrete structures will be infilled with NPAG waste rock, if needed.

Developed areas at each of the properties will be re-graded and contoured to remove uneven ground for public safety, minimize the potential for erosion, and to blend with the surrounding landscape.

9.9 ROADS AND AIRSTRIPS

Culverts will be removed from all-weather roads and the natural drainage restored. Roads will otherwise remain intact to ensure preservation of permafrost, and facilitate long-term site access for monitoring and inspection.

Any airstrips will remain functional with a gravel surface for use during post-closure monitoring. Final closure of the airstrip will be similar to the all-weather roads.

9.10 PIPELINES AND POWER DISTRIBUTION LINES

Pipelines (such as tailings, freshwater, and effluent) will be purged, dismantled, and disposed of in a landfill within a WRSA. On-site power lines and associated materials will be dismantled and deposited in the closure landfill once power is no longer required for reclamation activities including pumping.

Other power equipment and materials including oil-filled transformers will be drained and disposed of on-site, with the oil removed for off-site disposal with other hazardous wastes (Section 9.11).

9.11 WASTE MANAGEMENT SITES

Inert landfills will be established within WRSAs at Goose Property during the Construction and Operations phases. These landfills will be used as closure landfills if they have adequate capacity. Additional closure landfills could be established within other WRSAs, if an alternate location is more suitable or if the Operations Phase landfills reach capacity. The landfills will be closed by applying a 5 m cover of NPAG waste rock as a final cover.

The closure schedule will allow for substantial closure of landfills and removal of most hazardous materials off site during Year 13. The Project will continue for another six of Passive Closure while treatment of the water in Goose Main TF continues and monitoring occurs. After closure criteria have been met in Goose Main TF, a final decommissioning operation at the WTP and main camp will occur at the end of Passive Closure. The final camp, mobile equipment, pipelines and pumping systems will require landfilling and any remaining fuel and hazardous wastes will require removal from site by air.

9.12 WATER MANAGEMENT SYSTEMS

9.12.1 Goose Property Water Management during Closure

Water management will be an important element of the Active Closure stage at the Goose Property. Discharge infrastructure associated with the TSF will be decommissioned in Year 2, and capping of PAG rock with NPAG rock will be completed prior to cessation of mining as described in Section 9.6. Runoff

collected in the TSF WRSA Pond will be pumped to Goose Main TF for treatment at the WTP throughout the closure period until closure criteria are met. Pumping and pipeline infrastructure will then be dismantled and landfilled and the remaining portion of the TSF dam that has not been covered with NPAG rock will be breached at the end of the Passive Closure stage.

Water from Goose Main TF will be treated at the WTP during the Active and Passive Closure stages, with treated water being routed back to Goose Main TF, until closure criteria are met. Effluent treatment sludge from the WTP during the Closure phase will be placed in a closure landfill; this facility will be closed as described in Section 9.11. Pumping and pipeline infrastructure from the WTP will then be dismantled and landfilled at the end of Year 18.

The Saline Water Pond (SWP) will be dewatered to multiple locations at the beginning of Active Closure; these locations include Llama Reservoir, and the underground mines of Umwelt, Llama, and Goose Main. Once it is dewatered, sediments will be tested and disposed of properly, if necessary. The SWP diversion berms and dams will be breached allowing Umwelt Lake to re-establish.

Upon decommissioning pumping and pipeline infrastructure during the Active Closure stage, water management berms will also be breached in strategic locations to restore natural surface water drainages. Some berms will be breached during Operations, however the majority of the diversion berms will be breached during Closure.

9.13 CHEMICALS AND EXPLOSIVES

Hazardous materials will be collected for off-site disposal. Hazardous material will include: unused chemical reagents, unused explosives, unused fuel, used oil, used glycol, and the hazardous components of vehicles and related equipment (i.e., fuel tanks, gear boxes and hydraulic oil). Explosives will be used up or destroyed on site. Explosives and inert components still in their original packing may be returned to vendors for restocking.

All petroleum products and chemicals will be removed from the site and transported to a licensed facility for disposal. Fuel tanks will be steam cleaned, cut up, and landfilled. The rinse water will be treated before disposal.

9.14 CONTAMINATED SOIL

Soil found to exceed applicable Nunavut site remediation criteria will be bio-remediated on-site within landfarms at Goose Property and the MLA. These landfarms will be established during the Construction and Operations phases, and possibly the Closure phase. A site investigation will be undertaken during the Closure phase to locate any previously unidentified hydrocarbon contaminated materials. Soil will be bio-remediated in the landfarms and water (snow and ice) will be treated through an oil-water separator to meet oily water discharge criteria identified in the water licence. The length of time it will take to bio-remediate and treat is dependent on the final quantity of contaminated materials at closure.

