Greenland Minerals Limited and Greenland Minerals & Energy A/S
Kvanefjeld Project
Social Impact Assessment

July 2018

Shared Resources Pty Ltd

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List of Abbreviations and Acronyms

Acronym / Abbreviation	Description
A/S	Aktieselskab, Danish name for a stock-based corporation
AIDS	Acquired Immune Deficiency Syndrome
ALARA	As Low As Reasonably Achievable
AMA	Arbejdsgivernes Arbejdsmarkedsafgift
APP	Aalisartut Piniartullu Peqatigiffiat (Regiona Fishermen and Hunters Association)
ARTEK	Arctic Technology Centre
ASIAQ	ASIAQ, Greenland Survey
ASM	Artisanal and Small-Scale Mining
AVATAQ	Pinngortitaq avatangiisillu peqatigiffik (Greenland Nature and Environment Association)
BAT	Best Available Technology
BCE	Before the Common Era
BFS	Bankable Feasibility Study
BIP	Benefit and Impact Plan
BMP	Bureau of Minerals and Production (Greenland)
Bn	Billion
BOO	Build, Own, Operate
Bq	Becquerel, Unit of radioactivity
BWS	Blue Water Shipping, Denmark
CAA	Civil Aviation Authority
Capex	Capital expenditure
CE	Common Era (also referred to as Anno Domini (AD))
CCE	Capital Cost Estimate
CHP	Combined Heat and Power
CIA	Central Intelligence Agency
CMREO	Critical Mixed Rare Earth Oxide
CPI	Consumer Price Index
CREO	Critical Rare Earth Oxide
CRSF	Chemical Residue Storage Facility
CVR	Danish Central Business Registry
dB	Decibels
DCE	Danish Centre of Environment and Energy
DEA	Danish Energy Agency

DHI	DHI Water and Environment
DKK	Danish Kroner
DMP	Dust Management Plan
DTU Nutech	Technical University of Denmark, Danish Centre for Nuclear Technologies
DWT	Dead Weight Tonnage
EAMRA	Environmental Agency for Mineral Resources Activities
EBRD	European Bank for Reconstruction and Development
EC	European Community
EHS	Environment Health and Safety
EIA	Environmental Impact Assessment
EL	Exploration License
EMP	Environmental Management Plan
ERM	ERM Ltd
et al.	Et alii (and others)
EU	European Union
EUR, €	Euro (currency)
FEL	Front End Loader
FIFO	Fly-In Fly-Out
FS	Feasibility Study
FTE	Full-time Equivalent
FTSF	Flotation Tailings Storage Facility
GDP	Gross Domestic Product
GE	Greenland Business Association
GER	Greenlandic Business Registry
GHD	GHD Pty Ltd
GHG	Greenhouse Gas
GIF	Kalaallit Nunaanni Timersoqatigiit Kattuffiat (Sports Confederation of Greenland)
GIHR	Greenland Institute for Circumpolar Health Research
GIS	Geographic Information System
GME A/S	Greenland Minerals and Energy A/S
GML	Greenland Minerals Limited
GNI	Greenland Nature Institute
GoG	Government of Greenland
GPS	Global Positioning System
ha	Hectare
HDPE	High Density Poly-ethylene

HFO	Heavy Fuel Oil
HIV	Human Immunodeficiency Virus
HME	Heavy Mining Equipment
IAEA	International Atomic Energy Agency
IAIA	International Association of Impact Assessment
IBA	Impact and Benefit Agreement
ICC	Inuit Circumpolar Council
ICMM	International Council on Minerals and Mining
ICRP	International Commission for Radiological Protection
IFC	International Finance Corporation
ILO	International Labour Organisation
INULI	Inuussutissalerinermik Ilinniarfik (Catering School in Narsaq)
ISOS	International SOS
JORC	Joint Ore Reserves Committee
km	Kilometre
KNAPK	Kalaallit Nunaanni Aalisartut Piniartullu Kattuffiat (Fishermen and Hunters Association)
LCD	Liquid Crystal Display
LTIFR	Lost Time Injury Frequency Rate
MFA	Danish Ministry of Foreign Affairs
MIE	Ministry of Industry and Energy
MLSA	Mineral License and Safety Authority
MMR	Ministry of Mineral Resources
mRL	Metres Relative Level
MoH	Ministry of Health
M	Million
m	Metre
Mt	Million tonnes
Mtpa	Million tonnes per annum
MW	MegaWatt
NCA	Nuclear Cooperation Agreement
NEA	Nuclear Energy Agency
NKA	Nunatta Katersugaasivia Allagaateqarfialu (Greenland National Museum and Archives)
NORM	Naturally Occurring Radioactive Materials
NPV	Net Present Value
NUSUKA	Nunaqavisissuit Suliffiutilit Kattuffiat (Employers' Association)
OCE	Operating Cost Estimate

OECD	Organisation for Economic Co-operation and Development
Opex	Operating Expenditure
PAARISA	Department of Prevention
PEL	Pacific Environment Limited
PK	Peqqissaasut Kattuffiat (Nurses' Union)
PM	Particulate Matter
PPE	Personal Protective Equipment
REE(s)	Rare Earth Element(s)
REO	Rare Earth Oxide
REP	Rare Earth Phosphate
ROM	Run Of Mine
SIA	Social Impact Assessment
SIK	Greenland Workers Union
SIP	Sulinermik Inuussutissarsiuteqartut Peqatigiiffik (Local Department of SIK in Qaqortoq and Narsaq)
SIRI	Danish Agency for International Recruitment and Integration
SLiCA	Survey of Living Conditions in the Arctic
SPS	Savaatillit Peqatigiit Suleqatigiissut (Sheep Farmer's Association)
STD	Sexually Transmitted Disease
SU	National education grant system in Greenland
Sv	Sievert
TB	Tuberculosis
TDS	Total Dissolved Solids
TG	Turbo-generating
ToR	Terms of Reference
TRIFR	Total Recordable Injury Frequency Rate
TSF	Tailings Storage Facility
TSP	Total Suspended Particles
TWP	Treated Water Placement
UK	United Kingdom
UN	United Nations
UNESCO	United Nations Educational, Scientific and Cultural Organisation
$ or USD	United States Dollars
WHO	World Health Organisation
WNA	World Nuclear Association
WRS	Waste Rock Stockpile
w/w	Weight for weight

1. Introduction

This document presents the Social Impact Assessment (SIA) undertaken for the Kvanefjeld project (referred to as Kvanefjeld or the Project) in Greenland. It has been prepared as a stand-alone document addressing the social impacts of the Project. For a complete analysis of the Project's social and environmental impacts this SIA should be read in combination with the Project's Environment Impact Assessment (EIA).

An SIA provides the basis for analysing, monitoring and managing the social impacts of a planned development. This SIA describes how the Project has been designed and identifies and analyses both the Project's positive and negative impacts on society and sets out how the Project will be implemented to minimise its adverse impacts and maximise its benefits. The SIA specifically provides information on the:

- Use of Greenland labour;
- Use of Greenland Enterprises; and
- Extent to which processing of minerals will take place in Greenland.

The SIA will form the basis for negotiating the Impact and Benefit Agreement between Greenland Minerals Limited (GML, or the Company), the Greenland Government (GoG) and the municipality.

A Terms of Reference (ToR) for the SIA was approved in 2015, and a draft SIA was submitted by GML to the Ministry of Industry and Energy (MIE) in 2015. The draft SIA was prepared by Dutch consultancy Grontmij and Danish consultancy NIRAS A/S (NIRAS). MIE is the GoG Ministry responsible for reviewing SIAs and Impact Benefit Agreements related to mineral resource projects and feedback on the draft SIA was received in early 2016. Responding to this feedback, this 2018 update has now been prepared, incorporating new Project details and presenting the analysis in a format consistent with international practice. The updating of the SIA has been undertaken by the Australian consultancy, Shared Resources Pty Ltd, drawing upon the baseline data previously collected and work previously undertaken by Grontmij and NIRAS.

1.1 Overview of the Project

The Project is located in South Greenland, approximately 7.5km to the north of Narsaq town and 40km to the southwest of the international airport and settlement of Narsarsuaq. The Project is located in the arctic region, with the mineralisation located at an elevation of approximately 600m above sea level.

The Project plans to treat 3.0 million tonnes of ore per year (Mtpa) to extract rare earth elements (REE), uranium and zinc. The mine life is expected to be at least 37 years.

The main components of the Project include an open pit mine, two processing plants (concentrator and refinery), two tailings facilities in the Taseq basin, slurry and water pipelines, a 13km access road and a new port (the Port) in Narsap Ilua. The Project also includes an accommodation village (the Village) located on the outskirts of Narsaq town, administrative and maintenance facilities, power plant and fuel storage.

1.2 Background

Greenland Minerals and Energy A/S (GME A/S) acquired the license to explore the Project area in 2007. GME A/S is a 100% owned subsidiary of GML. GML is listed on the Australian Securities Exchange.

A Brief Project History

First discovered by scientists in the 1950s, the Kvanefjeld orebody was the subject of extensive work programmes in the 1960s, 70s and into the 1980s. These programmes were funded by the Danish Government and carried out by highly trained scientists from the Danish nuclear research facility, Risø. The historic studies investigated the geology and mineralogy of the Kvanefjeld area (specifically the Ilimaussaq complex) and established initial mineral resources focussed on uranium and thorium concentrations. The lack of multi-element chemical assays precluded the resource estimation of other components.

During this period, extensive investigations were made into the processing the resources to extract uranium. After investigating a number of techniques, scientists established an alkaline pressure leach methodology that proved to be an effective means of extracting uranium. An adit was driven 800m through the Kvanefjeld resource in order to generate bulk samples which could be used to pilot the processing method. The piloting, conducted in Europe, proved successful and a feasibility study was developed for the Project. The Danish Government's decision in 1983 not to pursue the option of nuclear power resulted in the cessation of work programmes at Kvanefjeld.

There was almost no activity at Kvanefjeld for a period of 24 years, until Greenland focussed, Australian domiciled company, Greenland Minerals Limited, acquired the license to explore the area in 2007. Geoscientists that had studied the Ilimaussaq complex in the past had identified the potential for substantial resources of rare earth elements, but this potential had never been properly evaluated. GML's first exploration programme in 2007 confirmed Kvanefjeld as an important resource of REEs, as well as a uranium resource of global significance.

During the course of GML's exploration activity, with significant exploration campaigns conducted each summer between 2007 and 2011, 3 discrete ore zones were identified in the Ilimaussaq complex suggesting that the complex hosts a large scale REE and uranium resource.

GML commenced a feasibility study for the Project in 2010. In line with this activity, and to meet the requirements to obtain an Exploitation Permit, work on the "scoping phase" of the Company's SIA also commenced at this time. During the scoping phase, a number of stakeholder engagement workshops were conducted to present the Project to stakeholders and to receive feedback on topics to be covered in the SIA. In July 2011, after extensive consultation, GML drafted the first version of the ToR for the SIA. Subsequent changes to the Project design and an amendment to the Mineral Resources Act in 2014 prompted the development of an Updated ToR in 2014. Public consultation on the Updated ToR was undertaken between late August and early October 2014, with comments from the consultation process consolidated in a White Paper. In the first half of 2015 GML revised the ToR based on comments collated in the White Paper and a Revised ToR was prepared. The Revised ToR was approved by the GoG in late 2015.

1.3 Objective of the SIA

The purpose of the SIA is to identify and analyse the potential social impacts of a proposed mine and processing plant development. This SIA has been developed to address the SIA objectives outlined in the Guidelines for Social Impact Assessment for Mining Projects in Greenland (MIE, 2016). These include:

- To provide a satisfactory and impartial description for Greenlandic society in general about what Greenland, the local affected communities and individuals will gain from the Project;
- To inform and involve relevant and affected individuals and stakeholders early on in the process via ongoing dialogue and specific procedures;
- To provide a detailed description of the social pre-Project baseline situation, which, on the basis of the most recent available data, is to form the basis for planning, mitigation initiatives and future monitoring;
- To provide an assessment based on collected baseline data to identify both positive and negative social impacts at local and national levels;
- To optimise positive impacts and mitigate negative impacts throughout the Project lifetime and through this ensure sustainable development;
- To involve in a meaningful manner affected towns, settlements and communities (individuals) that may be directly or indirectly impacted throughout the Project by utilising and respecting local knowledge, experience, culture and values; and
- To form the basis for the development of the Impact Benefit Agreement (IBA).

1.4 General Approach

Pursuant to Inatsisartut Act no. 7 of 7 December 2009 on mineral resources and activities of significance for such activities (the Mineral Resources Act), mineral companies are required to prepare an SIA in connection with developing mineral projects. The same Act requires that a mining license will only be approved once a Project's SIA has been accepted by the GoG.

The processes used to develop the SIA and the structure of the SIA report have been informed by three key documents, namely:

- BMP (2009) Guidelines for Social Impact Assessment for mining projects in Greenland;
- Social Impact Assessment (SIA) – Guidelines on the process and preparation of the SIA report for mineral projects (2016); and
- IFC (2012) Performance Standards on Environmental and Social Sustainability.

The SIA has been developed using a participative approach, involving stakeholders as much and as effectively as possible at all stages of the process.

The identification of potential impacts (adverse and beneficial, direct and indirect) draws upon an understanding of the social baseline conditions, analysis of the Project and its effects, and assessments of how these effects might generate social impacts. For each impact identified, the SIA evaluates the significance of the impact and identifies mitigation measures to address each impact. Mitigation measures follow the globally accepted mitigation hierarchy of "avoid, minimise,

and where residual impacts remain, compensate and/or offset"[1]. Following identification of mitigation measures, impacts are then re-evaluated to identify the anticipated residual impact. Cumulative impacts are also identified, to understand the additive effect of multiple impacts on an affected community or area.

1.5 Study Areas and Temporal Boundaries

Study areas are defined as the areas for which baseline data is collected to inform the assessment of social impacts anticipated from the Project. The level of information collected over an area is proportional to the anticipated level of impact.

The closest population centre to the Project is the town of Narsaq (located 7.5km to the south of the Project). In addition to the town of Narsaq, other users of land and resources in close proximity to the Project live in settlements and on farms within the Narsaq area. The closest farm is located 4km from the proposed mining area.

Narsaq is one of three towns located in Kommune Kujalleq (Narsaq, Qaqortoq and Nanortalik) and it has particularly close ties to the capital of the municipality, Qaqortoq, which is located approximately 1 hour by fast boat (2 hours by ferry) from Narsaq. The Project is also likely to have some impact on the settlement of Narsarsuaq as it currently hosts the municipality's international airstrip and the port for ferry transfers to Narsaq.

Greenland's small population has the potential to extend the social impact of the Project beyond Kujalleq Kommune as labour (and good and services) may need to be sourced from larger population centres, such as the capital, Nuuk.

Based on the anticipated impacts, three study areas have been defined for Kvanefjeld:

- Local – Narsaq (including Ilua Valley and the Narsaq settlements)
- Regional – Kommune Kujalleq (South Greenland), with a specific focus on the population centres of Qaqortoq (capital of Kommune Kujalleq), and Narsarsuaq, and settlements within the municipality (Qassiarsuk, Igaliku and other small settlements)
- National – Greenland, with a specific focus on impacts which may predominantly affect the capital, Nuuk.

The SIA will consider impacts across the life of the Project. The Project is expected to operate for 37 years as a minimum. A decommissioning, closure and rehabilitation phase (hereafter referred to as the Closure Phase) of six years is also anticipated. Three phases of the Project have been defined:

- Construction;
- Operations; and
- Closure.

[1] IFC (2012)

1.6 Structure of the Report

The report is divided into the following chapters:

Chapter 1	Introduction to the SIA;
Chapter 2	Non-Technical Summary of the SIA;
Chapter 3	Description of the Project;
Chapter 4	Summary of the regulatory framework under which the Project will be developed;
Chapter 5	Summary of the analysis of Project alternatives, relevant to the social impact assessment, which were considered;
Chapter 6	Social and economic baseline for the local, regional and national study areas;
Chapter 7	Detailed social impact assessment for the Project;
Chapter 8	Defines the Benefit and Impact Plan;
Chapter 9	Summary of the Company's stakeholder engagement activities to date and the plan for further engagement; and
Chapter 10	Explanation of the connection between the SIA and the Impact Benefit Agreement.

2. Non-Technical Summary

2.1 Introduction

2.1.1 Purpose and scope of document

GML is an Australian mining company based in Perth and listed on the Australian Securities Exchange. Greenland Minerals and Energy A/S (GME) is the Greenlandic subsidiary of GML and is headquartered in Narsaq. GML acquired a majority stake in GME, the holder of the license to explore the Kvanefjeld rare earths project (Project), in 2007. In 2011 GML acquired the balance of GME and thereby assumed 100% control of the Project.

GML proposes to develop a mine and integrated minerals processing facilities at Kvanefjeld. In addition to producing significant quantities of rare earth (REE) products, the Project will also produce small but commercially valuable quantities of uranium concentrates, zinc concentrates and fluorspar.

A social impact assessment provides the basis for analysing, monitoring and managing the social impacts of a planned development. This document (the SIA) describes how the Project has been designed to minimise its adverse impacts and maximise its benefits to society.

The SIA has been prepared in accordance with the Social Impact Assessment (SIA) – Guidelines on the process and preparation of the SIA report for mineral projects (MIE, 2016).

2.1.2 Project description

The Kvanefjeld Project (the Project) is located within the Kommune Kujalleq (the Municipality of southern Greenland). The mine and processing facilities are located approximately 7.5km from the town of Narsaq with the port approximately 1 km from Narsaq. The Project is 40km to the southwest of the international airport and settlement of Narsarsuaq.

GML proposes to treat approximately 3.0 million tonnes of ore per year (Mtpa) to extract REE, uranium and zinc. The mine life is expected to be at least 37 years followed by a six year closure and rehabilitation phase.

The mining operations involve conventional open pit mining with blasting followed by truck/shovel haulage. Broken ore is transported to a concentrator to produce rare earth phosphate concentrate (REP), zinc concentrate and fluorspar. The REP is further processed in the refinery to produce a REE product and uranium oxide. All saleable products will be transported to a purpose built port and exported. Key elements of the Project relevant to the SIA are summarised in Table 2.1, with more detail available in the Environmental Impact Assessment (EIA).

Table 2.1 Project summary

Project Element	Description	Details
Tenement	EL 2010/02	80 km^2
Mine reserve		108 Mt
Mining rate		3.0 Mtpa
Mining method	Open pit	Extraction of ore and waste rock using drilling, blasting and power shovels
Processing method	Mechanical (Concentrator) and chemical processing (Refinery)	
Life of Mine		37 years
Construction phase		3 years
Operating phase		37 years
Decommissioning and closure		6 years
Products	Rare earth elements	30,000 tpa
	Zinc concentrate	15,000 tpa
	Fluorspar	16,000 tpa
	Uranium oxide	517 tpa
Supporting infrastructure	Power station	59 Mw
	Power lines	2 x 11 km, 11 Kv transmission lines
	Roads	10 km dual lane (8 m wide) unsealed road from port to mine
Size of Project elements	Total footprint (at 37 yrs)	5.9 km^2
	Mine pits	1.14 km^2
	Port	0.1 km^2
	Accommodation	0.04 km^2
Water use from Narsaq river	Supplementary fresh water	191 m^3/h
Excess water	Discharge of treated excess water to Nordre Sermilik	816 m^3/h
Product transport	22 vessels per year	Handy-Max, 40,000 DWT
Employee transport	Airport	Narsarsuaq
Employees	Construction phase (peak)	200 Greenlandic, 971 foreign
	Operation phase (average)	328 Greenlandic, 387 foreign
	Closure phase (average)	41 Greenlandic, 7 foreign
Capital Investment	Total	USD 1.24 billion
Operating Expenditure	Annual	USD 259 million
Taxes and Import duties	Annual	USD 124 million

2.1.3 Social Impact Assessment process

Inatsisartut Act no. 7 of 7 December 2009 (the Mineral Resources Act, MRA) requires that mining companies prepare a social impact assessment in connection with the development of any proposed mineral project. The MRA also stipulates that an exploitation license for a proposed project will only be granted once the project's social impact assessment has been accepted by the Government of Greenland (GoG).

Evolution of the SIA

In 2010 GML prepared an initial feasibility study for the Project.

At the same time, to initiate activity to satisfy the requirements for obtaining an exploitation license for the Project, work on the "scoping phase" of a social impact assessment was also commenced.

During the scoping phase, several stakeholder engagement workshops were conducted to present the Project to stakeholders and to receive feedback on topics to be covered in the SIA. In July 2011, after extensive consultation, GML drafted the first version of the Terms of Reference (ToR) for the Project's social impact assessment.

Subsequent changes to the Project design and an amendment to the Mineral Resources Act in 2014 prompted the development of an updated ToR. Public consultation in respect of the updated ToR occurred in the period August – October 2014, with comments from the consultation process consolidated in a subsequent White Paper.

In the first half of 2015 GML prepared a further revision of the ToR based on comments collated in the White Paper. The 2015 version of the ToR was approved by the GoG in late 2015. This SIA has been developed in accordance with this ToR.

The SIA has been developed with the involvement of stakeholders as much and as effectively as possible at all stages of its development. Table 2.2 summarises the key stakeholders the Company has engaged with in relation to the development of the Project.