9.15 PROGRESSIVE RECLAMATION

9.15.1 Definition of Progressive Reclamation

Progressive reclamation is defined as the opportunistic reclamation activities completed during the operational phase of a project before permanent closure (MVLWB/AANDC, 2013). Progressive reclamation can increase efficiencies by utilizing available mining resources to conduct reclamation activities during the revenue-generating phase of the project. Progressive reclamation typically reduces the final closure costs and the timeframe for achieving closure objectives.

9.15.2 Candidate Facilities/Areas and Reclamation Activities

Progressive reclamation activities can take place during either the Construction or the Operations phases. At the Goose Property, reclamation efforts will be focused on any final earthworks opportunities that present themselves, including:

Open Pits

- Establish partial or full boulder fences around open pits, TFs and TSF, where physical barriers are required to prevent entry by people or animals.
- Install proper signage around mine openings and TSF.
- Construct open pit overflow structures.

WRSAs

- Progressively cap PAG waste rock within the WRSAs using NPAG waste rock derived from adjacent or nearby active pit operations.
- Application of a final cover over PAG waste rock using NPAG waste rock from active pit operations represents the most substantial progressive reclamation effort proposed. Final closure measured for the WRSAs are described further in Section 9.6.

Tailings Storage Facility (TSF)

Progressively cap tailings contained in the TSF using PAG and then ultimately NPAG waste rock. This ensures that the TSF is completely rehabilitated prior to cessation of Operations.

Tailings Facilities (TFs)

The final closure strategy for the TFs is a permanent water cover. Tailings deposited in the TFs will be covered with water throughout Operations and as a result the reclamation of these facilities are ongoing and progressive.

Buildings and Infrastructure

As buildings and infrastructure become unnecessary during the life of the mine, they will be removed and the sites will be reclaimed as much as practicable.

Contaminated Materials and Waste Disposal

Materials (soil, snow, ice) that may become contaminated during Construction and Operations due to fuel or other spills will be cleaned up immediately following the spill. Soil will be remediated on-site in lined landfarms. Final disposal will be in a WRSA or reused on site, if appropriate, once the soil meets Nunavut site remediation criteria for industrial land use. Water, snow, or ice will be collected in a lined containment area and treated using an oil-water separator during the summer months. Discharge to land (not directly to surface waters) is possible provided that the treated water meets Water Licence discharge limits for oily waste water.

Hazardous wastes will be shipped off site periodically to minimize the amount of waste requiring removal at closure.

Reclamation Studies

As part of the Feasibility Study work, recommendations were made regarding future studies that will impact reclamation activities. Table 9.15-1 presents a summary of the proposed reclamation studies going forward.

Table 9.15-1. Proposed Reclamation Studies

Study No.	Description	Status and Completion Timeline
1	Additional geochemical characterization to characterize the ARD/ML potential of the pit walls that will be above the final pit lake elevations.	Water Licence Application
2	Community perspectives on closure - to be obtained during the NIRB environmental review and the NWB Type A Water Licence Application processes.	Ongoing; Permitting through life of Project
3	Confirm cover designs are appropriate through further modelling and monitoring of temperatures, completion of energy balance on model inputs during freeze-back period, permafrost aggregation, active layer thaw in waste rock storage areas, etc.	Water Licence Application
4	Acquire an estimate of creep parameters for WRSA foundations and perform long-term deformation modelling for physical stability closure objective.	Water Licence Application; Interim MCRP
5	Develop an improved estimate of the runoff coefficient from the WRSAs. This will have an impact operationally on pump and pond sizing, and during closure on treatment volume and environmental loading estimates.	Water Licence Application
6	Collect additional baseline water quality data during the winter to permit less conservative water quality modelling assumptions during the under-ice period.	Ongoing; Future updates to water and load balance models for permitting through life of Project
7	Identify opportunities to locate the saline reservoir outside of Umwelt Lake in order to avoid an MMER Schedule II application for Umwelt Lake. Possible opportunities include building a ring dyke containment structure or transporting the connate water to Bathurst Inlet and discharging via a diffuser.	Water Licence Application

9.15.3 Progressive Reclamation Schedule

Progressive reclamation activities at the open pits can be completed as material becomes available to construct boulder fences and spillways. The use of NPAG waste rock as a final cover over PAG rock in the WRSAs and tailings in the TSF closely follows the mine plan and waste rock production schedules. All of the WRSAs will be fully developed and closed during the Operations phase as progressive reclamation; this includes the WRSA covering the TSF.

Progressive reclamation measures will be considered successful if they are completed as described in this section and monitoring confirms that the completed work is consistent with the objectives stated in the MCRP.