Table 2.2 Key Stakeholders

English Description	Greenlandic Name
AUTHORITIES	
MLSA	Aatsitassanut Ikummatissanullu Aqutsisoqarfik
Ministries in Greenland : • Finances • Mineral Resources • Housing, Building and Agriculture • Industry, Labour and Trade • Family, Equality and Social Welfare • Health • Education, Culture, Research and Church • Nature, Environment and Justice	Naalakkersuisoqarfiit: • Aningaasaqarnermut • Aatsitassanut Ikummatissanullu • Ineqarnermut, Sanaartornermut Attaveqarnermullu • Aalisarnermut, Piniarnermut Nunalerinermullu • Inuussutissarsiornermut, Suliffeqarnermut Niuernermullu • Ilaqutariinnermut, Naligiissitaanermut Isumaginninnermullu • Peqqissutsimut • Ilinniartitaanermut, Kultureqarnermut, Ilisimatusarnermut Ilageeqarnermullu • Pinngortitamut, Avatangiisinut Inatsisinillu Atuutsitsinermut
Municipality – Kommune Kujalleq: • The Mayor's department (Qaqortoq) • Industry and labour market, (Narsaq) • Culture, leisure and prevention (Narsaq)	Kommune Kujalleq: • Borgmesterip allaffia • Inuussutissarsiornermut Suliffeqarnermullu Ingerlatsivik

English Description	Greenlandic Name
• Prevention consultant (Narsaq) • Housing and Environment (Qaqortoq) • Social Services (Qaqortoq) • School and pre-school (Nanortalik) • Finances (Qaqortoq)	• Kulturi, Sunngiffik Pitsaaliuinerlu • Pitsaaliuinermi Siunnersorti • Teknikkeqarnermut, Ineqarnermut & Avatangiisinullu Ingerlatsivik • Isumaginninnermut Ingerlatsivik • Atuarfeqarfinnut ulluinnarnilu paaqqinnittarfinnik ingerlatsivik • Aningaasaqarnermik Ingerlatsineq
GOVERNMENT ORGANISATIONS	
The Greenland Nature Institute	Pinngortitaleriffik
National Museum	Kalaallit Nunaata Katersugaasivia
Narsaq Museum	Narsap Katersugaasivia
Working Environment Authority	Sullivinnik Nakkutilliisoqarfik
National Association of Municipalities	KANUKOKA
WORKERS AND EMPLOYERS ORGANIZATIONS	
Workers Union	Sulinermik Inuussutissarsiuteqartut Kattuffiat (SIK) Sulinermik Inuussutissarsiuteqartut Peqatigiiffik (SIP)
Greenland's Employers' Association	GA
Greenlandic Employers' Association	Nunaqavisissut Suliffiutillit Kattuffiat (NUSUKA)
ORGANIZATIONS RELATED TO BUSINESS AND DEVELOPMENT	
Visit Greenland	Visit Greenland
Greenland Venture	Greenland Venture
Greenland Business	Greenland Business
Local Trade Forum	(Erhvervsforum Kujalleq)
Private rock and gemstone gatherers	
ORGANIZATIONS RELATED TO FISHING, HUNTING AND FARMING	
Fisherman and Hunters Association (KNAPK) Locally representatives (APP)	Kalaallit Nunaanni Aalisartut Piniartullu Kattuffiat (KNAPK) Aalisartut Piniartullu Peqatigiiffiat (APP)
Sheep Farmers' Association	Savaatillit Peqatigiit Suleqatigiissut
ORGANIZATIONS RELATED TO EDUCATION AND TRAINING	
School of minerals and petroleum (Råstofskolen) School of Metal and Mechanics (from Jan 11 associated to School of Mining)	Sanaartornermik Ilinniarfik or Sanilin (Sisimiut)
Cooking School	INUILI
The workers' school	Sulisartut Højskoliat
OTHER ORGANISATIONS	

English Description	Greenlandic Name
Narsaq Earth Charter	
Against uranium in Narsaq	
AVATAQ	AVATAQ – Pinngortitaq avatangiisunullu peqatigiiffik
ICC – Inuit Circumpolar Conference	
Women's Association (local representative in Narsaq)	Arnat Peqatigiiffiat
Elders Association/Council (local representative in Narsaq)	Utoqqaat Peqatigiiffiat

Objectives of the SIA

The objectives of the SIA include:

- To provide a satisfactory and impartial description for Greenlandic society in general about what Greenland, the local affected communities and individuals will gain from the Project;
- To inform and involve relevant and affected individuals and stakeholders early on in the process via ongoing dialogue and specific procedures;
- To provide a detailed description of the social pre-Project baseline situation, which, on the basis of the most recent available data, is to form the basis for planning, mitigation initiatives and future monitoring;
- To provide an assessment based on collected baseline data to identify both positive and negative social impacts at local and national levels;
- To optimise positive impacts and mitigate negative impacts throughout the Project lifetime and through this ensure sustainable development;
- To involve in a meaningful manner affected towns, settlements and communities (individuals) that may be directly or indirectly impacted throughout the Project by utilising and respecting local knowledge, experience, culture and values; and
- To form the basis for the development of the Impact Benefit Agreement (IBA).

The SIA also specifically provides information on the:

- Use of Greenland labour;
- Use of Greenland Enterprises; and
- Extent to which processing of minerals will take place in Greenland.

2.1.4 Study Areas and Temporal Boundaries

Study areas are defined as the areas for which baseline data is collected for the purpose of assessing the Project's anticipated social impacts.

Three study areas were defined for the Project's SIA:

- The local area Narsaq (including Ilua Valley and the Narsaq settlements)

- The regional area — Kommune Kujalleq, with a specific focus on the population centres of Qaqortoq (capital of Kommune Kujalleq), and Narsarsuaq, and settlements within the municipality (Qasiarsuk, Igaliku and other small settlements)
- National Area — Greenland with a specific focus on impacts which may predominantly affect the capital, Nuuk.

2.1.5 Structure of the Impact Assessment

The identification of the potential social impacts of the Project (adverse and beneficial, direct and indirect) was based on:

- An understanding of the social baseline conditions,
- Analysis of the Project and its social effects, and
- Assessments of how these effects might generate social impacts.

The impact assessment grouped impacts under seven topics:

- National and local economy
- Employment
- Land use
- Ocean resources
- Community health, safety and security
- Occupational health and safety
- Social structures and community life

For each impact identified, the SIA evaluated the significance of the impact or benefit and identified mitigation/enhancement measures to address each. Following identification of appropriate measures, impacts/benefits were then re-evaluated to identify the anticipated residual impact. Cumulative impacts were also identified, to understand the additive effect of multiple impacts on an affected community or area.

2.2 Assessment of Alternatives

A number of alternatives have been considered during the course of Project design. Those specifically relevant to the SIA are summarised below:

1 Not proceeding with the Project

Not proceeding is an alternative in an environment subject to volatile commodity prices and increasing processing costs.

If the Project were not developed, USD 1.24 Bn of capital investment would not occur in Greenland and the annual operating expenditure of USD 259 million would also be foregone. The Project anticipates paying approximately USD 124 million per annum in taxes and duties and anticipates generating approximately 328 Greenlandic jobs during the operations phase.

2 Processing methods

Three alternative processing scenarios were examined: mechanical concentrator only; mechanical concentrator and chemical processing; or mechanical concentrator, chemical processing and REE separation.

The mechanical (concentrator) and chemical processing (refinery) option was selected as the processing method for the Project. The method involves some downstream processing of REEs in Greenland and the production of several saleable by-products.

This option is aligned with the priority of the GoG to ensure that, as much as practically possible, processing of mineral products takes place within Greenland.

3 Location of Project components

Two potential locations for each of the concentrator and refinery, and port and accommodation facilities were considered: Location East and Location West.

Following public consultations, Project development was focused on the alternative where facilities and activities would be located in the Ilua Valley (Location West).

Alternative locations for employee accommodation and port facilities within the Ilua Valley were also considered with the final locations selected to minimise social and environmental impacts associated with these facilities.

4 Energy supply

As a potentially suitable source for hydropower, Johan Dahl Land, is located approximately 55 km to the north of the Project, the development of hydropower for the Project was considered.

Based on construction requirements this option was not considered feasible for the first stage of development of the Project.

Wind sourced power was not considered to be a viable alternative as it would not be capable of providing a reliable source of base load electricity.

Power generation from heavy fuel oil was not adopted because of the level of sulphur emissions which would be produced. The decision was made to use diesel fuel to generate electricity.

2.3 Baseline

Baseline data has been collected from primary and secondary data sources. Primary data has been sourced using both quantitative and qualitative methods. Specific interview questionnaires and tools for qualitative methods were developed for the SIA and international experts were engaged to ensure that the methodologies were scientifically sound. Greenlandic experts ensured local sensitivity and adequacy.

Secondary data sources included public domain information, with a strong reliance on data prepared by Statistics Greenland (2018). The data presented in this SIA is representative of data available on December 7th, 2018. High quality secondary data from research studies such as the Survey on Living Conditions in the Arctic (SLiCA) were also utilized.

The Project will be located 7.5km from the nearest town, Narsaq, located in Kommune Kujalleq. Kommune Kujalleq comprises approximately 12% of the Greenland population, and Narsaq

(including settlements) has a population of 1,594. Consistent with the trend seen across Greenland, Narsaq has been experiencing a declining population in recent years.

Greenland's economy is dominated by exports of fish and shrimp and the "block grant" from Denmark. Tourism and resource developments, amongst other things, have been prioritised by the GoG to expand the economy, however relatively little material expansion has occurred in the economy to date. A number of resource projects (including the subject of this SIA) are in advanced stages of planning and construction, with the potential to substantially boost the national economy in coming years.

The regional economy largely replicates the national economy, with a focus on fishing activities and a growing tourism sector. The private sector in Kommune Kujalleq consists of small enterprises such as retailers, fishermen, hotel and catering services and repair services.

The number of employed people (on average in a month) in Kommune Kujalleq was recorded as 2,794 in 2017, of which 683 people were resident in Narsaq. At both the regional and local levels, public administration (>40%) and service roles dominate the types of employment held by residents. Fishing and hunting make up the majority of the remainder of jobs held by residents of Narsaq. More than 13% of the Narsaq population was recorded as "unemployed" in 2016, more than 50% of whom were aged between 18-29 years of age.

Education levels in Greenland have increased significantly over the past decade, with a near 50% increase (to 1445 students) in the number of students enrolled in upper secondary school in the period 2003-16. However, scholastic achievement is constrained by a large proportion (60%) of students abandoning their education programmes before completion (dropping-out).

Most higher education in Greenland is free of charge for students, being funded by the tax system. Greenland has one university and at least seven education institutions providing vocational training skills.

Greenland's health service is expansive, however it faces challenges due to the vast geographical regions health staff need to cover. Narsaq has a health centre and the referral hospital for Kommune Kujalleq is located in Qaqortoq.

Despite its isolation, Greenland experiences significant levels of communicable diseases, notably tuberculosis and sexually transmitted diseases. While the prevalence of these diseases remains high, the mortality levels associated with diseases is on the decline. Greenland also has an increasing prevalence level of non-communicable diseases, specifically obesity, cardiovascular disease and type 2 diabetes. These diseases are associated with the rapid transition from a traditional to a modern society and the associated changes to lifestyle and eating habits. Social and emotional well-being issues are also an area of concern for Greenland, with significant challenges related to alcohol and drug abuse, domestic violence and suicide.

Narsaq is located on the coast, with a fertile valley (Ilua Valley) to the north-east of the town. Almost all of the sheep/reindeer/cattle farming undertaken in Greenland occurs in Kommune Kujalleq. The nearest farm to the Project is the Ilua Valley Farm, located 4km from the Project site. A series of summer houses are also located in the Ilua Valley.

Narsaq residents and tourists place considerable value on the ecosystem services derived from the land and ocean surrounding Narsaq, with berry picking, hiking, fishing, hunting (hares, seals and whales) and stone collecting all being undertaken on a semi-regular basis. Kommune Kujalleq is

also home to the Kujataa UNESCO World Heritage Area, with the nearest listed area (Qaqortukulooq) located approximately 18km to the east of the Project.

The isolated nature of population centres in Greenland, combined with low population densities, create significant challenges for community infrastructure. In 2010, Narsaq comprised 761 dwellings, of which a proportion have become derelict, as result of being left vacant over time as the town's population has declined.

Narsaq sources its drinking water from the Napasup Kuua, Kuukasik and Langnam rivers, with a reservoir located to the east of the town.

Pre-existing vulnerabilities specific to regional Greenlandic lifestyle have been identified as part of the SIA. Groups affected by the vulnerabilities include: people with mental disabilities or experiencing symptoms of drug and alcohol abuse; households with no recent history of employment; and unemployed young men. Impacts affecting these "vulnerable groups" have been specifically assessed in the impact assessment.

2.4 Assessment of Impacts

The SIA sets out the potential social impacts of the Project during construction, operation and closure. It identifies the sources of impacts and benefits associated with the Project's infrastructure and activities and considers impacts/benefits induced by social changes associated with the Project, including direct employment, economic inputs and demographic changes.

For each subject area the assessment describes:

1. Project activities and / or sources of potential benefit and impact for those activities;
2. The nature of potential benefits and impacts;
3. The features incorporated in the Project to reduce impacts to acceptable levels and to enhance benefits;
4. The significance of impacts/benefits after mitigation/enhancement measures are applied.

2.4.1 National and local economy

During the construction, operation and closure phases of the Project, opportunities will be generated for Greenlandic labour and business enterprises. Opportunities will include both those directly created by the Project and those generated indirectly to support the Project. In accordance with the MRA, GML will seek to maximise Greenlandic labour and business opportunities where possible.

The Project is anticipated to generate:

- Capital investment of USD 1.24 billion, with annual operating expenditure of USD 259 million;
- Taxes and import duties paid to the Greenland Government and Kommune Kujalleq in totality approximately USD 125 million per annum; and
- A peak construction workforce of 1,171, an average operations workforce of 715 for a period of 37 years, and a closure workforce of 48 individuals.

These benefits will primarily accrue at the Kommune Kujalleq and national levels, and benefits will be highest for those securing employment or contracts with the Project. The development of large projects, with significant benefits, run the risk of creating inequitable benefits across society. Specifically, potential risks include: concerns over the distribution of mineral revenue at a national and regional level; local inflationary pressure in Narsaq due to increased salaries in the town; and jealousy amongst residents of Narsaq related to the distribution of benefits from the Project.

To enhance the equitable distribution of economic benefits and minimise the potential for the risks identified above, the following mitigation measures will be implemented:

- GML will make public the tax values paid on an annual basis;
- Contracts will be unbundled where possible to increase the likelihood of Greenland Enterprises securing tenders with the Project;
- Community development activities will target vulnerable households and women will specifically targeted for participation in vocational training courses relevant to indirect employment opportunities; and
- All employees, contractors and visitors will be required to sign the Kvanefjeld Project Code of Conduct, minimising the risk of anti-social spending in Narsaq.

2.4.2 Employment and Labour Conditions

Employment

The development of the Project will generate employment opportunities. During the construction phase, 3 years, the Project workforce will average approximately 800 people. Direct employment during operations is expected to be in the order of 715.

The creation of this number of job opportunities in Greenland is significant at a local, regional and national scale. As a result of a shortage of skills nationally, only a proportion of these jobs are expected to be filled by Greenlandic labour. In line with Greenlandic legislation, Greenlandic labour will be prioritised wherever possible, and GML anticipate the proportion of Greenlandic labour in the workforce will increase over time. GML will initially seek to recruit workers locally (within Narsaq area and Kommune Kujalleq) and then nationally.

Approximately 134 Greenlandic jobs (17% of the average construction workforce) will be created during construction (200 during peak construction) and approximately 328 will be created during operations (46% of the operations workforce). During the Project's closure phase Greenlandic labour will fill 41 jobs (85% of the closure workforce). These employment estimates represent the anticipated breakdown of opportunities at the commencement of each Project phase, with expectations that the proportion of Greenlandic workers will rise over time.

In addition to direct employment opportunities, the Project is expected to generate indirect employment opportunities for Greenlanders and business opportunities for Greenlandic enterprises. An indirect employment multiplier of 1.3 is expected to be applicable for the Project. This is expected to equate to an additional 930 jobs during the Project's operation phase.

The Project will require a skilled workforce. Some of the skills required will be highly specialised and will need to be implemented by existing specialists. Others, however, will require skills which can be trained within a reasonable period.

Effective training is the gateway through which Greenlandic labour will be able to gain access to employment opportunities and to progress through the management ranks of the Project. Training will need to be targeted to develop skills which are needed in the long-term. The Company believes the best way to develop Project relevant skills in the Greenlandic workforce is through on the job skills transfer from foreign labour to Greenlandic staff.

Opportunities for training and capacity building are likely to be greatest during the operations phase of the Project. To increase the training the work skills capacity building opportunities the following actions, amongst others, will be undertaken by GML:

- Operational staff will be hired at least 6 months in advance of the commencement of operations to allow for completion of effective training;
- Anticipated recruitment of at least 40 students from the Greenland School of Minerals and Petroleum in Sisimiut;
- Coordination with the GoG to sponsor students through the PKU-Kurser;
- Development of a comprehensive internal training and mentoring program to accelerate the progression of Greenlandic workers within the company.

Labour conditions

GML will be responsible for establishing labour conditions which are fair, attractive to employees and consistent with norms and standards required by relevant government authorities and Greenland's major labour union, SIK.

To ensure labour conditions are well managed and all workers are treated equitably, GML will implement the following measures:

- Continuous engagement with labour unions to establish working conditions which will meet Greenlandic requirements;
- Engagement with SIK and the GoG to agree a "skilled workers" wage sufficient to attract and retain top quality local employees.
- Workforce rotations will be developed to support family-friendly employment.

Workforce accommodation

Significant numbers of Project employees will be accommodated on the Project site and in the Narsaq environs during the life of the Project. The introduction of a significant workforce into a relatively small community has the potential to generate a range of impacts, including:

- Social tension generated by a large non-local workforce;
- A shortage of accommodation in Narsaq and Narsarsuaq;
- Cramped or low quality living conditions for employees; and
- Changes to housing availability and rental prices in Narsaq.

The following measures are proposed to minimise the negative impacts and enhance the benefits associated with the proposed approach to accommodating the Project workforce:

- All Project workers, contractors and Project visitors will be required to sign and agree to a code of conduct regulating their behaviour and interaction with the residents of Narsaq;
- Maximising the use of Greenlandic labour in jobs affiliated with the accommodation facilities;
- Setting workforce accommodation standards that comply with international good practice;
- In the event of an accommodation shortage during construction, GML will utilise a marine vessel to provide additional short-term accommodation. This may be initiated during peak tourist season to ensure impacts to tourism are minimised; and
- Refurbishment of the housing stock in Narsaq.

2.4.3 Land use and land-based livelihoods

The development of the Project has the potential to impact the livelihoods of households which derive an income from the land as a result of a combination of the physical footprint of the Project, environmental impacts generated by the Project and access restrictions applied by the Project.

Land-based livelihoods in the local area include: farming (cattle, sheep and reindeer), gemstone collection (tugtupit) on the Kvanefjeld plateau and tourism activities using Narsap Ilua. The potential for impact to each of these livelihoods was assessed in the SIA.

Recognising that land based livelihood impacts may develop during the course of the Project (for example, impacts deriving from perception concerns related to local produce rather than physical impacts to the produce) the following socio-economic mitigation measures will be put in place to reduce potential land-based economic displacement impacts:

- Land acquisition and compensation (to the extent it is applicable) will be undertaken in a manner consistent with leading international practice (consistent with the IFC Performance Standards);
- The Project will acquire the Ilua Valley Farm through a negotiated settlement with the owner; and
- Engagement and consultation with all land users in the area.

While tourism is increasing in Kommune Kujalleq, the Narsaq tourism industry is relatively small. Potential tourism impacts generated by the Project include the risk that fewer tourists will visit seeking pristine nature and local hiking opportunities. This impact may be countered by a potential increase in tourist numbers with the enhancement of local transport of options.

To manage these impacts, there will be an Investigation with Kommune Kujalleq of opportunities to promote local tourism.

2.4.4 Ocean resources and ocean-based livelihoods

Fishing and other ocean-based activities are a key element of Greenlandic life. The extent to which the Project will impact upon ocean-based lifestyles depends both on impacts to the ocean and its resources and on the existing use of those resources to sustain livelihoods. Ocean-based livelihoods which have the potential to be impacted by the Project include commercial fishing and seal hunting and traditional fishing and hunting activities. No economic displacement of fishermen, either commercial or subsistence, is anticipated from the Project.

2.4.5 Occupational health and safety

The Project environment has the potential to generate workforce exposure to both acute (safety) hazards and chronic (radiation exposure) hazards. Specific controls for workers that will minimise exposure to these hazards will be developed in the Project's Health and Safety Management Plan.

The Project design includes the construction of a medical facility accessible by all employees, contractors or visitors in the event of an accident or work-related medical emergency.

The occupational health and safety mentioned in the SIA is the description outlined by GML. The relevant authorities, including the authorities responsible for health, occupational health and radiation etc., will set terms in relevant subsequent licences and/or approvals and therefore decide upon final approvals of the activities.

Accidents

The risk of accidents on a mine site is tied to the presence of potential hazards. The Project will be exposed to typical mining related acute safety hazards each of which has the potential to result in short or long-term injuries or, in the worst case, fatalities.

A comprehensive Health and Safety Management Plan will be implemented by GML consistent with the company's Occupational Health and Safety Policy. The goal of the policy is to remove or reduce risks to the health, safety and welfare of all workers and to ensure that all Project activities are undertaken safely.

GML will undertake the following measures to minimise the risk of accidents on the Project:

- Preparation of a written workplace assessment of occupational health and safety prior to the commencement of construction;
- Preparation of safe work procedures for key activities;
- Maintaining all plant and equipment in safe working condition; and
- Provision of information, instruction, training and supervision to ensure that all workers are safe from injury and risks to their health.

Radiation (health and occupational health impact)

Project workers will potentially experience workplace exposures to radiation due to the mineral composition of the Kvanefjeld orebody.

The IAEA has adopted recommended annual radiation exposure/dose limits. These are:

- For a worker - 20 mSv; and
- For a member of the public - 1 mSv

The responsibility for setting dose limits in Greenland will be shared between the Danish (for occupational health) and Greenlandic (for public health) Governments.

Based on estimated exposures to naturally occurring radioactive material and exposures related to the Project, the estimated residual radiation doses per annum for Project workers are well below internationally recognised dose limits and within the norm for other uranium projects.

All the following measures will be implemented at the Project:

- Appropriate clothing will be supplied to employees and will be laundered on site to ensure no potentially radioactive materials migrate to private living accommodation;
- All employees will undergo a regular (annual) medical exam, performed by the Company medical clinic;
- All employees will be provided with gamma radiation dose badges and the Company radiation protection officer will monitor exposure levels and the results will be made public through the Project's annual report and will be shared directly with the GoG;
- Areas where elevated radioactivity is expected will have engineering measures (shielding, distance) and procedural controls (exposure time, worker rotation and personal protective equipment (PPE)) to minimise radiation exposure;
- Water trucks will be used to suppress dust across all areas of the mine; and
- A vehicle washing bay will be used to remove mine dust / dirt from all vehicles leaving the mining area.

2.4.6 Community Health and Safety and Security

The Project has the potential to create number of community related health, safety and security impacts. These are associated with, amongst others, environmental factors (eg dust, noise, radiation), traffic movements and increased risk of disease.

The conditions related to health, safety/security and radiation in the SIA is the description outlined by GML. The relevant authorities, including the authorities responsible for health, safety and radiation etc., will set terms in relevant subsequent licences and/or approvals and therefore decide upon final approvals of the activities.