9.16 CLOSURE AND POST-CLOSURE MONITORING PROGRAMS

Monitoring will be carried out during the Closure phase and up to five years Post-Closure to ensure that closure activities are being undertaken as identified in the Final MCRP and closure objectives are being met. Specific monitoring will include:

- Supervision of closure activities to confirm conformance with the Final MCRP.
- Geotechnical inspections of TSF embankments, WRSAs, pit walls, and other areas for physical stability. Temperatures within the WRSAs will be monitored to confirm that they are frozen throughout except for the predicted active layer thickness.
- Water quality and aquatic effects monitoring to confirm that discharge water quality meets MMER requirements and water licence discharge and receiving waters criteria. Sabina will seek status as a recognized closed mine from Environment Canada.

10. Monitoring and Management Plans

10. Monitoring and Management Plans

Sabina is committed to environmentally responsible and socially acceptable exploration and mining practices. The Company is dedicated to creating and maintaining a safe environment for both the land it occupies and the people that drive its success. Sabina also subscribes to the principles of sustainable development in mining. While mining cannot occur without an impact on the surrounding natural environment and communities, the company's responsibility is to limit negative environmental and social impacts and to enhance positive impacts. The executive and management team will demonstrate to employees, contractors, government and the community that the company regards excellence in environmental performance a priority. This is demonstrated in Sabina's Environmental Policy Statement that commits to:

- ensure that we design our activities and operate in compliance with all environmental regulations to minimize our impact on the environment;
- promote responsibility and accountability of managers, employees and contractors to protect the environment and make environmental performance an essential part of the management/contractor review process;
- provide resources, personnel and training to enable management, employees and contractors to implement programs and policies to protect the environment;
- communicate openly with employees, contractors, local stakeholders and government on our environmental protection and sustainability programs and performance;
- address any concerns pertaining to potential hazards and impacts;
- promote the development and implementation of systems and technologies to reduce environmental risks;
- establish and maintain appropriate emergency response plans for all activities and facilities;
- maintain a self-monitoring program at each facility to ensure compliance and to proactively address plans to correct potential deficiencies;
- work cooperatively with government agencies, local communities and contractors to develop and enhance systems and technologies to improve environmental and sustainability practices; and
- encourage all employees, contractors or stakeholders to report to management any known or suspected departures from this policy or its related procedures.

This chapter describes how Sabina intends to implement a range of environmental monitoring and management measures throughout the life of the Project. These measures demonstrate how Sabina will avoid, or minimize to an acceptable level, the potential negative environmental effects identified in the environmental impact statement.

10.1 ENVIRONMENTAL MANAGEMENT SYSTEM (EMS)

Both Sabina's environmental policy and the EMS provide the framework through which the EMPs will be delivered. The EMS is the system through which Sabina will ensure that the conditions set at the time of authorization, and legal requirements are met. They will also ensure that standard operating procedures reflect legal requirements pertaining to the Project. Ownership of the EMS resides with Sabina's management team who will make provision for the resources necessary to assure the successful implementation and sustainability of the process.

The EMS has been based on a continuous improvement model as defined in the internationally recognized standards ISO 14001:2004, Environmental Management Systems. The model is shown in Figure 10.1-1. Through all phases of the cycle, community engagement will be an integral part of decision making. As well, the application of the Precautionary Principle will be a fundamental consideration in any action.