Dust (health impact)

Dust will be generated by construction and mining related activities until the end of life of the mine. During closure, emissions will be significantly lower with primary sources being vehicle movements, maintenance of the tailings facility and power plants.

Air quality modelling for the operations phase of the Project, the period of maximum impact for dust and air quality, indicates that no adverse health impacts should be anticipated from Project related emissions of particulate matter. Modelling for the construction phase is more difficult because of intermittent activity levels and emissions sources but qualitative assessments indicate that, while short-term dust levels may be higher during construction, levels will remain well below relevant health criteria.

GML has developed a Dust Control Plan (GML 2015c) containing measures which include:

- Wetting haul roads, stockpiles, concentrates and waste materials;
- Salting of haul roads to melt ice and snow;
- Setting appropriate vehicle speed limits, regular grading and maintenance; and
- Dust containment equipment.

The dust generation from mining activities is expected to be significantly lower than the modelled values.

Noise

During the construction phase, noise will be generated by mobile equipment, drilling and blasting, vehicle movements, maritime transport and vessels at the wharf.

During the operations phase, the principal noise sources will be in and around the mine area, access roads and the Port.

When compared against the IFC EHS Guidelines, the identified noise levels are compliant with the standards. Denmark guidelines values for summer house noise levels will not be met by the Project and the following mitigation measures will be implemented to further reduce noise impacts:

- Noise levels will be monitored at the point of the nearest sensitive receptors;
- High noise activities will be scheduled to minimise disruption to the community;
- Opportunities to reduce noise generation will be investigated in detailed engineering; and
- Residents will have access to a community grievance mechanism established by GML.

Radiation (health impact)

The development of the Project has the potential to release small amounts of radioactivity in addition to the baseline radiological exposures in the community. A detailed assessment of potential incremental radiation exposure, for both ecological and human receptors, was undertaken and incremental exposures are well below the dose benchmark for members of the public. As a result all of the local foods will be safe to eat and there will be negligible change to overall exposure from the consumption of traditional foods (e.g. seal and seabirds)

Measures to mitigate both the Project's contribution to radiological exposure and the background exposure levels include:

- Implementation of the dust control measures in GML's Dust Control Plan; and
- Engagement with Greenland's Ministry of Health to better understand baseline radon exposure in Narsaq and to help residents understand how they can reduce this exposure.

Traffic Safety

The Project will require the upgrading of the existing access road / track from Tunu Peninsula at Narsap Ilua (location of the Port) to the mine area. The access road will be accessible to the public along the valley floor but access restrictions will apply closer to the mining area.

As part of the Company's noise modelling, estimates of traffic movement levels along the access road during the Project's operations phase were prepared. The traffic volume anticipated will potentially increase the traffic on the road by an order of magnitude or greater. From a community safety perspective this has the potential to increase the traffic safety risk in the Ilua Valley because of a lack of community experience with higher volumes of traffic.

To reduce this community safety risk, speed restrictions will apply, small convoys will be considered for heavy vehicles and community traffic safety campaigns will be coordinated with the town of Narsaq.

Communicable diseases

Development of the Project will require the recruitment of significant numbers of, predominantly male, foreign employees and Greenlandic employees who are not residents of Narsaq. These employees will interact to varying degrees with residents in Narsaq and other local communities. This interaction could generate increased transmission of communicable diseases, including sexually transmitted diseases (STDs) and tuberculosis (TB).

The following measures will be implemented to reduce these impacts:

- Construction workers will be largely segregated from the town of Narsaq and operations workers will live within a security-controlled environment;
- All employees and visitors will be required to sign a Code of Conduct requiring workers to engage with community members respectfully and in a socially beneficial manner.
- GML will provide and will require its contractors to provide:
    - STD (including HIV) testing and diagnosis and access to counselling/referral services as necessary;
    - Pre-employment medical screens targeting TB and regular health checks; and
    - Accommodation that ensures adequate space is available for all workers in order to reduce the risk of TB transmission
- GML will monitor and share health outcomes and develop campaigns to change behaviours as necessary.

Non-communicable diseases

The Project, by increasing the level of income in the local community and introducing workforce catering, may further accelerate changes in the dietary intake of households. This development, together with the move away from traditional, higher energy lifestyles towards more sedentary working environments, has the potential to affect the level of cardio-vascular disease, obesity and type 2 diabetes in the community.

The Project also has the potential to positively affect the level of non-communicable diseases by encouraging good health behaviours (e.g. no-smoking working environment and zero tolerance for drugs and alcohol).

GML will undertake the following measures to further manage these impacts:

- A strict no-smoking policy and random drug and alcohol testing will be applied to all employees, contractors and visitors;
- Workforce accommodation will include areas for exercise; and
- Caterers will create balanced diet offerings and Village store will provide healthy alternatives and local foods where possible.

Social and Emotional Well-Being

Social and emotional well-being comprises a range of health concerns, from drug and alcohol abuse, to depression and suicide and it is a significant issue in Greenlandic society.

The development of the Project has the potential to positively influence the social and emotional well-being of the town of Narsaq by offering new opportunities to community members and providing incentives to reduce drug and alcohol consumption.

GML will stimulate, support and encourage improvements to social and emotional well-being in Narsaq and Kommune Kujalleq by:

- Engaging with local health providers to deliver campaigns targeting mental health;
- Developing policies for the Project which highlight non-tolerance of discrimination; and
- Actively promoting successful Greenlandic employees and business partners as success stories which can be shared locally, regionally and nationally.

2.4.7 Social structures and community life

The Project has the potential to create impacts upon social structures and community life. Specifically, potential impacts include: changes to population demographics, changes to infrastructure and service level demand, impacts to traditional knowledge and interactions with vulnerable groups and social issues.

In-Migration

The Project has the potential to generate local in-migration as people move to the Narsaq area to benefit from the economic opportunities associated with the development and operation of the Project.

The nature of the Project and the development strategy for the Project will tend to limit in-migration for a number of reasons:

- The Project will use a fly-in fly-out workforce;
- The Kvanefjeld mineralisation is not appropriate for small-scale or artisanal mining; and
- The modular approach to construction will reduce the Project related demand for small construction enterprises in Greenland and Kommune Kujalleq particularly.

In addition to these Project related factors, Greenland's geographic isolation and harsh winter conditions will also tend to limit in-migration.

While significant in-migration is not anticipated, the following measures will be put in place to manage in-migration impacts if they occur:

- Effective communication of the nature of Project employment opportunities; and
- Engagement with Kommune Kujalleq to respond to pressure placed on services.

Infrastructure, Services and Government Delivery Capacity

The development of the Project has the potential to increase the demand for government services and infrastructure. The Project is expected to increase the population of Narsaq by at least 25% during the operations phase. Typically, this scale of population increase would have the potential to exceed the existing capacity of services in a town. However, the scale of the impact in Narsaq is likely to be somewhat moderated by the recent decline in the town's population (leaving services under-utilised) and the establishment of Project specific facilities / services.

Given these factors, the potential impacts to infrastructure, services and government delivery capacity include:

- Education facilities

  Due to the high proportion of FIFO workers, the number of students living in Narsaq is not expected to rise significantly. To the extent that an increase in student number's is seen, this would likely to considered a positive impact as it would boost school enrolments;

- Health facilities

  The Project will establish its own medical clinic which will treat Project workers. The clinic will be staffed with a full-time nurse with video link to an emergency doctor as required. Families of workers who move to Narsaq will likely make use of the existing health services in Narsaq, equating to an increase in public health service demand of approximately 25%.

- Police services

  Increased population in Narsaq has the potential to generate additional crime, potentially increasing the demands on existing police services;

- Skilled staff

  There is a risk that skilled employees currently working with the GoG or Kommune Kujalleq delivering key services (e.g. town administrators, teachers, nurses etc) may apply for jobs at Project thereby creating a resource shortage for Government services.

Impacts to infrastructure, service and government delivery capacity will be mitigated through implementation of the following measures:

- Engagement between GML and Kommune Kujalleq administrators in respect of the number of new residents anticipated as a result of the development of the Project.
- GML will engage with Greenland's Ministry of Health to determine how best to support the expansion of health services in Narsaq to meet increased demand; and
- The requirement for Project employees, contractors and visitors to comply with the company's Code of Conduct will reduce the risk of increased crime in the area.

Protection and Promotion of Traditional Knowledge

The recruitment of a mining project workforce and an increased level of cash income in remote communities can have an impact on the maintenance of traditional values and practices. Traditional values can come under pressure but can also benefit from increased focus from those who see the importance of protecting this knowledge in the face of greater exposure to external influences.

GML places very high importance on the protection and promotion of traditional knowledge in Narsaq, and Greenland more broadly, and will implement the following measures to support activities:

- The working language of the Project will be English, however all safety, information, consultation and management documents will also be translated into Greenlandic to protect local language skills

- Opportunities to support Greenlandic culture through the use of the local dialect and coordination of community activities reinforcing culturally relevant practices; and
- Work rosters will be developed to ensure Greenlandic workers can maintain their connection with family and traditions.

Vulnerable Groups and Social Issues

Three vulnerable groups were defined in the SIA, namely:

- People experiencing mental disabilities or affected by drug and alcohol abuse
- Households with no recent history of members having been employed
- Unemployed young men

The Project has the potential to positively affect these groups through employment and training opportunities and by increasing the level of income in Narsaq. There are also potentially negative effects, in particular the potential for increased income to lead to an increase in drug and alcohol consumption thereby reinforcing existing social challenges.

The Company will take steps to, where possible, stimulate the positive impact and mitigate the negative impacts felt by these vulnerable groups including strict implementation of the Company's Code of Conduct and coordination with the Narsaq police to develop strategies targeting drug abuse in the community.

2.4.8 Cumulative impacts

Cumulative impacts are defined as "impacts that result from the incremental impact, on areas or resources, used or directly impacted by the Project, from other existing, planned or reasonably defined developments at the time the risks and impacts assessment process is conducted" (IFC, 2012).

Society will be potentially exposed to cumulative impacts associated with the development of several mining projects in Greenland at the same time and from the effects of climate change.

The assessment of cumulative impacts is often challenging given a lack of detailed information about other developments. However, based on experience from countries with expanding minerals sectors, potential cumulative impacts could include:

Negative Price inflation, skills shortages, pressure on community infrastructure and services, loss of community identity, pressure on fish stocks

The Project is not expected to significantly affect the levels of fishing stocks and only expects to have a low to moderate impact on social services and facilities. Should local inflation become evident the Company will work with MIE to minimise its impact and co-ordination between the proponents of projects and relevant authorities will help to mitigate the impact of pressure on skills availability.

Positive Employment opportunities, investment, tax revenue, commercial opportunities, training and skills development, increased viability of service delivery

The Company will work with other project owners and relevant stakeholders in the Project to endeavour to maximise the beneficial impacts of the development of the Project on society.

2.5 Benefit and Impact Plan

The Benefit and Impact Plan summarises the benefits and impacts identified in the course of this SIA and the mitigation / enhancement measures which will be implemented by GML to maximise the benefit and minimise the impact of the Project. Table 2.3 outlines the draft Benefit and Impact Plan. The mitigation and enhancement measures referenced in Table 2.3 are defined in Table 2.4.

Table 2.3 Benefit and Impact Plan

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post -mitigation Significance
National and Local Economy						
Greenlandic Employment and Procurement	Construction	Moderate	EC1, EC2, EC3, EC4, EC5, EC6, EC7	Possible	Moderate	High
	Operations	Moderate	EC1, EC2, EC3, EC4, EC5, EC6, EC7	Likely	Moderate	Very High
	Closure	Moderate	EC1, EC2, EC3, EC4, EC5, EC6, EC7	Likely	Minor	Moderate
Greenlandic Processing	Operations	High	N/A	Almost certain	Major	Very High
Government Revenue	Construction	Moderate	EC8	Likely	Minor	Moderate
	Operations	Moderate	EC8	Likely	Minor	Moderate
Distribution of Benefits	Operations	High	EC8, EC9, EC10, EC11	Likely	Minor	Moderate

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post -mitigation Significance
Employment and Labour Conditions						
Greenland Employment Levels	Construction	High	EM1, EM2, EM3, EM4, EM6, EM7, EM8, EM9	Likely	Moderate	High
	Operations	High	EM1, EM2, EM3, EM4, EM5, EM6, EM7, EM8, EM9	Likely	Major	Very High
	Closure	Moderate	EM1, EM2, EM3, EM4, EM6, EM7, EM8, EM9, EM10, EM11	Likely	Minor	Moderate
Training and Work Skills Capacity Building	Construction Closure	Low	EM1, EM3, EM4, EM13, EM14, EM15, EM16	Likely	Minor	Moderate
	Operations	Moderate	EM1, EM3, EM4, EM12, EM13, EM14, EM15, EM16	Likely	Moderate	High
Indirect employment and local procurement	Construction Operations	Moderate	EM17, EM18, EM19	Possible	Moderate	High
Labour Conditions	Construction Operations Closure	Moderate	EM20, EM21, EM22	Unlikely	Minor	Low
Workforce accommodation – living standards	Construction	Moderate	EM23, EM24, EM25, EM26, EM27, EM28, EM29, EM30, EM31	Unlikely	Moderate	Moderate
	Operations	High	EM23, EM24, EM25, EM26, EM27, EM28, EM29, EM30, EM31	Remote	Moderate	Low
Workforce accommodation – interaction with Narsaq	Construction	Very High	EM23, EM24, EM25, EM26, EM27, EM28, EM29, EM30, EM31	Possible	Major	Very High

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post -mitigation Significance
Workforce accommodation – interaction with Narsaq	Operations	Very High	EM23, EM24, EM25, EM26, EM27, EM28, EM29, EM30, EM31	Possible	Moderate	High

Land Use and Land Based Livelihoods

Land-Based Economic Displacement – Ilua Valley Farm	Construction Operations Closure	Moderate	LA1, LA2, LA3, LA4, LA5, LA6, LA7, LA8, LA10, LA11	Possible	Minor	Moderate
Land-Based Economic Displacement – Ipuitaq and Tuttutooq Farms	Construction Operations Closure	Low	LA1, LA2, LA3, LA4, LA5, LA7, LA8, LA10, LA11	Remote	Negligible	Low
Land-based Economic Displacement – Gemstone Collectors	Construction Operations Closure	High	LA8, LA9, LA12	Possible	Moderate	Moderate
Land-based Economic Displacement – Kayak Tourism Operators	Construction Operations Closure	Low	LA13	Unlikely	Minor	Low
Food availability and ecosystem services	Construction Operations Closure	Moderate	LA14, LA15, LA16, LA17	Possible	Minor	Moderate
Tourism	Construction Operations Closure	Low	LA18, LA19	Possible	Minor	Moderate

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post -mitigation Significance
Ocean Use and Ocean Based Livelihoods						
Ocean-based Economic Displacement	Construction Operations Closure	Low	OC1, LA1, LA5	Unlikely	Low	Low
Occupational Health and Safety						
Risk of Accidents	Construction Operations Closure	High	OH1, OH2, OH3, OH4, OH5, OH6, OH7, OH8	Unlikely	Moderate	Moderate
Radiation Exposure	Construction Operations Closure	Moderate	OH9, OH10, OH11, OH12, OH13, OH14, OH15, OH16, OH17, OH18, OH19, OH20	Unlikely	Minor	Low

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post -mitigation Significance
Community Health Safety and Security						
Dust and Air Quality	Construction Operation Closure	Low	CH1, CH2, CH3, CH4, CH5, CH6	Unlikely	Negligible	Low
Noise Exposure	Construction	Moderate	CH7, CH8, CH10	Unlikely	Moderate	Moderate
	Operation	Low	CH7, CH9, CH10	Unlikely	Low	Low
Radiation Exposure	Operations	Low	CH11, CH12, CH13	Remote	Minor	Low
Traffic Safety	Operations	Very High	CH14, CH15, CH16	Unlikely	Major	High
Communicable Disease	Construction	Very High	CH17, CH19, CH20, CH21, CH22, CH23, CH24, CH25, CH26	Possible	Moderate	High
	Operations	High	CH18, CH19, CH20, CH21, CH22, CH23, CH24, CH25, CH26	Unlikely	Moderate	Moderate
	Closure	Low	CH19, CH20, CH21, CH22, CH23, CH24, CH25	Remote	Moderate	Low
Non-Communicable Disease	Construction	High	CH27, CH28, CH29, CH30, CH31, CH32	Possible	Minor	Moderate
	Operations	Very High	CH27, CH28, CH29, CH30, CH31, CH32, CH33	Possible	Moderate	High
	Closure	Moderate	CH27, CH28, CH29, CH31	Remote	Minor	Low

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post -mitigation Significance
Social Structures and Community Life						
Social and emotional well-being	Construction Operations	Moderate	CH34, CH35, CH36, CH37	Likely	Moderate	High
In-migration	Construction Operations Closure	Low	SO1, SO2	Unlikely	Minor	Low
Infrastructure, Service and Government Delivery Capacity	Construction Closure	Moderate	SO3, SO5, SO6, SO7	Unlikely	Minor	Low
	Operations	High	SO3, SO4, SO5, SO6, SO7	Possible	Moderate	High
Protection and Promotion of Traditional Knowledge	Operations	Low	SO8, SO9, SO10, SO11, EM4	Possible	Minor	Moderate
Vulnerable Groups and Social Issues	Construction Operations Closure	Low	SO12, EM4, CH18	Unlikely	Minor	Low

Table 2.4 List of Mitigation / Enhancement Measures

Topic	ID	Mitigation / Enhancement Measure
National and Local Economy	EC1	Organisation of a tri-party forum comprising GML, the Government (both regional and national) and the Greenlandic business community to allow for direct communication on business opportunities associated with the Project
	EC2	Preparation of a list of goods and services which will need to be sourced during each phase of the Project. These lists will be shared with the Greenlandic business community to help them organise to maximise their participation in the supply chain for the Project
	EC3	GML will work with local businesses (both national and regional) to explain the tendering and contract process which will be used by the company
	EC4	Provision of support to local businesses on the specific health and safety requirements which will need to be met by supplier companies when working with the Project
	EC5	GML will seek to break up large contracts into smaller value contracts which could be won by Greenlandic enterprises
	EC6	The GML procurement team will include staff Greenlandic speaking staff familiar with the Greenlandic business environment
	EC7	Provision of support to trading organisations such as the recently formed Bygge og Anlaeg og Rastof Klynge in Kommune Kujalleq and Erhvervsforum to coordinate efforts around capacity building of companies
	EC8	GML will make public the tax values paid on an annual basis
	EC9	Community development activities targeting vulnerable households will be implemented as part of the Project's community programs
	EC10	All employees, contractors and visitors will be required to sign the Project Code of Conduct, minimising the risk of anti-social spending (i.e. spending on drugs, alcohol, prostitution, and gambling etc.) in Narsaq
	EC11	Women living in Narsaq will be specifically targeted for participation in vocational training courses relevant to indirect employment opportunities

Topic	ID	Mitigation / Enhancement Measure
Employment and Labour Conditions	EM1	Coordination with the GoG to sponsor students through the PKU-Kurser program in fields of relevance to the development of the Project. The range of courses to be made available are likely to include as a minimum: environmental science, mining, geology, engineering, management, human resources and language
	EM2	Providing information sessions in Narsaq, the other towns and larger settlements in Kommune Kujalleq and in Nuuk on career opportunities at GML
	EM3	Working with vocational institutions (such as the School of Minerals and Petroleum, INUILI among others) to help develop coursework to support Greenlandic students to gain either direct or indirect employment associated with the development of the Project. The goal is to recruit at least 40 graduates from the School of Minerals and Petroleum
	EM4	Development of promotional material showcasing role model Greenlandic employees
	EM5	Establishment of an apprentice training program to train approximately 15 apprentices a year during the operations phase
	EM6	Establishment of a Kvanefjeld human resources department with appropriate Greenlandic language speaking personnel, with responsibility for negotiating contracts with local mediators and unions
	EM7	Preferential hiring of women when male and female candidates are equally qualified for a position
	EM8	Continuing to conduct open days to engage with the community and provide information on the Company's goals and labour requirements
	EM9	Implementing a mentoring program for junior staff to ensure progression through the workforce overtime, with a view to increasing the proportion of Greenlandic labour in management positions
	EM10	Development of up-skilling and retraining programmes for employees (also accessible to contractors) to facilitate their transition into future employment at mine closure
	EM11	A social exit strategy will be developed at least 5 years in advance of closure to address the transition process for employees (both direct and indirect), by providing job-matching support services to employees to assist them to secure future employment after mine closure and to address socio-economic impacts associated with the closure of the Project.
	EM12	Operational staff will be hired at least 6 months in advance of the commencement of operations in order to allow effective training to be conducted

Topic	ID	Mitigation / Enhancement Measure
Employment and Labour Conditions	EM13	Coordination with Kommune Kujalleq administrators to enhance the training opportunities provided within the municipality to better support the development of the mineral industry
	EM14	Work with Majoriaq and the local schools in Kommune Kujalleq to help students understand the job opportunities available at the Project (and indirectly generated by the Project) to see how they can best prepare themselves to secure employment in the future
	EM15	Development of a comprehensive internal training and mentoring program to accelerate the progression of Greenlandic workers within the company. This may involve partial duplication of some roles in the early stages of operations in order to expose junior workers to the experience of more senior, potentially foreign, workers. The objective of these programs will be to steadily increase the proportion of Greenlandic workers (and consequently, reduce the proportion of foreign workers) across every level of the Company as time progresses
	EM16	Engagement with other training centres across Greenland to explain the nature of roles which will be required by the Project and to determine how best to develop this capacity within Greenland
	EM17	Stocking of the “general store” within the Village with Greenlandic products where possible, and if local production is not possible, sourcing goods from Greenlandic suppliers
	EM18	Support for home-based industry which can support the Project, e,g., the development of sewing businesses which could manufacture uniforms and cold weather clothing
	EM19	Encouraging local procurement by contractors through establishing contractual language to support this activity. Local procurement should only be given preference where the local product is largely comparable in terms of quality and cost to internationally available alternatives
	EM20	Early and continuous engagement with SIK and other Greenlandic labour unions to establish working conditions which meet Greenlandic requirements and which will avoid distorting the local labour market
	EM21	Engagement with SIK and the GoG to agree a “skilled workers” wage which be sufficient to attract and retain top quality local employees. This agreement will also be topped up with supplements for shift work and overtime as necessary. The salary agreement will be negotiated with the GoG and SIK prior to the commencement of employment
	EM22	Workforce rotations will be developed to support family-friendly employment and will take into consideration the frequency of home visits necessary to maintain semi-traditional lifestyles
	EM23	Code of Conduct – All workers (including contractors) will be required to sign and agree to a code of conduct when working for the Project