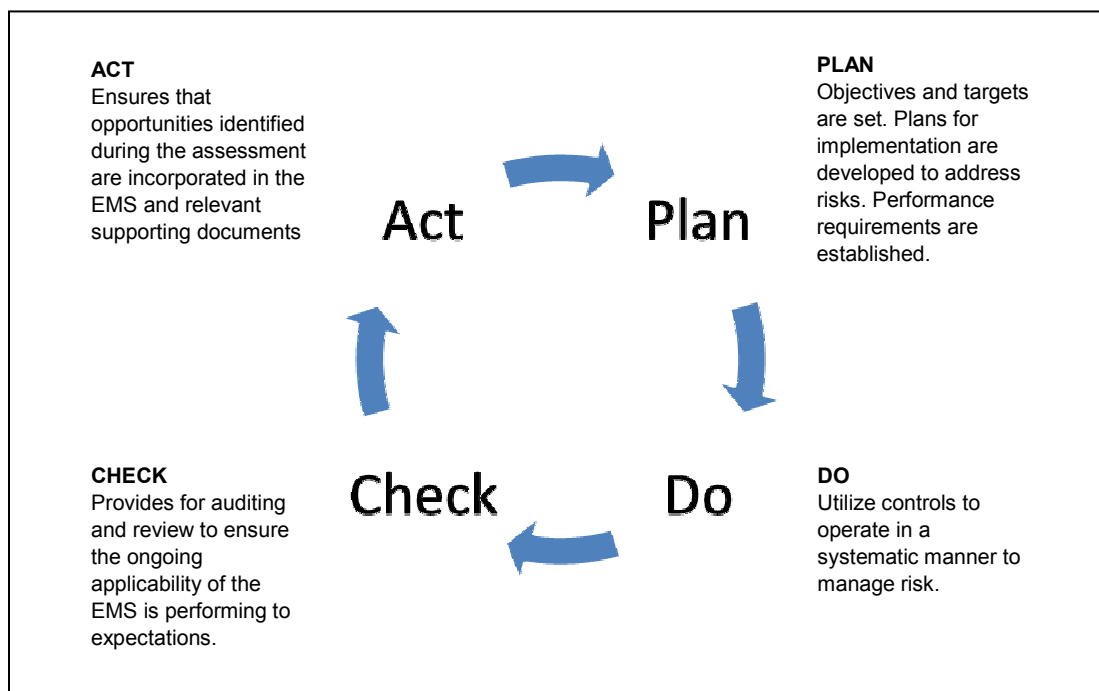


Figure 10.1-1. ISO 14001:2004 Environmental Management System

The EMS is structured around 10 core elements (Table 10.1-1) with associated sub-elements. Each of the elements is addressed in additional detail below. The EMS elements are interrelated and each one is essential for the effective operation of the process as a whole. As well, environment, health and safety are interrelated and in the EMS process, each element describes an essential part of the overall management of matters relating to all three components.

Table 10.1-1. Core Elements of Sabina's Environment Management System

Element	Title
1	Environmental policy and leadership
2	Planning
3	Organization and resources
4	Documents and records
5	Risk management
6	Regulatory requirements
7	Implementation, monitoring and measurement
8	Emergency and crisis management
9	Monitoring and audit
10	Management review

Sabina will make provisions for all resources necessary to assure the successful implementation and sustainability of the process.

The key objectives of the EMS are to:

- recognize that social responsibility and environmental management are among the highest corporate priorities;
- establish and maintain relationships with internal and external stakeholders;
- maintain information on legislative requirements and environmental and social aspects associated with the organization's activities;
- assign clear accountability and responsibility for environmental protection and social responsibility to management and employees;
- facilitate environmental planning through project life cycle;
- evaluate environmental performance and social responsibility against Sabina's environmental and other policies, objectives and targets and seek improvement where appropriate;
- establish a management process to audit and review the Sabina EMS and to identify opportunities for improvement of the system and resulting environmental performance; and
- review objectives and targets regularly through the operations phase to ensure that there is continuous improvement in environmental performance.

10.2 PRECAUTIONARY PRINCIPLE

Sabina is fully committed to acting as a socially responsible steward of the environment throughout the lifetime of the Project. To this end, the precautionary approach will be integrated into decision making on all aspects of implementation. In the absence of scientific consensus regarding risk to the public or the environment of a specific action, that action will be assumed harmful unless and until further conclusive scientific evidence determines that no harm shall result.

In gathering data to achieve scientific consensus, Sabina has conducted extensive research to establish baseline data, and where data is not yet available, incorporated examples from other similar, established operations. Extensive consultations with local stakeholders ensure that local and traditional knowledge will be fully evaluated and incorporated in order to support the goal of achieving scientific consensus.

Where there is uncertainty or some plausible risk, conservative approaches, together with a dynamic process of adaptive management will be implemented. A flexible approach will be supported by the design of monitoring programs to address all areas of uncertainty, provide a process for mitigation, and to further support the ongoing collection of scientific data.

10.3 TRADITIONAL KNOWLEDGE

Sabina recognizes that Traditional Knowledge (TK) is an “indispensable element both as baseline information and as an Inuit lens through which impact analyses can be better understood and can also result in a more active and meaningful community engagement” (NIRB EIS Guideline - April 2013). Volume 3, Chapter 3 summarizes the efforts undertaken by Sabina to incorporate TK into the Project development.

Consultations with communities and Hunters and Trapper Organizations are effective means of integrating traditional knowledge in planning the Project development and guiding decision making for key elements of the Project. In the development and implementation of its EMPs, Sabina will include consideration of traditional knowledge in relevant aspects of environmental planning and monitoring. In gathering and incorporating traditional knowledge, Sabina will:

- respect ownership, source and origins of the TK and the needs and sensitivities of its holders, and obtain their approval to use or disseminate that knowledge;
- establish trusting relationships with those who hold traditional ecological knowledge;
- work on projects of common interest and benefits;
- foster good communications between partners; and
- provide value-added knowledge back to the community.