Topic	ID	Mitigation / Enhancement Measure
Employment and Labour Conditions	EM24	Zero tolerance of alcohol and drug consumption and anti-social behaviour when working for the Project and when residing in workforce accommodation. All facilities will be designated as non-smoking. In the event that activity contrary to these policies is observed, disciplinary measures will be taken
	EM25	Respect for Narsaq community and for Greenlandic traditions, including the completion of cultural awareness training on commencement of employment with the Project
	EM26	Restrictions on the level of interaction between Narsaq residents and camp / Village residents. For example, residents of the camp / Village will not be permitted to frequent local bars, but will be encouraged to play sport with and engage with Narsaq residents in activities deemed socially beneficial. The identification of these activities will be undertaken with Narsaq and Kommune Kujalleq administrators as part of the discussion on the IBA
	EM27	Camp and Village facilities will be no-smoking areas
	EM28	Maximisation of Greenlandic labour in the temporary construction worker's camp and Village – GML will work with catering, cleaning and other support industries to best utilise local Greenlandic labour to run these facilities
	EM29	Workforce accommodation standards – Accommodation at the temporary construction worker's camp will be designed and managed by the construction contractor. Details of the planned accommodation were not available at the time of the preparation of the SIA, however, any final designs will need to be approved by GML and will also be reviewed by SIK to ensure compliance with Greenlandic standards. The Village will be designed to comply with international good practice, as outlined in the IFC / EBRD guidance note titled 'Workers' Accommodation: Processes and Standards" (IFC, 2009b)
	EM30	In the event of accommodation shortage during the construction phase, GML plan to utilise a marine vessel to provide additional short-term accommodation on an as needed basis. This would be a short-term measure only and may be initiated during peak tourism months to ensure impact to tourism are minimised
	EM31	GML will work with Narsaq and Kommune Kujalleq administrators to identify apartments and houses which are sitting idle, which could be made available to Greenlandic workers who want to move into town as permanent residents. Up to an additional 50 beds could be made available during these refurbishment activities. It is anticipated that this option might carry some appeal for residents of settlements in Kommune Kujalleq and may also encourage former Narsaq residents to return home when labour opportunities eventuate

Topic	ID	Mitigation / Enhancement Measure
Land-Use and Land Based Livelihoods	LA1	Displacement impacts will be avoided, or where avoidance is not possible, minimised by exploring alternate project designs
	LA2	Forced eviction will be avoided
	LA3	Land acquisition, where required, will where possible be agreed through a willing seller, willing buyer negotiation
	LA4	Where land acquisition is required or land access restrictions are applied, adverse social impacts will be reduced through a) providing compensation for loss of assets at replacement cost[1]; b) ensuring resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those involved
	LA5	Where economic displacement occurs, the company will aim to restore, or where possible, improve the livelihoods of affected households
	LA6	The Project intends to acquire the Ilua Valley farm through a willing buyer, willing seller transaction. While the Project's environmental impacts on this property will not affect the ability to continue conducting farming activity, in discussion with the affected household it is understood that the household would like to pursue other activities when the Project commences
	LA7	Engagement and consultation activities will be pursued with all land users in the area to explain the impacts and provide additional information about the Project as necessary
	LA8	In the event that livelihood impacts are created by the Project, a livelihood restoration plan (LRP) would be developed by GML working in coordination with KNAPK and SPS, depending on the nature of the impact
	LA9	In the event that enterprise based livelihoods are affected by the Project, GML will support business development activities including training and business planning to expand existing businesses and generate local employment
	LA10	Dust and radiological mitigation measures will be implemented
	LA11	Dust and radiological monitoring stations will be established near the mine boundary, in Narsaq town, with the Ilua Valley and in Ipiutaq (as a reference location) with results shared with interested community forums
	LA12	GML will engage with gemstone collection license holders to provide access to the highest grade areas of tugtupit prior to construction / mining activity occurring. The access will be controlled to maintain safety standards

Topic	ID	Mitigation / Enhancement Measure
Land-Use and Land Based Livelihoods	LA13	GML will engage with kayak tourism providers to explain the Project design and schedules and to develop impact mitigation measures as necessary
	LA14	The size of the footprint of the Project and areas of restricted access will be minimised to the extent possible
	LA15	Access roads will be sprayed with water at regular intervals to minimise the generation of dust along the Ilua Valley
	LA16	GML will seek to acquire local produce from the valley area when available (e.g. berries) to encourage the continuation of traditional activities
	LA17	GML will work with Narsaq town administrators to identify alternate running / hiking routes which have lower amenity impacts
	LA18	Engagement with Kommune Kujalleq and the town of Narsaq specifically to support local tourism opportunities
	LA19	Investigation of opportunities to promote local tourism at a national and international level

Topic	ID	Mitigation / Enhancement Measure
Ocean-Use and Ocean Based Livelihoods	OC1	Engagement with KNAPK and other relevant agencies to better understand the cause of changes to local catches – if observed

Topic	ID	Mitigation / Enhancement Measure
Occupational Health and Safety	OH1	Comprehensive health and safety plan will be implemented by GML consistent with the Company's Occupational health and Safety Policy
	OH2	GML will prepare a written workplace assessment of occupational health and safety prior to the commencement of construction consistent with the requirements in Order No. 1168
	OH3	Preparation of safe work procedures for key activities which will remain live documents throughout the duration of Project activity
	OH4	Maintaining plant and equipment in safe working condition
	OH5	Providing information, signage, instruction, training and supervision required to ensure that all workers are safe from injury and risks to their health. Supplier instructions and workplace usage instructions will be provided in English, Danish and Greenlandic
	OH6	Collection and monitoring of all relevant safety statistics including near misses and identified risks
	OH7	Establishment of a safety committee responsible for managing, providing advice on, informing and supervising activities concerning health and safety within the Company
	OH8	Allocation of responsibility for occupational health and safety to senior management within the Project team
	OH9	All work clothing worn by employees will consist of long sleeve shirts and pants made from cotton and clothes will be laundered at the Plant to ensure no potentially radioactive materials are brought into private living accommodation
	OH10	A change room will be provided at both the concentrator and refinery sites
	OH11	A dust mask will be provided to employees where dust is a hazard
	OH12	All employees will undergo a regular (annual) medical exam. The medical exam will be performed by the Project medical clinic and will be financed by the Project
	OH13	Workers seeing an increase in dose will have the reasons for the high dose investigated by the Project's Radiation Protection Office and the worker will be moved to a different section of the operation if necessary. If the increase in dose is considered significant (by the Radiation Protection Officer) the worker will undergo a medical exam at the Company medical clinic
	OH14	Monitoring statistics related to dose exposures will be made available to the public through the Project's annual report and will shared directly with the GoG

Topic	ID	Mitigation / Enhancement Measure
Occupational Health and Safety	OH15	Areas where elevated radioactivity is expected will have engineering measures (shielding, distance) and procedural controls (exposure time, worker rotation and personal protective equipment (PPE)) to minimise radiation exposure
	OH16	The pit will be evacuated prior to blasting and until blast dust clouds have subsided
	OH17	Water trucks will be used to suppress dust across all areas of the mine
	OH18	Mine workers operating in the mine pit will be mainly located in air-conditioned cabins of mining equipment. The air filters in the cabins will be replaced on a regular basis
	OH19	A vehicle washing bay will be used to remove mine dust / dirt from all vehicles leaving the mining area
	OH20	High ventilation levels will be maintained in the crushing building (turning air over 10 times per hour)

Topic	ID	Mitigation / Enhancement Measure
Community Health, Safety and Security	CH1	Wetting of rock stockpiles, concentrates and waste materials with water sprinkler systems (summer) with any excess water captured for recycling
	CH2	Wetting of haul roads with water spray trucks (summer)
	CH3	Salting of haul roads to melt ice and snow from the roads. The salt can also increase surface moisture by extracting moisture from the atmosphere (winter)
	CH4	Setting appropriate vehicle speed limits, regular grading and maintenance
	CH5	Using vehicles and equipment with energy efficiency technologies to minimize emissions rates
	CH6	Maintaining power plant, vehicles and other fuel powered equipment in accordance with manufacture's specifications to minimize on emissions
	CH7	Noise monitoring will be conducted at the point of the nearest sensitive receptors (summerhouses and the southern / western edges of Narsaq) in addition to noise monitoring at Project facilities. The results of monitoring will be shared with Narsaq stakeholders through ongoing engagement forums
	CH8	High noise activities during the construction of the Port will be timed to minimise disruption to households and educational institutions
	CH9	Opportunities to reduce noise generation through engineering or noise attenuative measures will be investigated as part of the detailed engineering conducted prior to Project construction
	CH10	GML will establish a community grievance mechanism whereby residents and affected stakeholders can share concerns or grievances (anonymously if they choose) to which Project management will respond
	CH11	Implementation of the dust control measures in GML's Dust Control Plan
	CH12	Monitoring of radon and gamma radiation levels in Narsaq, and at the nearest sensitive receptors around the Project
	CH13	Engagement with Greenland's Ministry of Health to better understand radon exposure in Narsaq and to help residents understand how they can improve airflow in their homes to reduce this exposure
	CH14	Speed restrictions will apply for all vehicles using the access road
	CH15	GML will investigate options for small convoys to be used in heavy traffic conditions

Topic	ID	Mitigation / Enhancement Measure
Community Health, Safety and Security	CH16	Community traffic safety campaigns will be coordinated with the town of Narsaq to increase traffic understanding. Specific programs will be coordinated with the kindergartens and primary schools to minimise the risk to young children
	CH17	Construction workers will be largely segregated from the town of Narsaq, minimising opportunities for interaction
	CH18	Operations workers will live within a security-controlled environment where non-workers will not be allowed to stay overnight
	CH19	All employees, contractors and visitors will be required to sign a Code of Conduct requiring workers to engage with community members in respectful, socially beneficial manners. This policy will apply to workers from the time they land in Greenland (in Narsarsuaq or Qaqortoq) through to their departure
	CH20	Conduct awareness raising exercises with their workforce on sexually transmitted diseases, including HIV/AIDS
	CH21	Provide condoms for workers
	CH22	Provide STD (including HIV) diagnosis and testing at the work place clinic, and provide access to counselling, and referral services as necessary
	CH23	Monitor health outcomes within the workforce and engage with health service providers in Narsaq and Kommune Kujalleq to share data and develop campaigns to change behaviours as necessary
	CH24	GML will work with the Narsaq health service to develop public awareness campaigns on STD transmission and safe sex initiatives
	CH25	All employees (regardless of nationality) will be subject to pre-employment medical screens and regular health checks once employed. The medical screening will specifically target the presence of TB and potential candidates will receive treatment for TB before being offered work on the Project. STD prevalence will not be screened at pre-employment medicals
	CH26	The living conditions provided at the temporary construction camp and the Village will be designed to ensure adequate space is available for all workers to reduce the risk of TB transmission within the workforce (which can then spread into the community)
	CH27	A strict no-smoking policy will be implemented in all GML office buildings and enclosed spaces. Workers will be encouraged to give up smoking as appropriate with the Company medical clinic providing guidance on “how to quit” campaigns
	CH28	Random drug and alcohol tests will be implemented by the Project with zero tolerance for workers, contractors and visitors who fail these tests

Topic	ID	Mitigation / Enhancement Measure
Community Health, Safety and Security	CH29	Workers will be encouraged to participate in outdoor exercise and “tool box talks” will be developed to facilitate worker’s passing these messages onto their families when they go on break
	CH30	Workforce accommodation (both the temporary construction camp and the Village) will include a gymnasium and other areas for physical activity
	CH31	Workers will be encouraged to participate in sporting competitions in Narsaq and to support the development of new competitions as appropriate
	CH32	Catering service providers for the workforce accommodation will apply their knowledge to define appropriate serving sizes for worker’s meals and to balance the workplace diet
	CH33	The general store located in the Village will be stocked with healthy alternative snacks and will seek to stock local foods where possible
	CH34	Engagement between the Company and social health providers in Narsaq and Kommune Kujalleq to deliver campaigns targeting mental health
	CH35	Human resources policies for the Project which specifically highlight non-tolerance of discrimination on the basis of sex, race, sexual orientation, disability, health condition, religion or belief, political affiliation, union membership or marital status
	CH36	Active promotion of successful Greenlandic employees and business partners as success stories which can be shared within the municipality and the country more broadly
	CH37	Continuation of the settlement “road shows” which have been undertaken by GML in the past

Topic	ID	Mitigation / Enhancement Measure
Social Structures and Community Life	SO1	Effective communication of the nature of employment opportunities available on the Project and the skills required to be eligible for the job
	SO2	Engagement with Kommune Kujalleq to understand pressure placed on existing services and to develop a plan to reduce the pressure
	SO3	Engagement between GML and Kommune Kujalleq administrators in respect of the number of new residents anticipated as a result of the development of the Project. With this knowledge, the Kommune will be able to plan for service delivery requirements as necessary
	SO4	GML will engage with Greenland's Ministry of Health to determine how best to support the expansion of health services in Narsaq to meet increased demand during the operations phase
	SO5	Identification, in coordination with the town of Narsaq and Kommune Kujalleq administrators, of a new method / site for the disposal of animal carcasses and engagement over any modifications required to the existing waste management site
	SO6	The requirement for Project employees, contractors and visitors to comply with the company's Code of Conduct will reduce the risk of increased crime in the area. This will be further reinforced through the application of strict disciplinary measures for any employees or contractors found to be participating in behaviour contrary to the Code of Conduct, anti-social behaviour or illegal activities
	SO7	GML will engage with SIRI to determine how to support the work and residency permitting process, and with the Danish Foreign Ministry to support visa issuing services and to streamline the process to the extent possible. The GoG will also be engaged given their primary role in the approval of work and residency permitting processes. The Project may also engage with the Ministry of Mineral Resources and Labour to establish a fast-track process for visa and permit issuance.
	SO8	The working language of the Project will be English, however all safety, information, consultation and management documents will also be translated into Danish and Greenlandic to protect local language skills
	SO9	GML will take care to use the Greenlandic dialect spoken in Kommune Kujalleq when engaging with community members in community forums
	SO10	Opportunities to support Greenlandic culture through coordination of community activities reinforcing culturally relevant practices (e.g. celebration of Greenlandic food, kayaking, seal hunting, berry picking etc.) will be identified by GML
	SO11	Work rosters will be developed to ensure Greenlandic workers have the opportunity to return home on a regular basis and maintain their connection with family and traditions
	SO12	Coordination with the Narsaq police to assess the presence of drugs in the community and to develop strategies targeting drug abuse in the community

3. Project Description

3.1 Project Setting

3.1.1 History of mineral exploration

The Kvanefjeld deposit is geologically located inside the northwest margin of the Ilimaussaq Complex, a lujavrite-rich area that has been exposed by erosion. The Kvanefjeld deposit is characterised by thick, mostly sub-horizontal slabs of lujavrite. Other rock types that outcrop include basalt, gabbro and sandstone of the Eriksfjord Formation, and augite syenite and naujaite.

The Danish Atomic Energy Commission identified the Kvanefjeld deposit in 1955. Over the next 30 years Narsaq was regularly the base for technical studies of the deposit. Renewed interest in the deposit developed following the assumption by the GoG of responsibility for the administration of mineral resources on January 1, 2010. In the period immediately prior to this transfer the administration of Greenlandic mineral resources was divided between Greenland and Denmark. Since then, GML has undertaken extensive geological exploration of the area and has collected extensive environmental data for the purpose of supporting the development of the deposit.

Drilling results identified that the highest metal grades occur near surface, with grades of REEs, uranium and zinc decreasing with depth. Steenstrupine is the dominant host mineral for REEs and uranium. It is a rare phosphorus and silicate alkaline mineral with contains both REEs and uranium. Other minerals present that are important hosts of REEs include the phosphate mineral vitusite, and to a lesser extent, cerite and monazite. Aside from steenstrupine, uranium is also hosted in unusual sodic silicate minerals that are rich in yttrium, heavy REEs, zirconium and tin. Sphalerite is the dominant host mineral for zinc.

3.1.2 What is being mined and why

The Project involves the mining and processing of ore from the Kvanefjeld deposit to produce four REE products together with a number of by-products. While the ore in Kvanefjeld deposit contains a number of elements with commercial value, the REEs are the primary products, and zinc and uranium are the main by-products.

The mining rate will be approximately of 3.0 Million tonnes of ore per annum (Mtpa), at which rate the Project would be expected to produce (approximately):

- 30,000 tpa of REE products
- 15,000 tpa of zinc concentrate
- 16,000 tpa of fluorspar
- 500 tpa of uranium oxide

The total Proven and Probable Mine Reserve (JORC 2012) for the Kvanefjeld deposit is 108 Million tonnes (Mt) @ 362 parts per million (ppm) U_3O_8, 1.43% Rare Earth Oxide (REO) and 0.26% zinc.

REEs are a group of specialty metals with unique physical, chemical and light-emitting properties. Many electrical products are dependent on these unique properties – for example wind turbines, hybrid vehicles, rechargeable batteries, mobile (cell) phones, plasma and LCD screens, laptop computers and catalytic converters. As a result of the widespread use of REEs global consumption is increasing substantially and is outstripping global supply.

The majority of the global production of REEs is in China. With only a relatively small proportion available for export from China there is a global demand for a stable source of REEs outside China particularly for the production of emerging technologies.

Kvanefjeld is one of the largest deposits of REEs in the world. Kvanefjeld has the potential to meet the world's rapidly growing demand for rare earths and in doing so, can become a major contributor to the Greenland economy for decades to come.

The Project will be a minor uranium producer producing less than 1% of total global uranium production.

3.1.3 Local community

The Project is situated approximately 7.5km from the town of Narsaq in South Greenland (Kommune Kujalleq) and approximately 40km from Narsarsuaq where the nearest airport is located (Figure 3.1).

The town of Narsaq was originally settled in the 1830s. The establishment of a landing site in the bay adjacent to the settlement in the 1880s stimulated scientific activity in the vicinity and by the 1900s geological mapping of the area had indicated the presence of radioactive minerals.

Agriculture in the form of sheep farming was introduced in the early 1900s.

The first major expansion of economic/industrial activity took place shortly after the end of the World War II when people came from all over Greenland to work at the slaughterhouse and cod processing plant. Today the primary occupations in Narsaq include public administration, fishing and wholesale activities, with farming activities continuing across the Kommune.

Narsaq was granted civic status granted in 1959. In 2017, the district of Narsaq had an estimated population of 1,594, of whom 1,397 live in the town of Narsaq with the remainder in the surrounding settlements of Narsarsuaq, Qassiarsuk and Igaliku, or on one of the farms in the area.

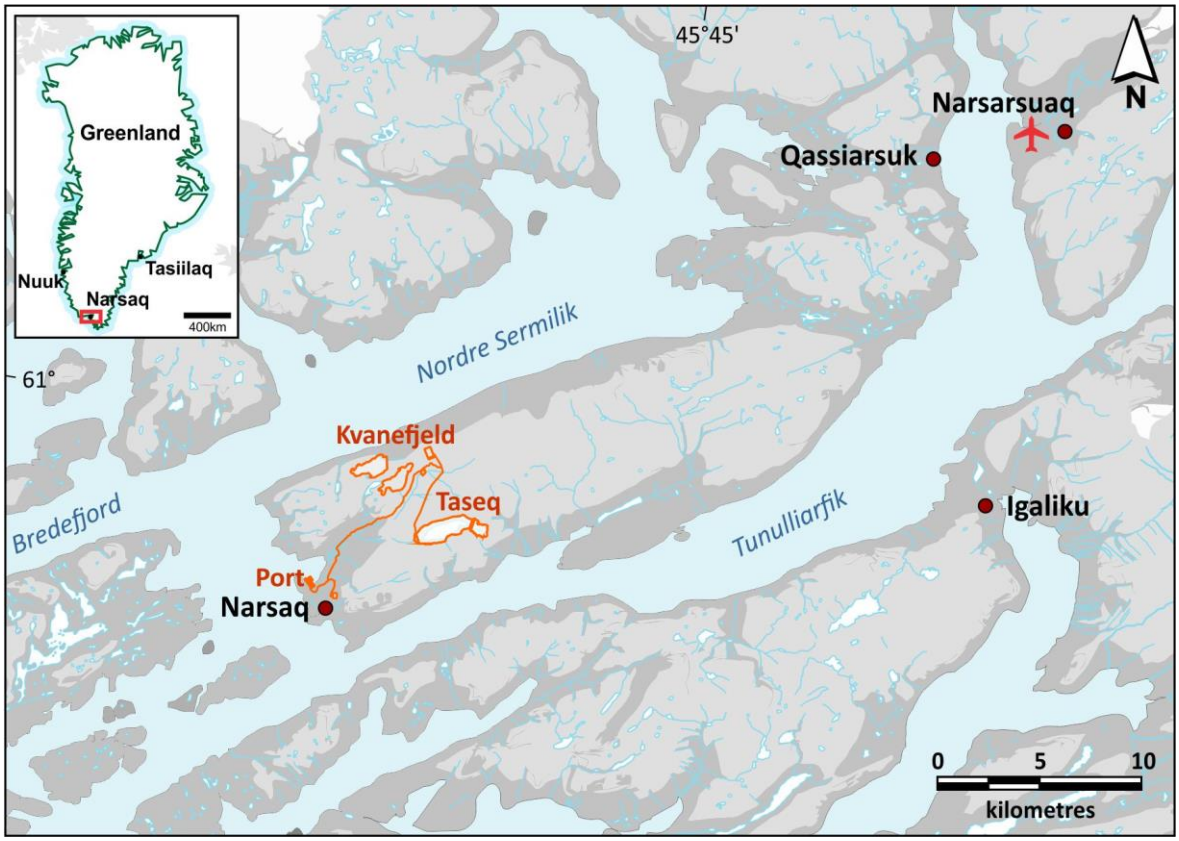

Figure 3.1 Project setting and surrounding area in Southern Greenland

3.2 Overview of operations

The mining operations involve conventional open pit mining via blasting followed by truck/shovel haulage. Ore will be transported to a concentrator to produce rare earth phosphate concentrate (REP), zinc concentrate and fluorspar. The zinc concentrate and fluorspar will be sold and the REP further processed in a refinery to produce REE products and uranium oxide. All saleable products will be transported to the Port and exported. Overburden from the mine will be stored in a waste rock stockpile (WRS). Tailings from the concentrator and refinery will be stored within a tailings storage facility (TSF).

The overall design of the operations is shown in Figure 3.2 and described in further detail below. In addition to the design of the Project, the operational elements (i.e. water and reagent use) are also described.

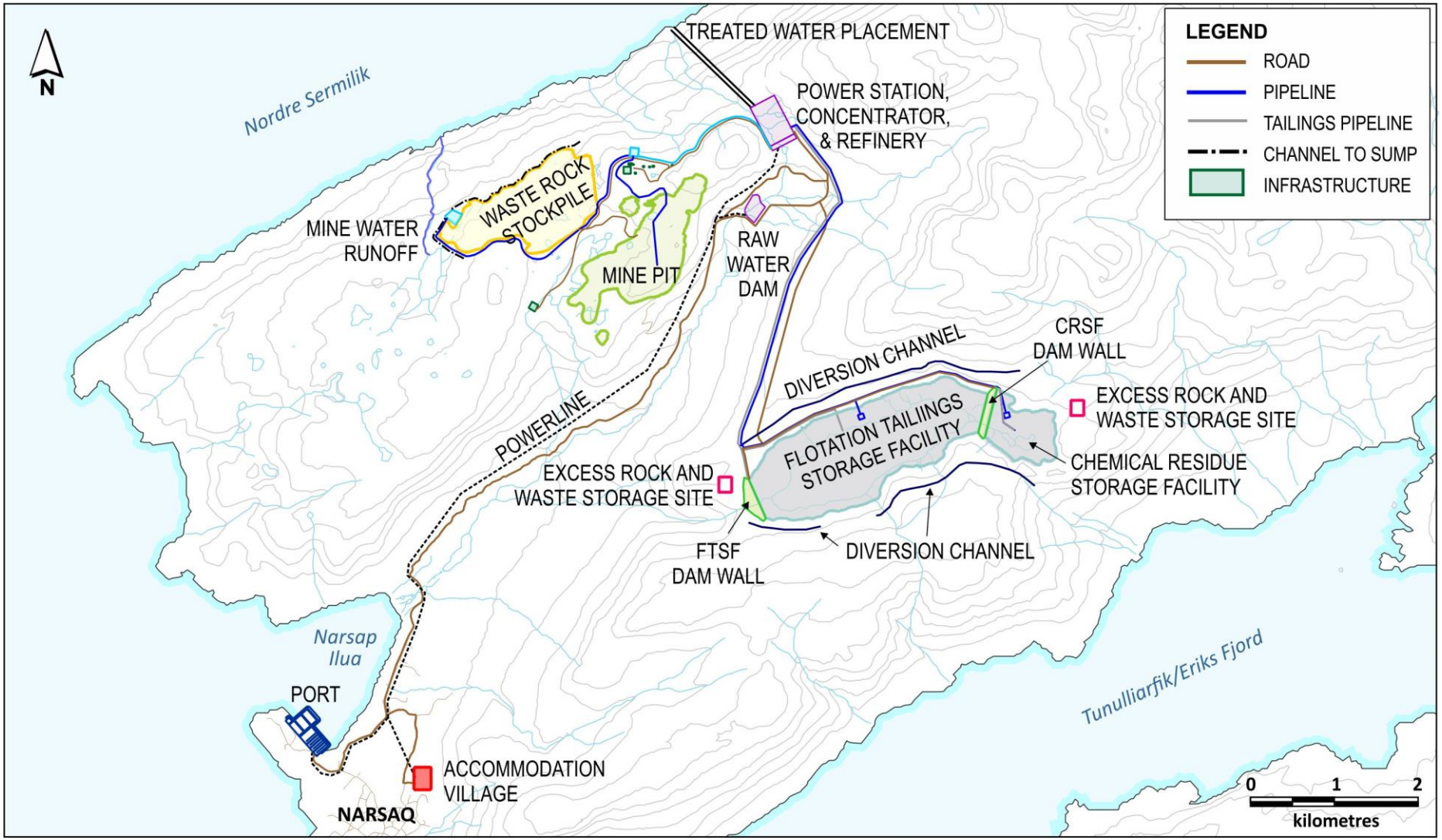

Figure 3.2 The Project

3.3 Project phases

The phases of the Project are described in Table 3.1. Decommissioning and closure timing is described in Section 3.9. The summary provided in this SIA focuses on those aspects of the project relevant to the SIA. For a more detailed project description please refer to the EIA.

Table 3.1 Project phases

Phase	Timing	Description
Construction Phase	3 years	Construction will primarily involve fly-in fly-out (FIFO) personnel and a small group of local employees and local subcontractors. Prior to the construction of the Port, a temporary landing pad will be used for beaching barges. Packaged equipment will arrive on site and be installed by specialist construction workers. Large buildings will be erected to provide protection against weather events. There will continuous deliveries of plant and equipment from the Port to the plant sites. Once the temporary facilities and basic infrastructure are established, the mine can be prepared for operation and construction and commissioning of processing facilities are commenced.
Operations Phase	37 years	Once operations commence the mine and processing facilities will gradually ramp up operations until steady state operations are achieved.
Closure	6 years	During the decommissioning plant and utilities will be removed while treating water in the Tailings Storage Facility. The mine pits will be fenced off to prevent access from people, livestock and animals.

3.3.1 The Mine

The mine has been designed in consideration of its environmental setting. The Kvanefjeld deposit is located on a plateau at an elevation of 600 m, with the orebody outcropping at surface and the highest grade material occurring in the upper zones.

The mine will have an open pit design with 10 m wide benches. Mining will be a standard drill-blast-truck-shovel operation. This configuration has been identified as the lowest operating risk mining method, both in terms of cost and productivity. Ore will initially be hauled to the run of mine (ROM) pad located adjacent to the pit where it will be arranged in stockpiles. Ore selected from individual piles will be blended using a front end loader and the blended ore will be hauled in mine trucks to the concentrator, with an average haul distance of 1.5 km. The trucks will dump ore directly into the primary crusher.

The active mining fleet will initially include three 150 t mining trucks and one excavator. As the pit deepens and haul distances increase, truck numbers will increase to a maximum of 6.

The mine will operate 24 hours per day and 365 days per year.

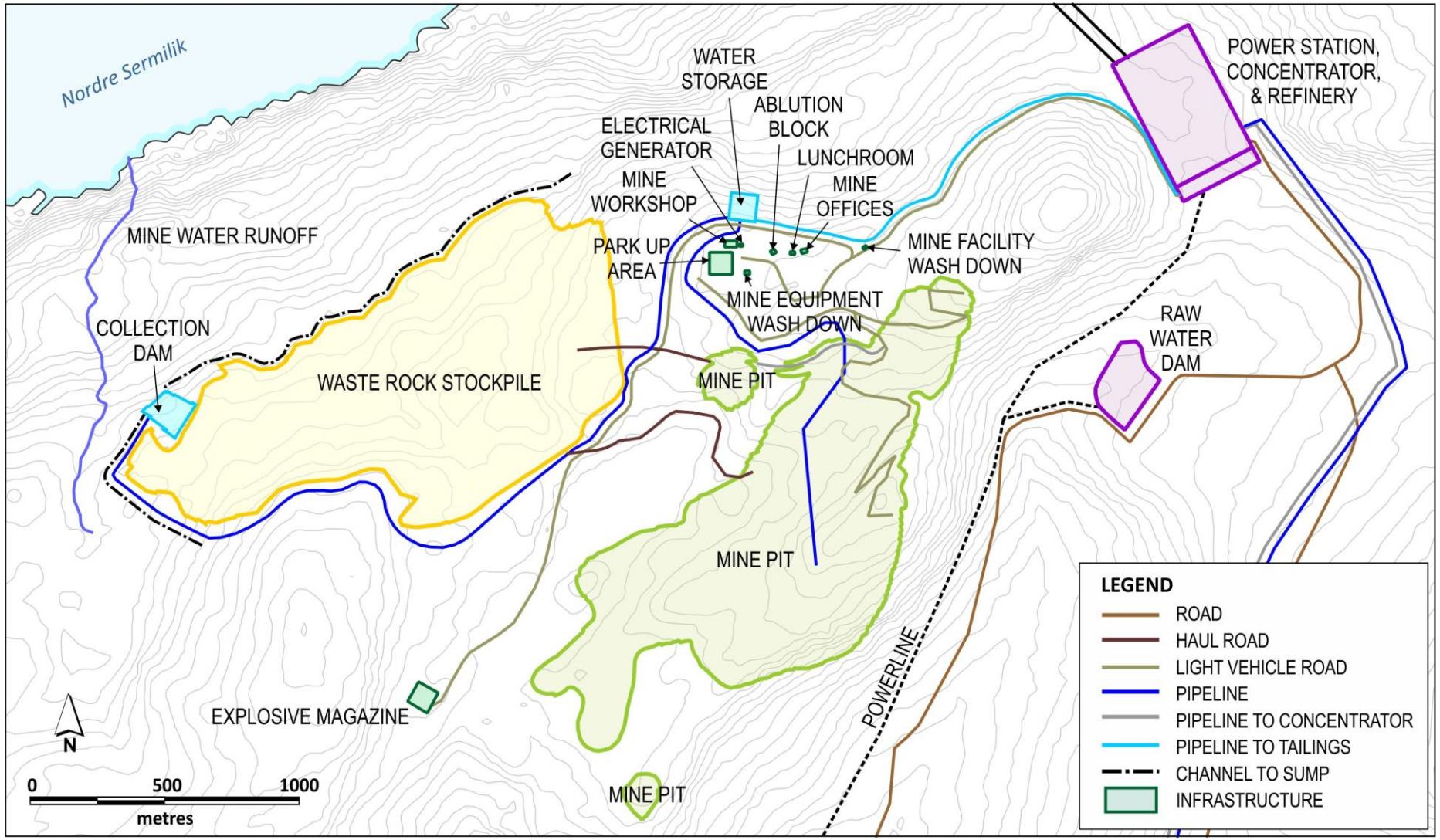

Figure 3.3 The Mine

3.3.2 Waste Rock Stockpile

The mine will have a low stripping ratio (unit of waste material moved per unit of ore) with expected ratio of only 1. Waste material is barren natural rock overlying the ore in a mine. On average approximately 3.0 Mtpa of waste will be transported to the WRS. The WRS has been located to the north west of the mine as this location offers a relatively short, downgrade haul and good access to the maximum height of the east side of the dump.

3.3.3 Concentrator and refinery

The Project includes two separate processing facilities; a concentrator (which involves physical processes) and a refinery (which uses chemical processes) which together comprise the Plant. The Plant will operate for 365 days per year and 24 hours per day.

Prior to flotation, the ore passes through a crushing and milling circuit in which the ore particles are reduced in size to the consistency of fine sand [80% passing 75 microns]. This size optimises the efficiency at which particles of value minerals in the ore are liberated from the relatively barren host rock.

The concentrator produces two saleable products, zinc concentrate and fluorspar, and an REP concentrate, which moves to the refinery for further processing. Approximately 80% of the REEs are recovered into the REP. From the 3.0 Mtpa that is delivered to the crusher, the concentrator will produce approximately:

- 233,000 tpa of REP concentrate (containing REEs and uranium)
- 15,000 tpa of zinc concentrate
- 16,000 tpa of fluorspar
- 2.8 Mtpa of flotation tailings.

REP concentrate from the concentrator is pumped via a pipeline to the adjacent refinery. The refinery is comprised of three sections;

- acid leaching
- uranium recovery
- REE recovery

Acid leaching dissolves the REE and uranium bearing minerals making REE and uranium available for recovery in subsequent processing steps. The refinery produces four rare earth products via solvent extraction. These are;

- lanthanum oxide
- cerium hydroxide
- a mixed lanthanum cerium oxide, and
- a mixed REO.
- All REE products will be exported.

A uranium by-product is produced from the leach solutions via solvent extraction. The final product is uranium peroxide UO_4, which will be sold into the nuclear power industry.

From the 233,000 tpa that is fed into the refinery, it will produce approximately:

- 30,000 tpa of REE products
- 500 tpa uranium peroxide
- 269,000 tpa chemical residue tailings.

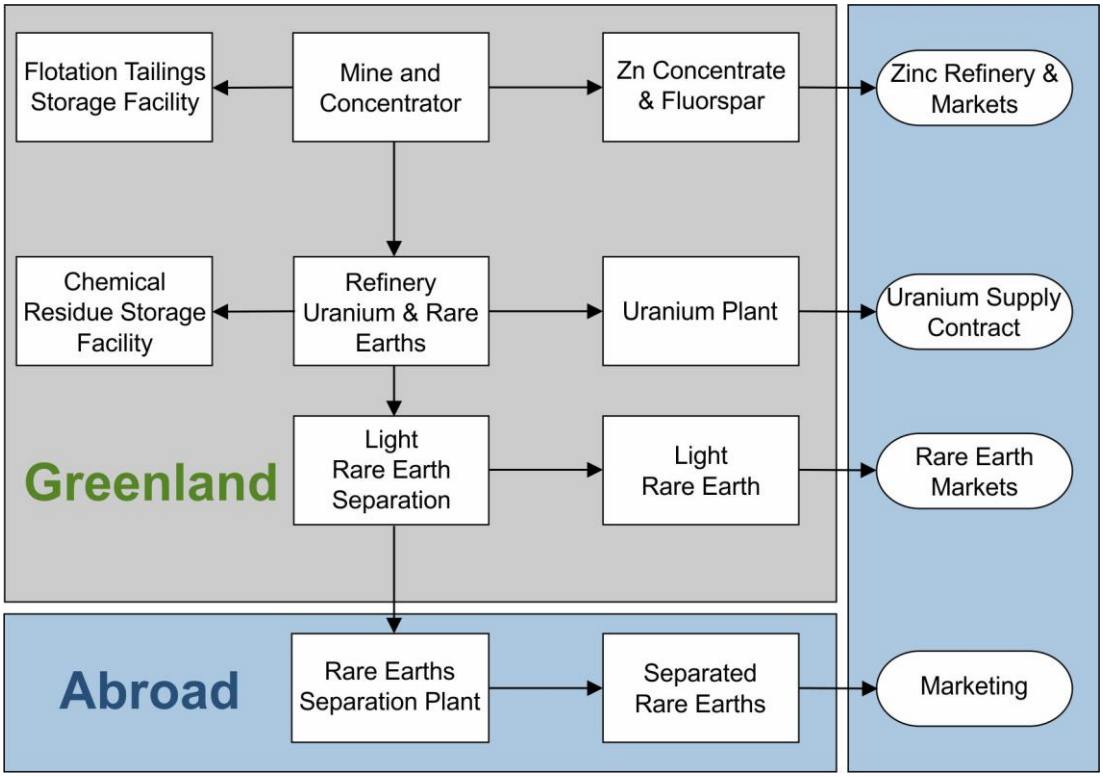

Figure 3.4 Diagram Showing Main Process Plant Steps

The majority of the material mined as ore will eventually be stored as tailings. The concentrator and the refinery will produce two distinct tailings streams which will be stored and handled separately. For more information on tailings please refer to the EIA.

3.4 The Port

Dedicated new port facilities (the Port) will be installed on the Tunu Peninsula at Narsap Ilua (Bay) for the Project. During the operation phase the Port will handle the import of fuel, reagents, consumables and the export of products. The new facilities will be designed to handle 40,000 DWT Handy-max vessels, which are 200 m long. Port utilisation is expected to be 20% of the year with ships docked for up to 5 days at a time.

The Port has been designed with a 200 m quay frontage with conveyors for bulk cargo, and mobile stackers for containers (Figure 3.5). Adjacent to the quay, an area will be prepared for container stacking and covered bulk storage for both imports and exports.

It is anticipated that there will be approximately 174 heavy vehicle movements per day to take material to the Port and an additional approximate 150 voyages by light vehicles.

A dedicated vessel will sail between the Port and a major mainland European port. From the mainland Europe port all cargos will be unloaded and forwarded to other destinations using commercial transport lines.

Dredging and possible rock blasting will be required for Port construction. Land reclamation will be the main method for construction.

Shipping containers, loaded at the Plant, will be loaded onto trucks and transported to the Port for temporary storage prior to loading onto vessels for export.

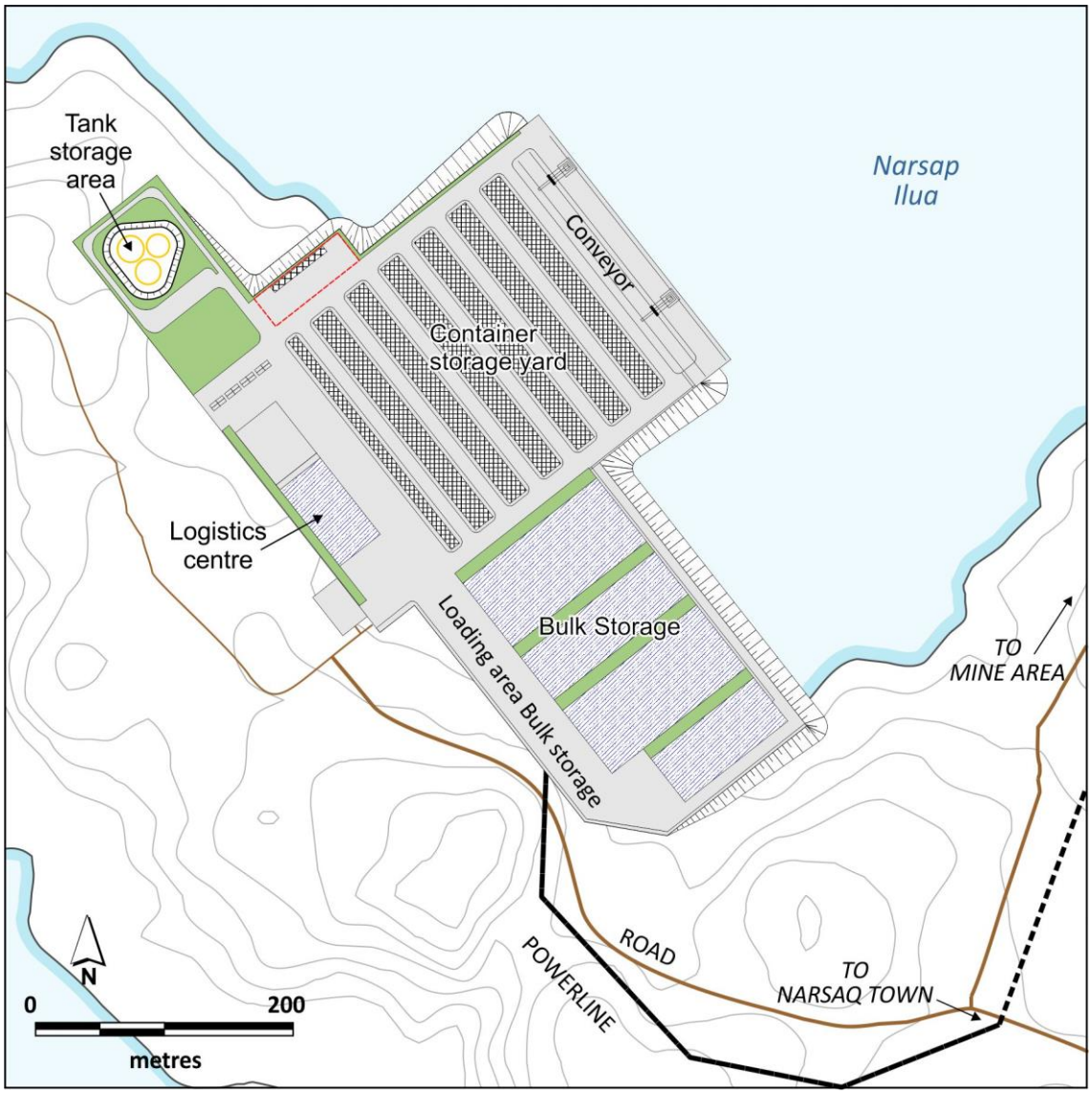

Figure 3.5 The Port

3.5 Handling of Radioactive Material

The conditions related to handling of radioactive material mentioned in the SIA is the description outlined by the GML. The relevant authorities, including the authorities responsible for health and radiation etc., will set terms in relevant subsequent licences and/or approvals and therefore decide upon final approvals of the activities.

3.5.1 Overall management

World's best practice principles will be applied from successful mining operations in developed countries. This will include radiation protection practices used in REE and uranium mines operating in Australia and Canada. Precautions will be taken throughout the mining steps to minimize worker

exposure to dust and other hazards. All worker radiation exposure will be constantly measured and monitored. Further details on occupational health, safety and radiation protection will be provided in the forthcoming Occupational Health and Safety Management Plan.

Overall radiation exposure management will involve:

1. Inductions and extensive training
2. Consistent monitoring of all employees
3. Best available technology dust control
4. Engineering out areas of potential radiation exposure in the design

In order to remove any dust from vehicles departing the mine area, a wash-down facility will be built to be used by all vehicles leaving the mine area. The facility will operate automatically and operators will not be required to leave the cabins of their vehicles during wash down. Radiation clearance control will be used to ensure that contaminated vehicles do not leave the mine area.

3.5.2 Health and safety of employees

The health and safety of the GML workforce will be of high priority for the management of the operations. All workers must return to their homes in the same state as when they left for work. A number of successfully applied safety systems for the mining industry are available which will be utilised for the Project. Safety statistics (such as Lost Time Injury Frequency Rates) will be monitored by the GML safety officers and presented to regulators. Safety statistics form part of standard reporting for Australian Stock Exchange listed mining companies.

The radiation exposure of all employees will be monitored using badges which are constantly worn in the workplace. Information on individual employee radiation exposure will be monitored consistently. If any employees register abnormal radiation exposure the issue will be investigated and action taken. Fixed radiation monitoring equipment will also be used in areas of potentially elevated radiation. All employees will undergo safety and radiation training to provide them with the knowledge and skills to work in their environment. GML will have a comprehensive dust management plan and procedures to minimise this as risk to increased radiation exposure.

If required, medical treatment will be provided on site to stabilise an individual's condition after which the individual(s) would be evacuated by air to the nearest major hospital in Nuuk. The management of dangerous chemicals used in the refinery will involve major hazard control and evacuation plans. The management of such chemicals has formed part of many chemical plants and refineries throughout the world with proven methods to be applied on the Kvanefjeld site.