10.4 ENVIRONMENTAL MANAGEMENT PLANS

Specific environmental monitoring and management plans (EMPs) have been developed for occupational health and safety, risk management and emergency response, spill contingency, the biophysical environment, and the human environment. These management plans provide Sabina with the tools for handling potential effects of its activities on the environment, as well as providing a structured approach to planning and implementing environmental protection measures.

The EMS and its associated EMPs are developed for the Life of the Project. They apply from the onset of the Exploration Phase, through mobilization activities, construction, operation, closure and post-closure. The application of the continuous improvement principle and adaptive management (Policy - Planning - Checking - Corrective Action) ensure that EMPs are appropriate for the level of activities at the site at all times. Adaptive management is the application of mitigation measures when review processes identify potential adverse effects. Sabina recognizes that the application of adaptive management measures can require the approval of regulatory authorities.

These management plans are the tools used by Sabina to ensure that the Company's objectives and environmental commitments are achieved. Some management plans will be included in Sabina's future Type A Water Licence Application and may be updated prior to the application submission pending comments from review of the FEIS. The Company acknowledges that the plans will require updating on a regular basis to ensure that they capture and incorporate the requirements outlined in the terms and conditions of the Project Certificate and Type A Water Licence, as well as other commitments made to local communities. They will also be updated based on management reviews, incident investigations, regulatory changes, or other Project-specific protocols and to incorporate any lessons learned, major changes to facility operation or maintenance, and environmental monitoring results. Any updates to select management plans will be filed with the Annual Report submitted under the Type A Water Licence.

Key elements of these plans are execution and line of accountability within the Company's organization to ensure that the objectives of the plan are met. As the Project advances through its various phases of development (mobilization and construction, operation and closure), the on-site organizational structure of the site management team will change. However, the fundamental commitments made by the Company as embodied in the management plans will remain. Furthermore, the process of continual improvement (review and adaptive management) may also introduce occasional changes for some components of the management plans. In essence, the management plans are tools designed to manage change while ensuring that the Company's objectives and environmental commitments are achieved.

Sabina does not expect the core content of these management plans to change significantly over the life of the Project. However, certain sections of each plan will be updated regularly:

- changes in regulations affecting the Project;
- roles and responsibilities - will adapt to the evolving organizational structure on-site and off-site;
- monitoring requirements, objectives and thresholds will be adapted on the basis of annual review of monitoring information collected in previous time period (adaptive management); and
- changes in reporting requirements as directed by the licensing authority.

The list of EMPs and their applicability throughout the Life of the Project are presented in Table 10.4-1.

Table 10.4-1. List of Environmental Management Plans for the Back River Project

Chapter	Document	Mobilization and Construction	Operation and Ongoing Maintenance	Temporary Closure/ Care and Maintenance	Final Closure	Post-Closure
1	Environmental Management Plan (including EMS and follow-up)	x	x	x	x	x
Risk Management and Emergency Response Plans						
3	Risk Management and Emergency Response Plan	x	x	x	x	
4	Fuel Management Plan	x	x	x	x	
5	Spill Contingency Plan	x	x	x	x	
6	Oil Pollution Emergency Plan	x	x	x	x	
Biophysical Monitoring and Mitigation Plans						
2	Environmental Protection Plan (outline)	x	x	x	x	x
7	Site Water Monitoring and Management Plan	x	x	x	x	
8	Ore Storage Management Plan		x	x		
9	Mine Waste Rock Management Plan	x	x	x		
10	Waste Management Plan	x	x	x	x	
11	Incineration Management Plan	x	x	x	x	
12	Hazardous Materials Management Plan	x	x	x	x	
13	Explosives Management Plan	x	x	x	x	
14	Road Management Plan	x	x	x	x	
15	Shipping Management Plan	x	x	x	x	
16	Borrow Pits & Quarry Management Plan	x	x	x	x	
17	Air Quality Monitoring and Management Plan	x	x	x	x	
18	Noise Abatement Plan	x	x	x	x	
19	Aquatic Effects Management Plan	x	x	x	x	
20	Wildlife Mitigation and Monitoring Plan	x	x	x	x	
21	Conceptual Fish Offsetting Plan	x	x		x	

(continued)

Table 10.4-1. List of Environmental Management Plans for the Back River Project (completed)

Chapter	Document	Mobilization and Construction	Operation and Ongoing Maintenance	Temporary Closure/ Care and Maintenance	Final Closure	Post-Closure
Biophysical Monitoring and Mitigation Plans (<i>cont'd</i>)						
22	Tailings Management Plan	x	x	x	x	x
23	Socio-economic Monitoring Plan	x	x	x	x	
24	Business Development Plan	x	x	x	x	
25	Occupational Health and Safety Plan	x	x	x	x	
26	Community Involvement Plan	x	x	x	x	
27	Cultural and Heritage Resources Protection Plan	x	x	x	x	
28	Human Resources Plan	x	x	x	x	
Mine Closure						
29	Mine Closure and Reclamation Plan		x	x	x	x

10.4.1 Occupational Health and Safety Plan

This plan aims at protecting the safety and health of its employees, contractors, and the communities in which Sabina operates. The Company's vision is to achieve:

- an accident and incident free culture; and
- a sustainable and competitive business advantage through leadership and excellence in environmental, health and safety.