3.5.3 Security of nuclear products

At the refinery, the uranium product (yellow cake), will be packed in sealed 200 L steel drums which will be loaded into standard shipping containers, also sealed, before being transported to the Port on trucks. The containers remain sealed throughout the journey from the mine to the final point of delivery. Containers will be unloaded at the Port and moved to a specified storage area. The storage area will have a gate and security that meets/exceeds the requirements of International Ship and Port Security Codes.

The uranium product will be packaged according to the International Atomic Energy Agency's (IAEA) international best practice.

3.6 Support Infrastructure

3.6.1 Administration and accommodation

During the construction phase, a peak workforce of 1,171 employees is anticipated. Of these, approximately 200 are expected to be Greenlandic citizens who will commute on a rotational basis to the Project. The remaining foreign workforce will be accommodated in a temporary construction worker's camp which will be constructed in proximity to the concentrator.

During Project operations, with an average workforce of 715 of which 328 are expected to be Greenlandic, non-local employees will be accommodated in the Village to be constructed on the north-west edge of Narsaq. The location of both the temporary construction workers' camp and the permanent Village are illustrated in Figure 3.6.

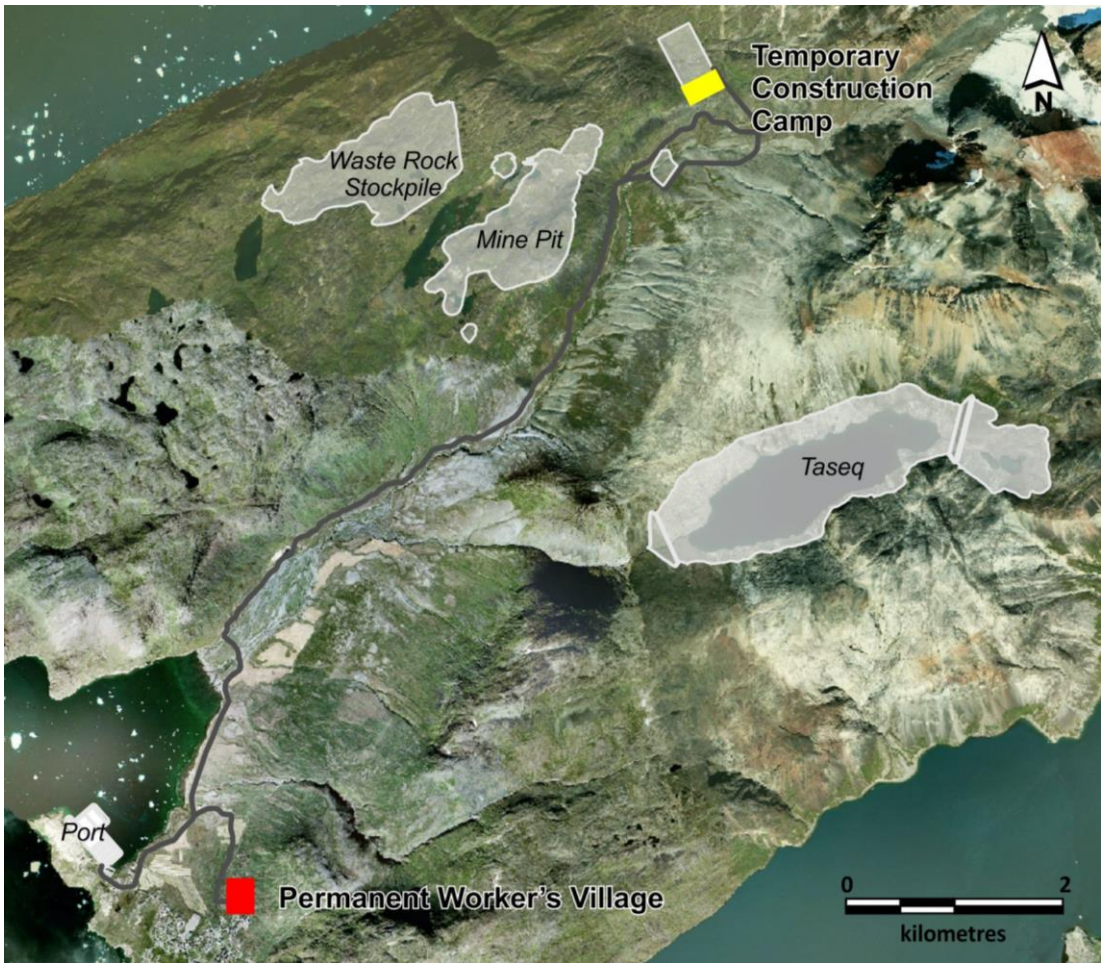

Figure 3.6 Accommodation Locations

Further details on the accommodation arrangements for the Project are provided below:

Construction phase –The construction phase of the Project will take three years and will comprise two periods with significantly different levels of activity. During the first period, pioneering, which will take 12 months, initial earthworks will be completed. The second period is the period during which the majority of construction activity will occur including the construction of the mine buildings, Plant and infrastructure. The second period will take 2 years, years 2 and 3 of the construction phase.

During pioneering the workforce will be accommodated in Narsaq and Narsarsuaq in existing accommodation, with workers primarily working on a FIFO basis. During this period, a temporary construction camp will be constructed on the Project site adjacent to the proposed location of the concentrator. This temporary construction camp will provide accommodation for the majority of the foreign labour force in the second period of the construction phase. It is estimated that the temporary camp will require close to 500 beds during peak construction. Greenlandic labour will again be accommodated in existing facilities in Narsaq and Narsarsuaq. It is estimated that just over 300 beds will be required in Narsaq and Narsarsuaq during the Project's construction phase.

Operations phase – The Village will be constructed on the north-west limit of Narsaq town. The Village will be sized to accommodate:

- All Greenlandic and foreign FIFO personnel during their roster periods; and
- All locally recruited personnel working at the mine and Plant during their roster periods (they will return to their own homes during their off-roster periods).

Clerical workers and all locally recruited personnel employed at the Port, the Village and in other activities based in Narsaq will continue to live in their own homes in Narsaq.

The Village will provide accommodation for approximately 450 workers during the Project's operations phase.

The Village will be provided with an access road connecting the mine and plant to the Port and will be supplied with power (from the power station), water and sewerage treatment. A large centre is envisaged with recreation facilities, meeting rooms, canteen, laundry, and access to the internet.

3.6.2 Airports

The Project will not involve the construction of an airport and the Company will largely utilise the airport at Narsarsuaq, approximately 42 km north east of Narsaq.

3.6.3 Transport Facilities

The FIFO workforce is expected to utilise the Narsarsuaq airport as the Greenland entry point. This is likely to be the case for the imported construction workforce in addition to the operations FIFO workforce. A ferry will be used to transfer workers from the airport to Narsaq.

An extension to existing passenger facilities will be required at the existing heliport at Narsaq but the airport at Narsarsuaq is considered to be adequate to handle additional passenger loads resulting from Project construction and operation. Additional commercial and chartered flights between Narsarsuaq and Nuuk, Reykjavik and Copenhagen, and the UK may be necessary for the increased volume of passengers.

A new 7 m wide road, approximately 13 km long, will be built to connect the Port at Narsap Ilua (Bay), the Plant, the mine and the Village. The new road will follow an existing gravel road along the Narsaq River. The new road will be for all transport between Port, Plant and mine, as well as ore transportation from the mine to the Plant. Specialised fuel trucks will transport diesel from the Port to the power plant at the concentrator site. Personnel will generally commute by bus between the Village and the work sites at the mine and processing plant.

Port utilisation will be approximately 20% per year. There will be in excess of 30 vessel arrivals during a typical operating year. It is expected that, each year, the Port will dock:

- 22 Handy-Max vessels (40,000 DWT) for containerized and bulk cargo
- 10 oil tankers per annum delivering fuel

3.6.4 Electricity and Gas Supply

The power station will be located within the Plant. This will allow recovery of power station waste heat within the Plant.

A 59 MW diesel-fired Combined Heat and Power (CHP) station will be built adjacent to the concentrator. This CHP plant will service the Plant, the Port and the Village. The power station will have a waste heat recovery system which will generate hot water that will be used for process heating in the concentrator and for heating of buildings in the Plant.

Fuel for the CHP plant will be stored at the Port and transported to the CHP plant in road tankers as required. The tankers will discharge the fuel into day tanks adjacent to the CHP plant.

An 11 kV overhead power line will deliver power to the Port and Village.

Power will primarily be supplied from the CHP plant to be built during the Project's construction phase. This source will be supplemented by power from a sulphuric acid plant where excess steam will be converted to power via a turbo-generating (TG) unit.

The CHP plant will be fitted with a waste heat recovery circuit, which will provide hot water to the concentrator to heat raw water and Plant support buildings.

Power required in the mine and at the TSF will be supplied diesel-fired power generating units.

3.6.5 Domestic and industrial waste handling

All solid waste will be pressed into bales and shipped to Qaqortoq for incineration. In the event that an incinerator were to be constructed in Narsaq, this facility would be used instead.

Accumulators, batteries, electronic devices, glass, etc. will be stored in temporary containers and periodically handed over to the Qaqortoq waste handling facility for further disposal according to regulations and after mutual agreement.

3.6.6 Hazardous material handling (hydrocarbons, explosives)

Hazardous waste will be handled according to the Kommune Kujalleq regulations concerning hazardous waste (Regulations for disposal of hazardous waste /Regulativ for bortskaffelse af miljøfarligt affald, 2009). In general, hazardous waste is shipped to Denmark and handled in compliance with a comprehensive EU initiated legal frame-work. Hazardous waste will be registered and traced using code standards (EC waste list / EAK koder (Europæiske Affalds Koder)).

3.6.7 Fencing

Fencing around the operations will be constructed for safety and security. Due to the steep topography of the area complete fencing is not required. Vehicle and fauna access will be restricted by the proposed fencing plan. As shown on Figure 3.7 the fencing will restrict access to the mine site, the Plant site, explosives storage and the fresh water dam.

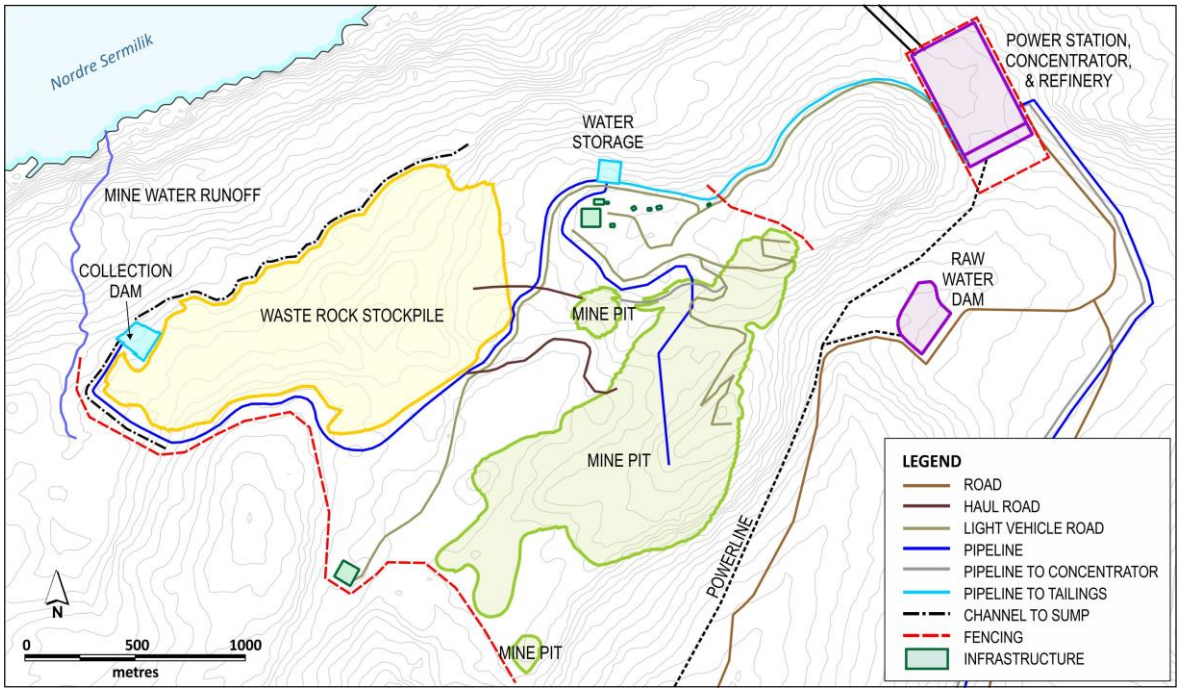

Figure 3.7 Project Fencing

3.6.8 Dangerous Goods Storage and Handling

Dangerous goods will be stored at the processing plant in accordance with EU requirements.

The explosives magazine will be located away from infrastructure at the south end of the pit and will be accessed by a gravel road. The explosives and detonators will be stored separately in an approved explosive magazine building.

3.6.9 Pipelines

Tailings (concentrator and refinery) will be pumped to the TSF as a slurry through pipework located in above ground piping corridors and mounted on supports and insulated to prevent freezing.

Recycled water from the TSF will be pumped to the Plant site via the tailings piping corridor in pipework mounted on supports, insulated and heat traced to prevent the return waters freezing.

Treated excess water will be pumped from the concentrator to Bredefjord, where possible, above ground in a piping corridor, mounted and insulated.

3.7 Labour and services

The Project will seek to maximise employment for Greenlandic people. Suitably qualified workers will be offered employment and other potential employees will be offered opportunities to train to fill vacant positions.

Anticipated Project employment opportunities are described in Table 3.2.

Table 3.2 Labour Requirements by Project Phase

Labour Requirements			
		Average Workforce	Peak Workforce
Construction Phase	Greenlandic workers (local or FIFO)	134 (17%)	200 (17%)
	Foreign workers	649	971
Construction Phase Total		783	1171
Operations Phase	Greenlandic workers (local or FIFO)	328 (46%)	
	Foreign workers	387	
Operations Phase Total		715	
Closure Phase	Greenlandic workers (local or FIFO)	41 (85%)	
	Foreign workers	7	
Closure Phase Total		48	

It is anticipated that the existing Greenlandic labour force will not be able to initially meet all of the labour required for the Project for each of these phases. A proportion of workers will therefore have to be sourced from outside Greenland. GML's commitment remains that where a suitably skilled worker can be sourced from within Greenland, that worker will be given preference over a foreign worker.

3.8 Project footprint

The overall Project footprint is described in Table 3.3.

Table 3.3 Project footprint

Element	Area (ha)
Mine	115
Waste Rock Stockpile	130
Tailings Storage Facility	310
Plant	15
Port	15
Other (accommodation, offices etc.)	30
Roads and infrastructure	16
Total	**631**

3.9 Decommissioning, Closure and Rehabilitation

The overall closure and reclamation goals are to return the mine site and affected areas to viable land and, wherever practicable, establish self-sustained ecosystems that are compatible with both a healthy environment and human activities.

In order to achieve this, the following core closure principles will be followed:

Physical Stability – All Project components that remain after closure will be physically stable to humans and wildlife;

Chemical Stability – Any Project components (including associated wastes) that remain after closure will be chemically stable and non-polluting or contaminating meaning that any deposits remaining on the surface or in lakes will not release substances at a concentration that would significantly harm the environment;

Minimized radiological impact - It will be ensured that the long-term radiation exposure of the public due to any radiological contamination of the Project area is kept "as low as reasonably achievable" (ALARA); and

No Significant Change to Baseline Landforms – Baseline landforms and land use prior to the mining operations will returned to similar visual amenity and geography.

The post closure landform is shown in Figure 3.8.

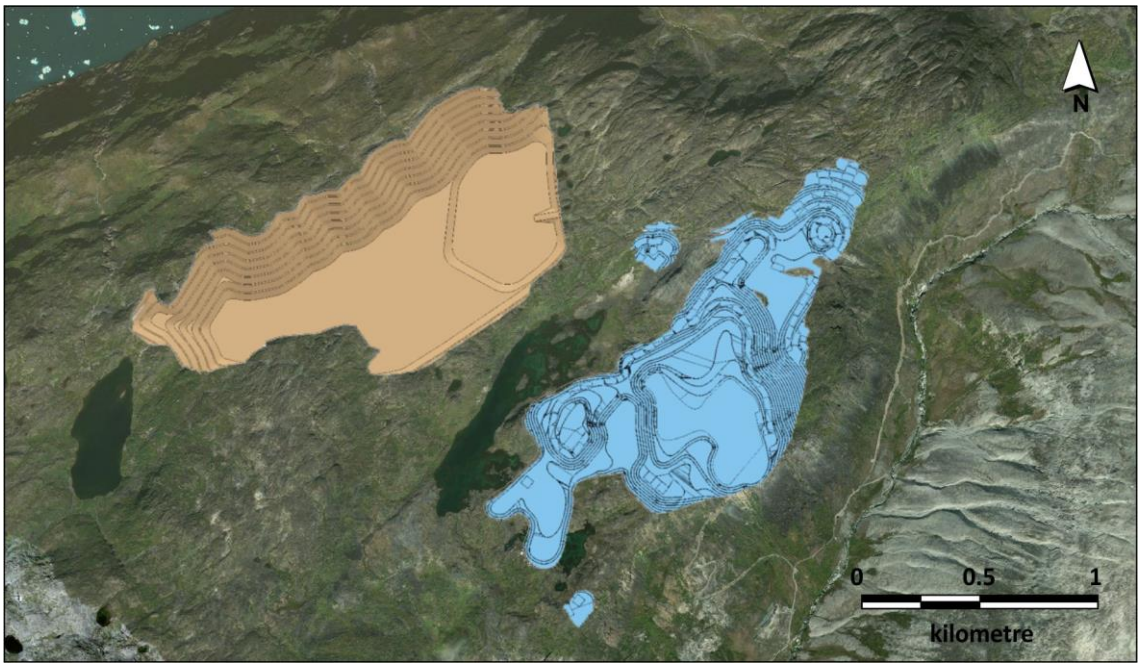

Figure 3.8 Post closure landform

3.10 Project Investment

3.10.1 Capital Cost

The capital cost estimate (CCE) for the Project, inclusive of the mine, the Plant, the TSF and the relevant Project infrastructure, both local and regional, is US$ 1,238 million. The CCE is exclusive of:

- The mining fleet as the mining fleet will be supplied by the mining contractor, the cost of which is factored into the estimate of Project operating costs
- Owner's costs
- Escalation

A number of key elements of Project infrastructure, the Port, the Village, the acid plants (chlor-alkali and sulphuric acid) and the CHP plant will be financed by third parties under build, own, operate (BOO) arrangements. This infrastructure has been separately identified in the CCE.

The costs of the BOO arrangements have been included in the operating cost estimates for the Project.

Under the terms of a typical BOO arrangement, a third party design and builds a facility which it owns and operates it for an agreed period. The customer agrees to purchase all of the output of that facility during this period. The prices include the cost of operating and maintaining the facility, a capital component to cover the investment in the facility and profit for the third party.

At the end of the initial period the third party either continues to operate the facility or transfer it to its customer at an agreed value.

Details of the capital cost estimate ate included in Table 3.4.

Table 3.4 Total Capital Cost Estimate

	Area	USD M
Direct Costs	Area 1000 – Mining	37.6
	Area 2000 – Concentrator Process Plant	224.6
	Area 3000 – Refinery Process Plant	174.4
	Area 5000 – Regional Infrastructure	105.7
	Area 6000 – Major Off-site Infrastructure	4.3
	First Fill Reagents and Consumable	14.2
	Start-Up Spares	3.4
	Mobilisation / Demobilisation	35.1
	Commissioning Assistance	2.4
	Total Plant Direct Cost	**601.5**
Indirect Costs	Temporary Construction Facilities	17.3
	Engineering, Procurement and Construction Management	117.2
	Contingency (Growth Allowance)	103.4
	Total Indirect Costs	**237.5**
BOO Capital	Acid Plant	160.8
	Power station (CHP plant)	53.8
	Accommodation village (the Village)	73.8
	New port (the Port)	110.9
	Total BOO Capital Costs	**399.3**
Project Cost – excluding items financed under BOO arrangements		**839.0**
Total Project Cost		**1,238.3**

The CCE contains an amount of US $ 25.7m for the construction of tailings storage facilities. A series of subsequent embankment lifts, to expand capacity of the YSF will be necessary for both storage facilities during the life of the Project. These costs have been included in financial modelling for the Project.

3.10.2 Operating Cost

The operating cost estimate (OCE) for the Project, inclusive of the cost of BOO arrangements is US$ 259 m per annum. The OCE is an estimate of the annual average operating costs (annual and unit) over the life of the Project. Actual costs year on year will vary with grade and throughput. The OCE includes the cost of mining, the cost of operating the Plant and the cost of operating relevant local and regional Project infrastructure. Details of the operating cost are included in Table 3.5.

Table 3.5 Operating Cost Estimate

	Annual Cost (US$ 000 pa)	% of Total
Mining	17,732	6.9
Labour	36,819	14.2
Power	30,996	12.0
Reagents	45,581	17.6
Consumables	11,145	4.3
Maintenance Materials	25,809	10.0
G&A	14,419	5.6
Freight	30,439	11.8
BOO	45,598	17.6
TOTAL	**258,538**	

4. Regulatory Framework

Greenland is part of the Kingdom of Denmark. Autonomous local governance was introduced to Greenland in 1979 followed in 2009 by a new Act of Greenland Self Government, which states that Greenland can take over the administration of natural resources. In 2009, Naalakkersuisut (the Government of Greenland) took over mineral resource administration from Denmark, including the administration of social and environmental issues in relation to mineral projects.

This SIA has been developed to satisfy the regulatory requirements of Greenlandic legislation. Under Greenlandic legislation, an Environmental Impact Assessment and a Social Impact Assessment must be developed for a major project. Consistent with this legislative requirement, the EIA and SIA for the Project have been developed as standalone documents, however the reader is advised to read both to gain a full appreciation of the Project and its environmental and social impacts.

This SIA has been developed in a style which is consistent with Greenlandic guidance on SIAs and aligned with international good practice in order to meet the expectations of project financing institutions and potential future investors in the Project. These expectations are encapsulated in the Equator Principles, which are based upon the International Finance Corporation's Environmental and Social Performance Standards.

In addition to the requirements relating to impact assessment, the Project will also comply with all other applicable Greenlandic and Danish legislation, including conventions to which Greenland is a signatory.

An overview of relevant legislation and international standards is provided below.

4.1 Legislation and Regulation Applicable in Greenland

The requirement to complete an SIA for the Project is set out in the Mineral Resource Act (Greenland Parliament Act No. 7 of 7 December 2009[2]). This Act regulates mineral resource activities. Section 78 of this Act requires that mineral resource activities with significant impacts on social conditions can only be licensed and approved once an SIA has been completed and the GoG has approved a SIA Report.