Key objectives of the Occupational Health and Safety Plan include:

- protect worker health;
- prevent incidents or workplace accidents and injuries;
- maintain productivity by directly or indirectly enhancing social conditions to positively affect the wellbeing of workers;
- provide a safe and healthy workplace for all employees, contractors and visitors;
- ensure all people understand that “no task is so important that time cannot be taken to complete work safely”;
- identify and make provisions to address the needs of all individuals with respect to health and safety; in a manner that their ability to do work is not compromised;
- provide a process for achieving targeted performance levels; and
- provide appropriate and sufficient resources, including training, to enhance performance levels on an ongoing basis.

Sabina is focused on everyone's safety each and every day. Business success will not be possible without a safe workplace and safe workers. Implementing the processes and systems for safety excellence and integrating them into everyday activities, develop safe behaviour and ensure a safe place for its employees are Sabina objectives.

10.4.2 Risk Management and Emergency Response Plans

Accidents and malfunctions, illnesses, emergencies and unforeseen events that could result in an incident causing injuries need to be considered within the EMS. Sabina develops and maintains operational controls to identify the potential for, and responses to, these events. Management plans focusing on prevention and response to these criteria include:

- Risk Management and Emergency Response Plan (Volume 10, Chapter 3);
- Fuel Management Plan (Volume 10, Chapter 4),
- Spill Contingency Plan (Volume 10, Chapter 5), and,
- Oil Pollution Emergency Plan (Volume 10, Chapter 6).

Due to the remoteness of the Project site and the lack of infrastructure, Sabina has committed to be self-sufficient in terms of emergency response capabilities. Each emergency response plan is adapted to the level and type of activities taking place at the Back River property.

Diesel fuel is an essential commodity for the ongoing operation of the Project and a range of accidents and malfunctions may result in fuel spills. Sabina has developed specific management plans to address transportation and storage of fuel as well as procedures for field refuelling.

Sabina will also operate a fuel handling and storage facility at the Marine Laydown Area. In accordance with regulations, the Company has developed an Oil Pollution Emergency Plan (OPEP) that addresses the potential spill scenarios associated with ship to shore transfer of fuel and refuelling of storage tanks. The OPEP adheres to requirements of the Canada Shipping Act and the associated Oil Handling Facility Regulations. The OPEP must be reviewed and approved by Transport Canada on an annual basis.

Finally, the Spill Contingency Plan focuses on likely spill scenarios and outlines the required response for each type of spills.

10.4.3 Biophysical Monitoring and Management Plans

The biophysical monitoring and management plans all focus on the VECs identified in the FEIS. Each biophysical EMP identifies:

- the targeted VEC(s) by the EMP;
- the regulatory requirements related to the targeted VEC(s);
- the potential effects and proposed mitigation measures to minimize or avoid adverse effects on the targeted VEC(s);
- the objective of the EMP, the indicators of potential effects or changes, and the monitoring requirements for these indicators;
- the roles and responsibilities of individuals responsible for the implementation and follow-up of the EMP; and
- the auditing, review and reporting requirements.

Table 10.4-1 presents a list of the EMPs developed for the Back River Project. Each EMP is provided as a specific chapter in Volume 10. These plans will be used to provide the overarching direction for environmental management for the Project and form the basis for the ongoing development of further detailed environmental documentation through permitting and the different phases of the Project.

Monitoring programs are designed to provide an early warning to changes in the receiving environment that might be of concern. With these signals, additional mitigation measures can be implemented and the appropriate EMP modified. This process is continuous and will occur throughout all phases of the Project with changes to environmental management made as required.

10.4.4 Socio-economic Monitoring Plans

Sabina is committed to managing the social and economic effects of the Project in a way that maximizes potential positive and beneficial outcomes and reduces, or where possible eliminates, negative or adverse effects. The Socio-economic monitoring program (SEMP) was developed to respond to, manage and/or mitigate the potential social and economic effects identified in the EIS. The SEMP includes plans developed for the Back River Project, and its application through the mine-life is presented in Table 10.4-1. The primary socio-economic plans are:

- Socio-economic Monitoring Plan (Volume 10, Chapter 23);
- Business Development Plan (Volume 10, Chapter 24);
- Community Involvement Plan (Volume 10, Chapter 26);
- Cultural and Heritage Resources Protection Plan (Volume 10, Chapter 27); and
- Human Resources Plan (Volume 10, Chapter 28).