Three authorities are responsible for the administration of mineral resource areas:

- The Ministry of Mineral Resources (MMR)
- The Ministry of Industry and Energy (MIE)
- The Environmental Agency for Mineral Resource Areas (EAMRA)

Under this structure, the MMR and the underlying Mineral License and Safety Authority (MLSA) are responsible for mining licence administration, technical and geological matters.

The MIE is responsible for the SIA, Impact Benefit Agreement (IBA) and issues concerning industry. The Ministry of Mineral Resources and Labor is the authority responsible for general labour policies

[2] Amendments to the Mineral Resources Act were introduced in 2012, 2014 and 2015 and became effective in 2013, 2014 and 2015 respectively.

within Greenland. MIE is also the administrative body under the GoG which coordinates with the Ministry of Foreign Affairs of Denmark, the Ministry of Business and Growth (Denmark) and international bodies such as the International Atomic Energy Agency (IAEA), in relation to the prevention of the spread of nuclear weapons and promotion of cooperation in the peaceful uses of nuclear energy. The cooperation between MIE and the two aforementioned Danish ministries is performed in accordance with the Greenland Self-Government Act.

EAMRA is the administrative authority for environmental matters including the review and approval of Environmental Impact Assessments for mineral resource projects.

In addition to the Mineral Resource Act, the following Greenlandic legislation is also relevant to the development of the Project:

- Greenland Working Environment Act (Executive Order No. 1048 of October 26, 2005, and Act No. 1382 of December 23, 2012)
- Danish Regulation No. 150 of February 23, 2001 on requests relating to the entry into force of the law on non-nationals in Greenland
- Act No. 882 of 25 August 2008 on Maritime Safety (Safety at Sea)
- Greenland Parliament Act No. 4 of June 4, 2012 on Greenland Oil Spill Response A/S
- Greenlandic Parliament Act of 2015 regarding Ionizing Radiation and Protection Against Radiation
- Greenlandic Parliament Act of 1 July 2016 on the Control of Peaceful use of Nuclear Material
- Greenlandic Parliament Act of 1 July 2016 on Control of Export of Dual Use Items
- The Large Scale Act (Greenland Parliament Act No. 25 of 18 December 2012 on construction for large scale projects)
- The Greenland Working Environment Act no 461 of 15 May 2017 (and later amendments)
- Greenland Parliament Act No. 27 of 30 October 1992 (and later amendments) on the regulation of influx of labour in Greenland.
- Danish Decree No. 882 of 25 August 2008 relating to the entry into force of the Act on Maritime Safety (Safety at Sea).
- Danish Act No. 621 of 8 June 2016 on the Control of Peaceful use of Nuclear Material in Greenland.
- Danish Act No. 616 of 8 June 2016 on the Control of Export of Dual Use Items in Greenland.
- Orders on Health and Safety:

Orders on Occupational Health and Safety relevant to the Project	Year
Order no. 32 of 23 January 2006, rest periods and off-time in Greenland	2006
Order no. 155 of 18 April 1972, Pressure contained on land	1972
Order no. 133 of 5 February 2010, Asbestos	2010

Orders on Occupational Health and Safety relevant to the Project	Year
Order no. 302 of 26 March 2015, Work in Relation with Extraction and Exploration for the Extraction of Mineral Materials in Greenland	2015
Order no. 395 of 24 June 1986, Order on the performance of work	1986
Order no. 396 of 25 June, 1986, Work with substances and materials (chemicals0	1986
Order no. 399 of 24 June 1986, Layout/design of the Workplace	1986
Order no. 401 of 24 June 1986, Reporting of Work Related Injuries	1986
Order no. 656 of 12 May 2015, Technical Equipment	2015
Order no. 914 of 26 June 2013, Mandatory Education on Occupational Health and Safety	2013
Order no. 1168 of October 2007, Work place assessment in Greenland	2007
Order no. 1344 of 15 December 2005, Duties of the Developer	2005
Order no. 1347 of 15 December 2005, Order on the construction owner's obligations and responsibility	2005
Order no. 1346 of 15 December 2005, Occupational health and safety work in Greenland, with amendment in Order no. 364 of 6 April 2010	2005, 2010
Order no. 1348 of 15 December 205, Arrangement of construction sites and similar work places in Greenland	2005
Pending Executive Order from Danish Working Environment Authority on Ionizing Radiation and working environment in Greenland	Pending

Relevant aspects of each of these pieces of legislation and regulation are addressed below.

4.1.1 Mineral Resource Act

The Mineral Resource Act stipulates the conditions which need to be met in order to conduct mining activities in Greenland. Initially, a licensee must apply for and obtain an exploitation license for the area, which can be granted pursuant to Section 16 of the Minerals Resource Act upon submission to the authorities of the following documents:

- An application with key information on the proposed mining project;
- A Bankable Feasibility Study (BFS);
- An Environmental Impact Assessment (EIA); and
- A Social Impact Assessment (SIA).

When an exploitation licence is granted, the licensee needs to apply for and obtain an exploitation plan from the GoG (Section 19 of the Mineral Resource Act), which includes submission of a closure plan (Section 43). Provided Section 19 and 43 approvals are granted, all specific constructions, processes, vehicles, devices etc. must be individually approved under Section 86 of the Mineral Resource Act. Typically, the authorities will request a single application for all Section 86 approvals, which need to be renewed on an annual basis.

The Minerals Resource Act (Section 76) requires an SIA to be undertaken when the construction and operation of a mine are expected to have a significant impact on social conditions. The SIA report must demonstrate, describe and assess the direct and indirect impacts of the planned activity (mining) on social conditions, including consideration of cumulative impacts. Details of the information required in the SIA are addressed in SIA Guidelines (discussed below), which were first issued in 2009 and updated in 2016.

Section 18 of the Mineral Resource Act highlights a number of project parameters which will be defined in the exploitation license. Specifically, the license will define the extent to which the licensee must:

- Use labour from Greenland, noting that, to the extent necessary for the activities, the licensee may use foreign labour if labour with similar qualifications does not exist or is not available in Greenland (Section 18(1));
- Use Greenland enterprises for contracts, supplies and services, noting that other enterprise may be used if Greenland enterprises are not technically or commercially competitive (Section 18 (2)); and
- Process exploited mineral resources in Greenland, noting that minerals may be processed outside Greenland if processing in Greenland would result in significantly higher costs or greater inconvenience (Section 18 (3)).

Further to Section 18(1), a Greenland worker is defined in Greenland Parliament Act No. 27 of 30 October 1992 as:

1. A person who is born in Greenland and had permanent residence in Greenland for the first 5 years of his or her life (Act 27: Section 3), or
2. A person who has had permanent[3] residence in Greenland in the last 2 years or for 7 of the last 10 years (Act 27: Section 4), or
3. A person who is married to, or proves to have lived in a civil partnership for at least 1 year with a person who satisfies condition (1) or (2) or is employed by a public or private employer (authority of business) in Greenland in accordance with Greenland law (Act 27: Section 4), or
4. A person who otherwise has a particular connection to Greenland, as may be decided by the Greenland Government (Act 27: Section 3).

In the Mineral Resources Act Section 18, a Greenlandic Enterprise is defined as:

- An enterprise registered as a Greenlandic Enterprise;
- An enterprise based in Greenland; or
- An enterprise which has a real connection to Greenlandic society. This determination is made based on the activities of the enterprise in the past ad its future planned activities.

[3] "Permanent" residence, under condition 2, includes residence outside Greenland for educational purposes when the person concerned satisfied the conditions for obtaining public grants under the Greenland education grant and loan scheme when the education began.

4.1.2 Large Scale Act

The Large Scale Act (Greenland Parliament Act No. 25 of December 18, 2012) is relevant to building and construction of large-scale projects. The Act aims to promote investment in and the performance of large scale projects of particular importance to Greenland's economic development, while taking into account the interests of the population. The Act specifically applies to the procurement processes applicable to construction contracts for large-scale projects. For a project to be classified as "large-scale" under this Act, it must have:

- Project capital costs exceeding DKK 5 billion; and
- The project's demand for construction labour exceeds the qualified, not otherwise employed and available workforce in Greenland; or
- The project's requirement for technical and financial capacity exceed the capacity of Greenlandic enterprises in a technical or financial sense.

Projects implemented under the Large Scale Act are required to ensure the project company and its service providers promote the use of Greenlandic enterprises and Greenlandic labour when procuring bids and entering tri-partite agreements (Impact and Benefit Agreements, IBAs) between the GoG, other public authorities and the project proponent.

4.1.3 Greenland Working Environment Act

This Act aims to ensure a safe and healthy working environment which shall at all times be in accordance with the technical and social development of Greenland society. It sets out the health and safety conditions which a project must apply including consideration of minimum working age requirements, hours of work, medical examinations and provides details on the administrative oversight of workplace conditions.

4.1.4 Application of the Aliens Act in Greenland

This Act is contained within the Danish Decree No. 150 of February 23, 2001 and addresses immigration of foreign residents and workers to Greenland. Visa applications to Greenland are made through the Danish Foreign Ministry. Applications for residency and employment permits in Greenland must be applied for through the Danish Agency for International Recruitment and Integration (SIRI). The Government of Greenland (Naalakkersuisut) is a hearing partner in the SIRI led processing of applications, with a view to checking that the employment contract meets the terms of employment of Greenland. Residency and employment permits are granted simultaneously, and both a permit and a visa may be required depending on the nationality of the applicant. A procedure has been established to facilitate processing of permits for workforce involved in extractive sector projects.

4.2 National Guidelines

Table 4.1 summarises the Greenlandic national guidelines relevant to the social impact assessment for the Project.

Table 4.1 National Guidelines

Title	Summary	Year
Guidelines on the process and preparation of the SIA report for mineral projects	Guidelines on the process and preparation of the SIA report for mineral projects.	2016

4.3 International Standards and Guidelines

The SIA is based on the Guidelines on the process and preparation of Social Impact Assessment report for mining projects (2016) and the Guidelines for Social Impact Assessment for mining projects in Greenland (2009). It has also been informed by approaches defined by the International Finance Corporation in their Environmental and Social Sustainability Performance Standards and international good practice as defined by the International Association of Impact Assessment (IAIA).

For topics related to management of radioactive materials, the following conventions and treaties have also been used to inform the SIA:

International Body	Conventions and Treaties
United Nations	United Nations Security Council Resolution 1540 (2004) related to the non-proliferation of weapons
	Convention on Nuclear Terrorism
	Treaty on the Non-Proliferation of Nuclear Weapons (NPT)
	UN Recommendations on Transport of Dangerous Goods
International labour Organisation (ILO)	Radiation Protection Convention no. 115 (1960)
International Atomic Energy Agency (IAEA)	Convention on Assistance in the case of a Nuclear Accident or Radiological Emergency
	Convention on Nuclear Safety
	Convention on the Physical Protection of Nuclear Material (including amendments)
	Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management
	IAEA Safety Standards relevant to mining and milling
Organisation for Economic Co-operation and Development (OECD)	Nuclear Energy Agency (NEA) directive on Managing Environmental and Health Impacts of Uranium Mining (2014)

4.4 International Security Obligations

Due to the nature of the Project's ore products, international security obligations regarding transport and sale of these products will be applicable. In 2016, the governments of Greenland and Denmark released the texts of joint declarations on nuclear safeguards and uranium export controls together with supporting documents relating to administrative arrangements to be adopted by the two governments. The agreements collectively address domestic political and legal issues arising

from the GoG's decision to permit uranium in Greenland by formally ending a "zero tolerance" position on nuclear activities.

The complexity regarding uranium arises from Greenland's non-independent status in relation to the international treaties governing the commercial uranium business on the one hand and Denmark's obligations under those same treaties, as well as the Euratom Treaty which applies to Denmark courtesy of its membership of the EU on the other.

Throughout the uranium debate in Greenland there has been the firm view that Greenland should "control" the exports of Greenland uranium, and that the highest international standards of reporting and safeguards should be applied. The joint declarations implement these principles explicitly by establishing a cooperative administrative framework underpinned by a new uranium and nuclear policy to be established by Denmark.

The joint declarations satisfy Greenland's requirements by specifying a scheme where the MIE will have a key role in monitoring, supervising and reporting on uranium activities within Greenland, including collection of export information. The Danish Ministry of Foreign Affairs (MFA) will be the state regulatory authority dealing with the International Atomic Energy Agency (IAEA) on nuclear safeguards and material accountancy. This allocation of responsibilities is likely to placate concerns in Greenland about the right to determine the use of Greenland's resources while acknowledging the legal realities of Greenland's non-independent status within the Danish Realm.

The joint declarations state that the minimum standards which will apply to the supply of uranium from Greenland will be modelled on the "best practice" exemplars of Australia and Canada. Those conditions of supply will include:

- Uranium will only be supplied to states which are parties to the Nuclear Non-Proliferation Treaty and which also have an Additional Protocol in place;
- Fall-back safeguards arrangements in the event of the IAEA is unable to perform monitoring;
- International physical protection standards are applied;
- Denmark's prior consent rights on certain third party re-transfers of nuclear material; and
- Recipient countries retain all responsibility for any nuclear waste arising from uranium usage.

These considerations are similar to those in Australian uranium export policy which has been effective for more than twenty years and has not adversely affected commercial activities in the uranium field.

Denmark intends to negotiate Nuclear Cooperation Agreements (NCAs) with recipient countries which will be consistent with these conditions and also meet Denmark's obligations under applicable EU regulations. The NCAs may also be signed by Greenland should agreement with the Danish require this to occur.

Under the joint declarations, Denmark and Greenland agreed to pass enabling legislation, as summarised in Section 4.1.

5. Alternatives Assessment

A number of alternative project configurations have been considered during the course of the Project design phase. This chapter outlines the outlines the alternatives that have been discussed during the SIA process.

5.1 Not proceeding with the Project

- Not proceeding with the Project is an alternative in an economic environment subject to falling commodity prices and increasing processing costs. Not proceeding with the Project would mean any environmental and social impacts and benefits would not occur.
- The Project has the potential to provide significant short and long term social and economic benefits to Greenland and in particular the Narsaq region including:
- Up to 1,171 direct construction jobs
- 715 direct operations jobs
- Capital expenditure of approximately $1,238 million for the construction of the mine, processing plant and infrastructure.
- Additional investment in associated infrastructure for a new port and accommodation facilities.
- Operational expenditure of approximately $ 259 million per annum over the 37 year life of the Project.
- Business opportunities for local and national suppliers to provide good and services during construction and operations
- Education and training opportunities
- Revenue for Greenland in the form of import duties, personal and corporate taxes amounting to ~$ 124 million per year.

5.2 Level of Processing

Three alternative processing alternative scenarios were examined in detail:

1. Concentrator only option
2. Mechanical (concentrator) and chemical processing (refinery) option
3. Greenland separation plant option

A summary of the alternatives which were assessed in included below. A detailed assessment of the social impacts relevant to the "level of processing" to be undertaken in Greenland is provided in Section 7.2.2.

5.2.1 Scenario 1: Concentrator-only

The concentrator only option involves the separation of minerals using physical separation methods only. This option would produce three products:

1. A REE and uranium bearing mineral concentrate

2. A zinc mineral concentrate
3. A chemical precipitate - fluorspar

This option would produce the simplest form of REE product which would require further processing outside Greenland. This option avoids the high cost of building and operating a complex chemical processing facility in Greenland.

5.2.2 Scenario 2: Mechanical (concentrator) and chemical processing (refinery)

In this option mineral concentrates containing REE and uranium will be treated to produce value added products in Greenland. A chemical processing plant will be established to provide an additional stage of processing. Treatment of the mineral concentrate would produce the following products:

- Lanthanum oxide
- Mixed lanthanum and cerium oxide
- Cerium hydroxide
- Mixed REE Oxide
- Uranium Oxide

In addition, the following products are also produced in this development option:

- A zinc mineral concentrate
- A chemical precipitate - fluorspar

This option is aligned with the priority of the GoG to ensure that, as much as practically possible, processing of mineral products takes place within Greenland. As such GML has opted for this as the preferred scenario. Under this development option some of the REE products will require further processing outside Greenland.

5.2.3 Scenario 3: Greenland Separation Plant

This option involves the construction of a REE separation complex in Greenland to produce 15 separated REE oxides. The metallurgical processing of REEs is one of the most complicated processes in the mining and chemical industry and separating individual rare earth oxides is very difficult.

It requires

1. Proprietary extraction technology. This technology is not available for purchase or licensing as it is a key commercial advantage for its current holders.
2. Significant capital expenditure in REE separation facilities. This will increase the capital hurdle required for Project financing.
3. Expertise and experience in the operation of separation plants. Limited resources available in Greenland.
4. Support services for maintenance and materials supplies which are not available in Greenland

5. Other issues include the fact that developing a REE separation process involves significant technical risk and being located far from customers and markets will increase transportation costs significantly

For these reasons GML has decided not to develop in-house REE separation technology or pursue the establishment of a separation plant in Greenland.

5.3 Alternative Facility Locations

Two potential locations for the concentrator and refinery, port and accommodation facilities were considered:

1. Location East - where the processing plant and accommodation facilities would be located at Ipiutaq and the port at Illunnguaq opposite Nunarsarnaq, 15 to 20 km northeast of Narsaq. The ore would be transported by haul trucks through a tunnel from the pit at Kvanefjeld. This scenario requires that the waste rock and tailings be deposited near the Ipiutaq area (see Figure 5.1).
2. Location West - where all mine facilities would be situated in the Ilua Valley and near surroundings, and with the port at Narsap Ilua (Narsaq Bay) (see Figure 5.2).

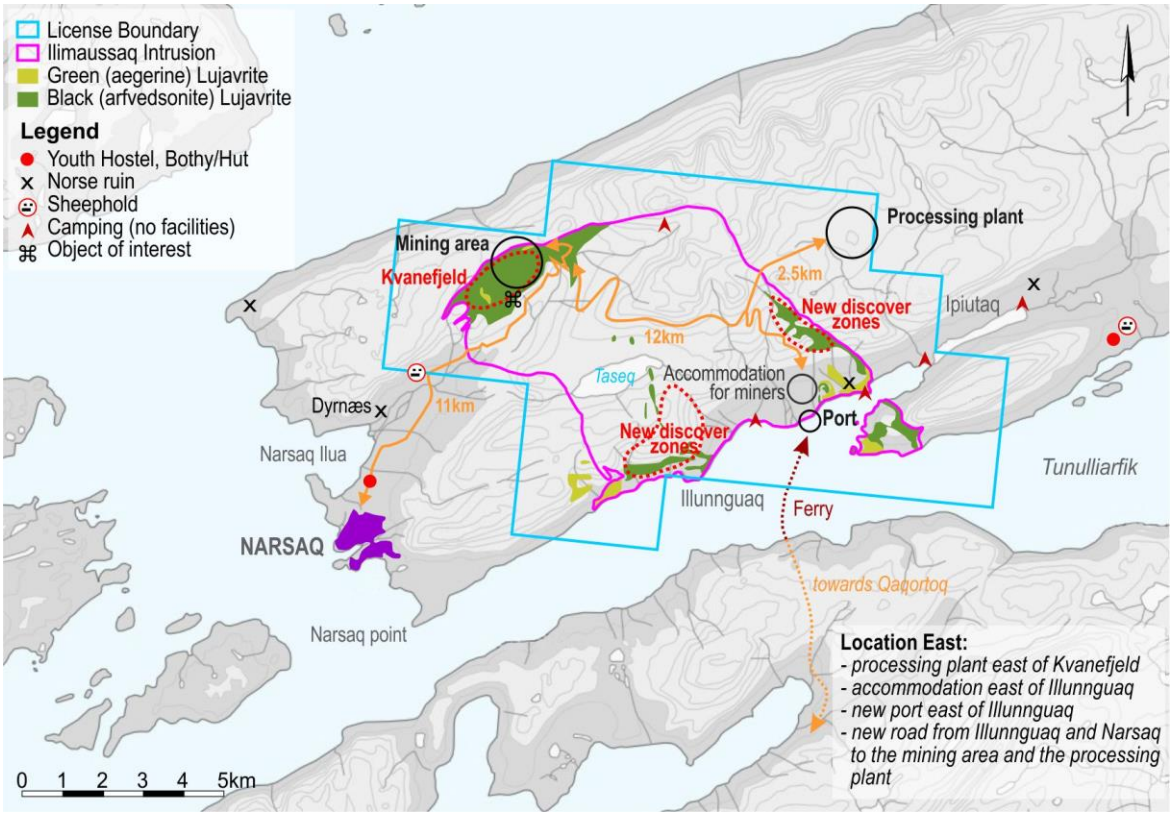

Figure 5.1 Location East

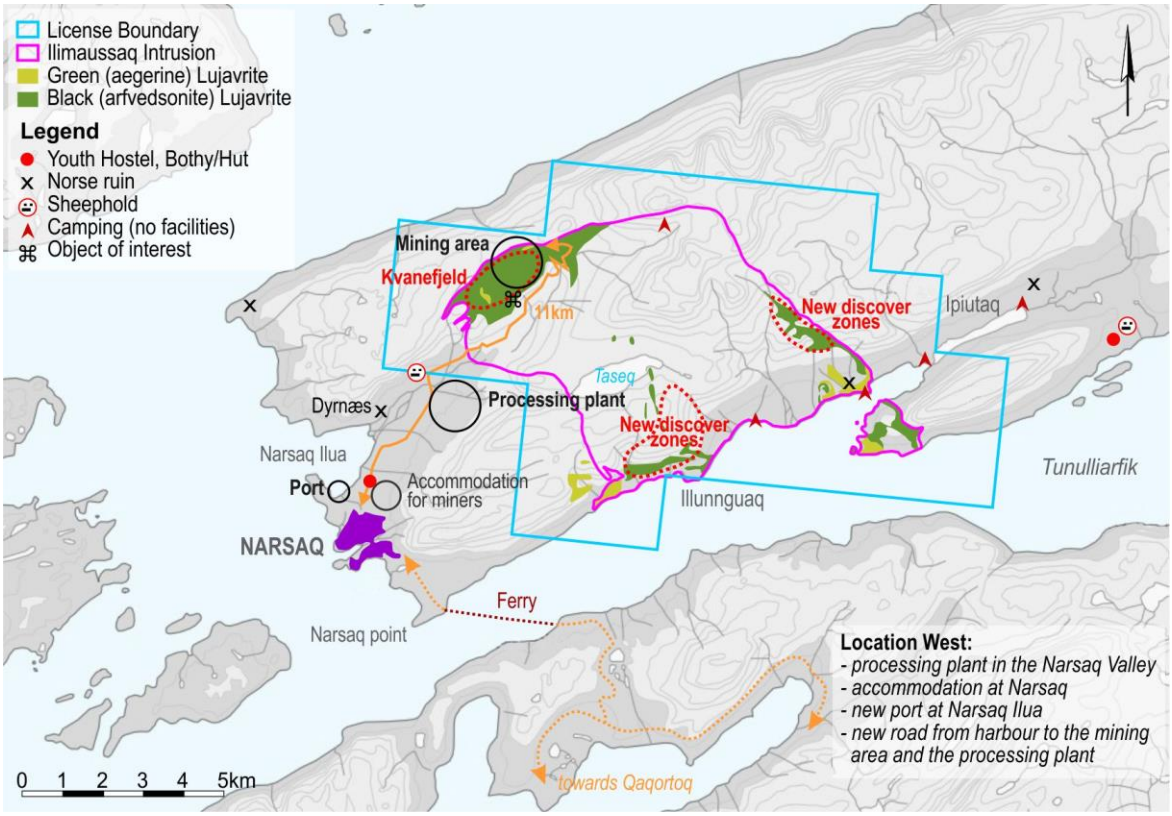

Figure 5.2 Location West

Following public consultations conducted in 2011 in Nuuk, Qaqortoq and Narsaq, Location East was abandoned and the development of the mine design was focused on Ilua Valley - Narsap Ilua area. The primary reasons for selecting Location West included: concerns over the loss of recreational areas with Location East; and the greater opportunities for benefit to Narsaq associated with Location West. The greater benefit to Narsaq stems from the fact that key project elements are to be located adjacent to the community rather than some distance along the fjord, and further, that there will be a more significant level of general development in the town of Narsaq and its associated infrastructure.