The SEMP is organized according to the VSECs established for the EIS and, where possible, aligned with reporting practices used by the Kitikmeot Region Socio-Economic Monitoring Committee. The SEMP outlines the methods that will be used to support the specific management plans listed above. The SEMP contains 'living documents' and as such will be updated as required based on management reviews, incident investigations, regulatory changes, or other Project-related changes. This may be revisited and modified on an annual basis.

10.4.5 Mine Closure and Reclamation Plan

The development of closure and reclamation measures is consistent with best management practices, and is integrated with the planning phase of the Project. The Mine Closure and Reclamation Plan (MCRP, Volume 10, Chapter 29) identifies measures to be taken during the operations phase that are aimed at progressive reclamation of disturbed areas of each mine location.

Mine closure will be carried out in a way that prevents or minimizes impacts and risks to the environment and human health after closure. These strategies identify site-specific objectives for mine closure and the intended post-closure land use for the site. The MCRP details the processes that will be used to decommission and reclaim the mining properties, including:

- mining and ore processing facilities;
- site infrastructure; and
- water and waste management facilities, including diversion structures, waste rock piles and tailings storage facilities.

The MCRP should be reviewed and revised as necessary throughout the mine life cycle. The plan will become more detailed by incorporating to a greater degree, all activities related to mine development and taking into greater consideration the existing site conditions and monitoring results as the Project evolves.

10.5 ADAPTIVE MANAGEMENT

The mitigation measures applied to the Project are based on best management practices and are expected to prevent or minimize adverse effects on the receiving environment, and ongoing monitoring will inform Sabina of their effectiveness. If any unforeseen adverse effects are identified during the life of the Project, measures will be taken to correct them and prevent them from occurring in the future. Adaptive management is an iterative approach based on a learning process gained from monitoring which improves long-run management outcomes. The approach to adaptive management is presented in Chapter 7 of this volume.

11. Summary of Commitments

11. Summary of Commitments

Sabina has prepared an Environmental Impact Statement (EIS) to identify and assess potential environmental and social effects resulting from the Project. The EIS is consistent with the requirements outlined in the Nunavut Land Claim Agreement (NCLA) and the Nunavut Impact Review Board (NIRB) Guidelines for the Preparation of an Environmental Impact Statement for the Back River Project (NIRB File No. 12MN036; NIRB 2013).

As part of the EIS, mitigation and management measures have been identified to eliminate or reduce the potential for adverse effects to the Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) assessed in this EIS.

Appendix V1-6 of this Main Volume provides a table listing all of the individual commitments that Sabina will adhere to as part of the planning, construction, operation, and closure of the proposed Project.

Sabina intends to build a mine with integrity—one that is safe, environmentally responsible, and beneficial to all parties involved. Sabina believes that its record in Nunavut demonstrates how it has learned to incorporate environmental and socio-economic considerations successfully into the exploration activities to date. Sabina has demonstrated its ability to adaptively protect the environment and minimize the adverse impacts of its operations on the land, water, and wildlife of the area. Sabina has also fostered relationships such that it has learned to work with local communities, Inuit organizations, and government agencies in a cooperative manner to minimize, where possible, the adverse social impacts of its activities while maximizing the socio-economic benefits to the residents of the Kitikmeot region and Nunavut as a whole.

12. Conclusions

12. Conclusions

Sabina has prepared an Environmental Impact Statement (EIS) to identify and assess potential environmental and social effects resulting from the Project, and is consistent with the requirements outlined in the Nunavut Land Claim Agreement (NCLA) and the Nunavut Impact Review Board (NIRB) *Guidelines for the Preparation of an Environmental Impact Statement for the Back River Project* (NIRB File No. 12MN036; NIRB 2013).

The selection of potential Valued Ecosystem Components (VECs) and Valued Socio-Economic Components (VSECs) was based on the NIRB scoping process which involved consultation with all potentially affected communities. The scoping and refining of the potential VEC/VSEC list was based on Sabina-led public consultation (where a potential list of VECs/VSECs was presented to the communities for feedback and input), the TK reports (KIA 2012, 2014), consultation with regulatory agencies, and regulatory considerations. The final list was provided to NIRB for inclusion in the draft EIS guidelines, and available for review and comment by all interested parties. The final list as indicated in the Sabina submission of April 8, 2013 for the final EIS guidelines are the VECs/VSECs included in the FEIS.

The Draft EIS was submitted to the NIRB on January 20, 2014 and was accepted through a positive EIS Guidelines conformity determination in mid-February, 2014. The ensuing review period was initiated and it was comprised of a round of information requests/responses (March to July 2014) and technical review comments/responses (October 2014). The NIRB held Technical Meetings, a Community Roundtable, and a Pre-Hearing Conference in Cambridge Bay (November 2014). A key output from these meetings and technical comments was a list of approximately 500 commitments that Sabina has considered during the execution of the feasibility study and this assessment.

The EIS provides a detailed evaluation of the potential biophysical and socio-economic effects of the Project. It includes extensive baseline data characterizing the Project area, and design features with measures to remove or minimize potential adverse effects on both VECs and VSECs in the assessed area.

The significance of Project residual effects is based on a comparison of the current environment without the Project proceeding, with the predicted state of the environment should the Project proceed implementing mitigation measures. Identified Project-related residual effects were described using the defined attributes direction, magnitude, geographic extent, duration, frequency, reversibility, resiliency, ecological context, and probability (refer to Table 1.2-4 in Chapter 1 of Volume 9 for further details) along with attributes outlined in the EIS guidelines. The ratings assigned to the attributes, along with the likelihood of occurrence, were used to determine the overall significance rating of a residual effect. Definitions of each of the attributes may be VEC/VSEC specific and may vary accordingly. Quantitative thresholds were used when available to assist with evaluating the significance of residual effects.

Project-related Effects Assessment Conclusions

Results from the Project-related effects assessment identified non-significant residual effects and no significant residual effects. All identified residual effects were either of low magnitude, confined to a localized area, reversible, or short term once abatements and management measures were considered. Offsetting measures were also presented as a mitigation measure for the assessment. Positive residual effects were identified for the VSECs economic development, business opportunities, employment, and education and training.

Hence, the overall effect of the Project on the atmospheric, terrestrial, freshwater, marine, and human environments is determined to be not significant.

Cumulative Effects Assessment Conclusions

Cumulative effects assessments were carried out in compliance with Section 7.11 of the EIS guidelines (NIRB 2013). Per these guidelines, consideration was given to the following factors when conducting the assessments:

- a larger spatial boundary (RSA rather than LSA);
- a longer temporal scale;
- alternatives analysis;
- consideration of effects on VECs and VSECs; and
- evaluation of significance.

Potential cumulative effects assessments were conducted for each VEC or VSEC that had an identified Project-related residual effect. There were no significant Project-related residual effects identified (see Chapter 6 of this Main Volume), but all non-significant Project-related residual effects were subjected to a potential cumulative effects assessment.

Results from the cumulative effects assessment identified non-significant residual cumulative effects, but no significant residual cumulative effects. All identified residual cumulative effects were either of low magnitude, confined to a localized area, reversible, or short term once mitigation and management measures were considered. Positive residual effects were not included in a potential cumulative effects assessment or transboundary analysis.

Hence, the overall effect of the Project to act cumulatively with other past, present or reasonably foreseeable future projects on the atmospheric, terrestrial, freshwater, marine, and human environments is determined to be not significant.

Transboundary Assessment Conclusions

One of the NIRB's ten minimum EIS requirements is to include a transboundary impact analysis. The requirement states that "where relevant, an EIS must include an assessment of all significant adverse ecosystemic or socio-economic transboundary effects." There are no significant residual effects identified for the Project. However, all non-significant negative residual effects were subjected to a transboundary analysis. Positive residual effects were not included in a transboundary analysis.

The transboundary nature of residual effects was addressed as part of the cumulative effects assessments. No significant residual cumulative effects are anticipated for the VEC and VSEC having transboundary considerations. Details for caribou and socio-economics are summarized below.

For caribou, the cumulative effects assessment spatial boundary included a portion of the Northwest Territories for both the Bathurst herd and the Beverly herd. The geographical boundary used for the potential cumulative effects assessment was based on the post-calving and summer seasonal ranges of the Bathurst herd and the summer and winter ranges of the Beverly herd. As such, the potential transboundary effects are accounted for in the cumulative effects assessment and are predicted to be not significant.

Special consideration was given to potential transboundary effects to employment and businesses within the socio-economic RSA. The transboundary effects assessment concluded that competition for local labour is not expected to be substantial outside the Kitikmeot Region but is rather anticipated to provide desired employment. The transboundary effects of the Project were determined as positive and therefore not further characterized.

The Project is not expected to result in significant transboundary effects to the atmospheric, terrestrial, freshwater, marine, and human environments.

Overall Conclusions

Through an exhaustive assessment of available baseline, TK, community consultation, and government engagement, the Project is not expected to result in significant effects to the atmospheric, terrestrial, freshwater, marine, or human environments.

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Definitions of the acronyms and abbreviations used in this reference list can be found in the Acronyms and Abbreviations section.

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9. RECLAMATION AND CLOSURE

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11. SUMMARY OF COMMITMENTS

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12. CONCLUSIONS

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