5.4 Port Location

Two potential port locations were considered within Narsap Ilua Bay. The two locations can be seen on Figure 5.3.

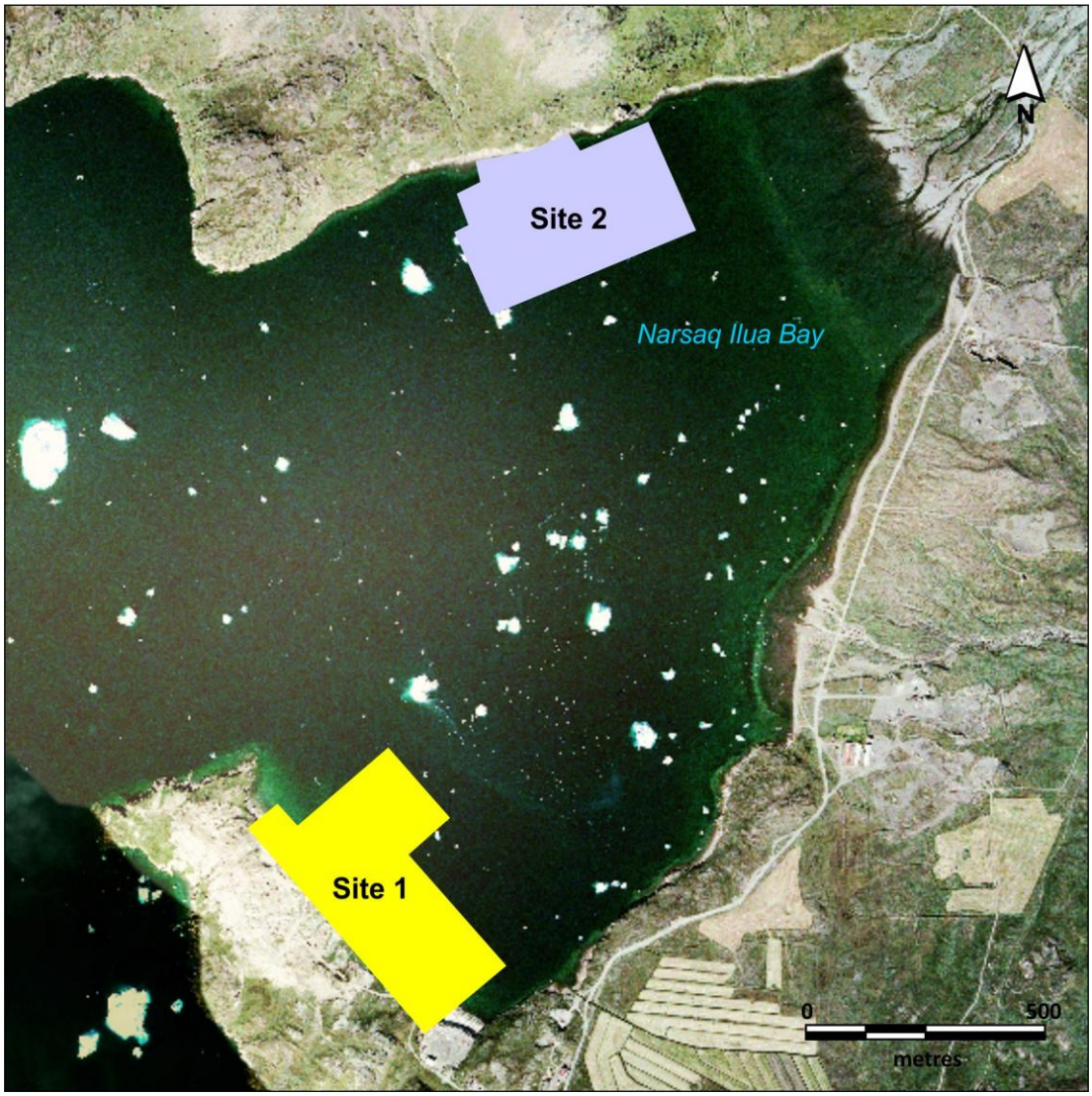

Figure 5.3 Potential Port Locations

The first location (on the Tunu Peninsula) offers good access for vessels and requires minimal dredging. The second location would have been closer to the Project area. The second location was rejected due to its proximity to a Norse farm ruin and the requirement for large-scale blasting to create space for container stacking and the storage of bulk cargo.

5.5 Accommodation Facilities

A number of alternative options were considered for the accommodation of employees during the operations phase of the Project. The choice of a primarily FIFO workforce means that whichever accommodation option was selected, significant and regular turnover of residents would be expected as employees come on and off roster.

The two primary accommodation options which were assessed were:

- Integrating new housing for the Greenland and foreign workforce into the town of Narsaq; and
- Building a security-controlled worker's village on the north-west boundary of Narsaq.

The accommodation strategy needs to balance the benefits brought to Narsaq through revitalisation of town facilities and houses with the potential risk and social change associated with integrating a large foreign workforce into a small town. For these reasons, the Village was seen to present a better balance for Narsaq, and the workforce. The location of the Village will utilise currently undeveloped land. The development of a connecting road between the access road for the site and the Village will minimise traffic impacts in the town of Narsaq.

5.6 Energy alternatives

Heavy Fuel Oil (HFO)

The installation of a 59 MW HFO-fired CHP station was studied for the Project.

On the basis that HFO produces significantly higher levels of sulphur emissions that the generation of equivalent levels of electricity from diesel combustion, the use of HFO for power generation for the Project was abandoned.

Hydropower

The application of hydropower for the Project was first studied by Risø in the 1980s. Johan Dahl Land, located approximately 55 km to the north of the Project, was identified as a potentially suitable source for hydropower. GML commissioned experienced hydropower plant specialists to determine the feasibility of developing hydropower for the Project (Orbicon 2014a). This study identified that in order to provide the hydropower energy to meet the Project's electrical power requirements (approximately 35 MW) would require the damming and diversion of three elevated lakes in the Johan Dahl area. A diversion tunnel to feed lake water to hydro turbines for electricity production would be required as would above ground transmission infrastructure to deliver electricity to the Project site from John Dahl Land.

On the basis of the substantial infrastructure construction required this option was not considered feasible for the first stage of development of the Project. Future expansion options will consider the use of hydropower as a potential alternative source of energy.

Wind

Wind sourced power was not considered to be a viable alternative energy source as it would not be capable of providing a reliable source of base load electricity.

6. Baseline Description

The baseline study has been developed based on primary and secondary data collection. Primary data collection has been undertaken using both quantitative and qualitative methods. The SIA team developed specific interview questionnaires and tools for qualitative methods which were based on international standards, local experience and the specific objectives and scope of the SIA for the Project. International experts ensured that the methodologies and tools used were scientifically sound and robust. Greenlandic experts ensured local sensitivity and adequacy. All tools were tested before undertaking the overall survey activities.

Secondary data sources included public domain information, with a strong reliance on data prepared by Statistics Greenland (2018). Statistics quoted in the report are accurate as of 7th December 2018. High quality secondary data from research studies such as the Survey on Living Conditions in the Arctic (SLiCA) have also informed this baseline.

Arising from stakeholder workshops in 2011, four specific studies were identified as being required to obtain information to understand the baseline conditions in the Project's study areas. These studies are described below:

- Traditional living conditions in South Greenland – this study was undertaken using data collected through the SLiCA surveys, specific to South Greenland. The areas covered by the SLiCA of relevance to traditional living conditions in South Greenland include: social networks; the use and importance of Greenlandic language; health, housing and living conditions, traditional food; engagement in society; societal problems; and safety and security. The data from the SLiCA was published in 2011, however in South Greenland the data was collected between 2004 and 2006. Given the length of time which has passed since the SLiCA data was collected, caution has been applied when using this data.
- A local use study focussing on recreational use of the area;
- A health study based on secondary sources; and
- Mapping of local infrastructure in the Project area.

There first three studies were completed in 2011, with the mapping of infrastructure occurring subsequently.

6.1 Social and Cultural Setting

With more than 44,000 km of coastline, Greenland is the largest island in the world, however the combination of a cold climate, large ice cap and remote location have resulted it only being sparsely populated, with a current population of 56,000[4].

Greenland was first settled by indigenous people from the North American continent over 4,500 years ago[5]. Archaeological evidence indicates that Greenland has experienced a number of waves of settlement, including[6]:

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[4] Statistics Greenland (2018)

[5] Statistics Greenland (2018)

[6] Motke, et. Al. (2015)

- Inuit of the Saqqaq culture who migrated to north-western Greenland from northern Canada around 2500 BCE
- Inuit of the Dorset culture who settled in north and north-western Greenland around 800 BCE
- Inuit of the Late Dorset culture who migrated to the Thule District in north Greenland, in approximately the 8th Century CE, where they remained until approximately 1300 CE.
- Inuit of the Thule culture who migrated from Alaska through to Canada to northern Greenland in approximately 12th Century CE
- Norse Vikings who settled in the southern part of west Greenland in 985, where they remained until approximately 1450 CE
- Inuit from the central Canadian arctic settled in Thule District around the 17th Century
- Greenland was a Danish colony between 1721 and 1953.

Present-day Greenlanders call themselves "Kalaallit" and are an indigenous Inuit people. Kalaallit constitute 85% of the population, with the remaining population primarily Danish. The Greenlandic language is a polysynthetic language and belongs to the Eskimo-Aleutic languages. While Greenlandic is the official language, distinct dialects are spoken in eastern and northern Greenland. Since the early 20th Century, Greenlandic has been taught in schools and subjects have been taught in Greenlandic. Danish is the second language of the country and is taught in all schools from second grade onwards. English is also taught in schools, from fourth grade onwards, but has only received significant usage among younger generations.

Greenland is part of the Kingdom of Denmark, which consists of Denmark, the Faroe Islands and Greenland. Home rule was granted to Greenland in 1979 and self-rule was established on 21 June 2009. Through the Home Rule and Self Government Acts, Greenland has the right to elect its own parliament and government, the later having sovereignty and administration over areas including: education, health, fisheries, environment and climate. The Greenlandic parliament (Inatsisartut) is composed of 31 members and convenes for two periods per year. Members are elected for four-year terms. The Inatsisartut approves the executive government (Naalakkersuisut) which is responsible for the central administration headed by a Premier with a cabinet[7].

6.1.1 Civil Society

Greenland has a long tradition of workers organisations and has a variety of civil society organisations, as listed in Table 6.1. The largest and most powerful union in Greenland is Sulinermik Inuussutissarsiuteqartut Kattuffiat (SIK), which has over 9,000 members. SIK was founded in 1956, with support from the Greenland Ministry of Labour and the Danish Labour Organisation. Mining workers are often associated with and represented by SIK[8] and SIK has local departments in 25 coastal towns and villages.

[7] Naalakkersuisut (2018)

[8] www.sik.gl

Professional fisherman and hunters are organised in Kalaallit Nunaanni Aalisartut Piniartullu Kattuffiat (KNAPK) at the national level, and Aalisartut Piniartullu Peqatigiffiat (APP) at the local level. KNAPK was established in 1953 with the purpose of securing living resources for future generations. KNAPK has more than 2,000 members across 70 branches[9]. These organisations work in the interests of fishermen and hunters and are actively involved in the determination of fishing and hunting quotas.

Professional sheep farmers are organised through the Savaatillit Peqatigiit Suleqatigiissut (SPS). Sheep farming only occurs in southern Greenland, and as such, SPS's focus is restricted to this region. SPS operates as a cooperative and does not act as an employer organisation. In 2017, 37 farms were reported to be operating in Kommune Kujalleq, of which two were reindeer farms and one was a cattle farm, with the remainder operating as sheep farms[10].

Women's associations are in place in every town and most large settlements in Greenland. They are focussed on both gender equality and the preservation of traditional handicrafts. Sorlak was established in 1984 to act as a unifying organisation for children and youth in Greenland. Today, Sorlak is an umbrella organisation for all who work with children and youth in Greenland. Sorlak has approximately 3,500 members[11].

The Inuit Circumpolar Council (ICC) is an international Indigenous Peoples' organisation representing approximately 160,000 Inuit living in the arctic regions of Alaska, Canada, Greenland and Chukotka, Russia. The principal goals of the ICC are:

- To strengthen unity among Inuit of the circumpolar region;
- To promote Inuit rights and interest on the international level;
- To ensure and further develop Inuit culture and society for both the present and future generations;
- To seek full and active participation in the political, economic and social development in Inuit homelands;
- To develop and encourage long-term policies which safeguard the arctic environment; and
- To work for international recognition of the human rights of all Indigenous Peoples.

ICC has a Greenland branch, ICC Greenland, based in Nuuk.

[9] Personal communication, KNAPK representative (August 2017)

[10] Personal communication, Ilua Valley Farmer (August 2017)

[11] www.sorlak.gl

Table 6.1 Labour Unions and Civil Society Organisations

Name in English	Name in Greenlandic
Greenland Business Association	Sulisitsisut (GE)
Employees' Association	Sulinermik Inuussutissarsiuteqartut Kattuffiat (SIK)
Employers' Association	Nunaqavisissuit Suliffiutilit Kattuffiat (NUSUKA)
Graduate Association in Greenland	Kalaallit Nunaanni Ilinniagaqartuut Kattuffiat
Nurses' Union	Peqqissaasut Kattuffiat (PK)
Greenland Nature and Environment Association	AVATAQ – Pinngortitaq avatangiisillu peqatigiffik
Association of Ornithologists	TIMMIAQ
ICC International Circumpolar Council	ICC
Organisation of Professional Fishermen and Hunters, National and Regional	Kalaallit Nunaanni Aalisartut Piniartullu Kattuffiat (KNAPK), Aalisartut Piniartullu Peqatigiiffiat (APP)
Association of Sheep Farmers	Savaatillit Peqatigiit Suleqatigiissut (SPS)
Women's Association	Arnat Peqatigiiffiat
Association for the Elderly	Utoqqaat Peqatigiiffiat
Lions Club	
Sports Confederation of Greenland	Kalaallit Nunaanni Timersoqatigiit Kattuffiat (GIF)
Joint Council for Youth and Children	Sorlak
Transparency International Greenland	
Nanu Children	Nanu Meeqqat
Save the Children	Meeqqat Ikiortigit
Association Against the Extraction of Uranium Bearing Minerals	Urani Naamik

6.2 Demographics

With over 80% of the landmass of Greenland covered by the ice cap, present day Greenlanders live in villages along the coast, as seen in Figure 6.2. Greenland is subdivided into five municipalities - Kommune Kujalleq, Kommuneqarfik Sermersooq, Qeqqata Kommunia; Avannaata Kommunia and Kommune Qeqertalik – and the Northeast Greenland National Park which is uninhabited. The municipalities of Avannaata and Qeqertalik were only pronounced in January 2018, previously being combined as Qaasuitsup Kommunia. Due to this recent change, statistics are not yet available for the new municipalities, and are instead reported in a combined format for Qassuitsup Kommunia.

In July 2018, the population of Greenland was reported to be 56,025, with 18,0844 inhabitants living in the capital Nuuk. The Greenlandic population has demonstrated a largely stable, if slightly declining, population, as seen in Table 6.2. A noticeable gender bias is evident in the population, with a sex ratio of 1.11 (number of males per female). Statistics Greenland project a diminution of the total population in the coming years. By 2040, the population is expected to have decreased by 6% compared 2005 levels, as illustrated in Figure 6.1. The same tendency is projected for Kommune Kujalleq[12].

Table 6.2 Greenland Population (Source: Statistics Greenland, 2017)

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Total	56,193	56,452	56,615	56,749	56,370	56,282	55,984	55,847	55,860	56,025
Women	26,385	26,516	26,673	26,708	26,532	26,553	26,428	26,304	26,367	29,538
Men	29,808	29,936	29,942	30,041	29,838	29,730	29,556	29,532	29,493	26,487

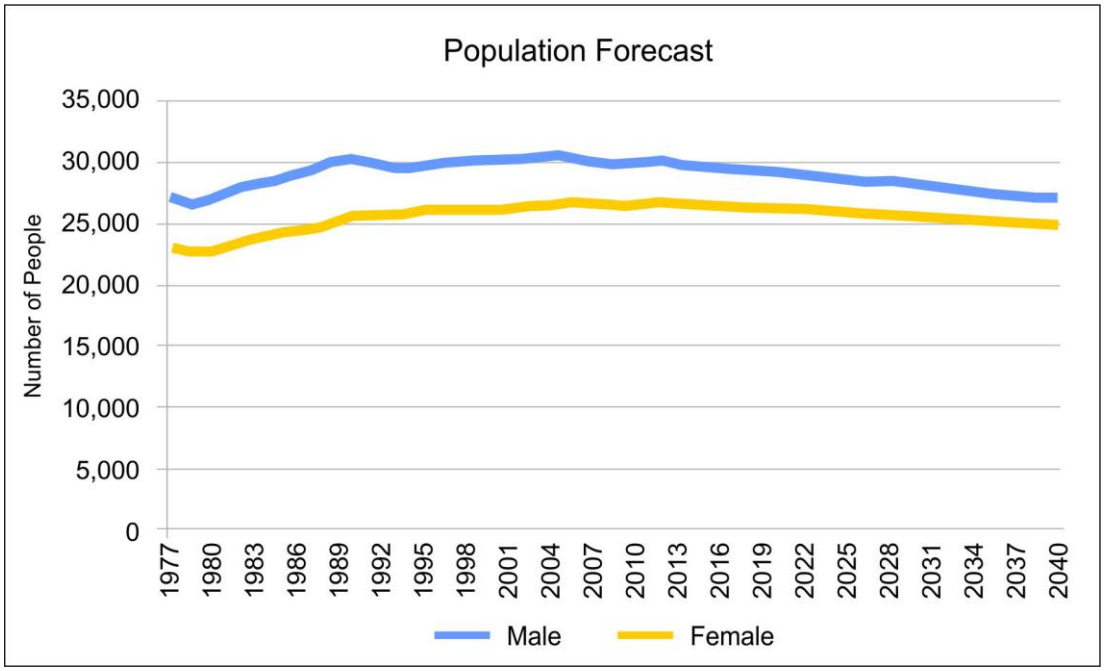

Figure 6.1 Population Forecast (Source: Statistics Greenland, 2018)

[12] Komune Kujalleq (2014 unpublished)

Figure 6.2 Greenland Towns and Settlements (Source: Statistics Greenland, 2017)

As illustrated in Table 6.3, two categories of population are recorded: people residing in towns and those residing in settlements. Greenlandic settlements are defined as having between 50 and 500 inhabitants. In 2018, more than 86% of the population was recorded as living in towns, marking a significant change from Greenland's early settlement pattern which favoured scattered small communities based on hunting. Urbanisation has occurred in a number of waves in Greenland, firstly with the increasing concentration of people near good fishing grounds in the 1920s as

commercial fishing activities commenced. A second wave of urbanisation occurred in the 1960s with the G60 Plan attempting to concentrate the population into larger settlements. This programme was supported by incentives based upon the provision of new houses and dwellings, and access to shops and schools in larger communities, and the closure of services in smaller communities[13]. As of 2018, nearly a third of the national population were resident in the capital, Nuuk.

Table 6.3 Greenland Population by Town and Settlement (Source: Statistics Greenland, 2018)

	2007		2018	
	Towns	**Settlements**	**Towns**	**Settlements**
Total	46,985	9,095	48,568	7,457
Kommune Kujalleq	6,379	1,220	5,616	957
Nanortalik	1,450	782	1,230	512
Qaqortoq	3,238	198	3,015	169
Narsaq	1,691	240	1,371	276
Kommuneqafik Sermersooq	18,892	1,661	21,585	1,204
Paamiut	1,753	153	1,376	82
Nuuk	14,719	323	17,798	246
Tasiilaq	1,895	1,174	2,043	871
Ittoqqortoormiit	525	-	368	2
Qeqqata Kommunia	8,186	1,499	8,117	1,322
Maniitsoq	2,824	703	2,593	589
Sisimiut	5,344	796	5,524	733
Qaasuitsup Kommunia	13,528	4,715	13,250	3,880
Kangaatsiap	669	794	573	653
Aasiaat	2,977	212	3,081	143
Qasigiannguit	1,220	71	1,103	84
Ilulissat	4,512	484	4,556	337
Qeqertarsuaq	1,013	42	867	18
Uummannaq	1,328	1,122	1,380	853
Upernavik	1,157	1,796	1,065	1,666
Qaanaaq	652	194	625	126
Outside Municipalities	-	200	-	94

The population of the three towns of Kommune Kujalleq has experienced significant decline in the past decade, as illustrated in Figure 6.3. Across the towns, the greatest decline was recorded in Nanortalik, which reported a 25% reduction in the population between 2009 and 2018. By comparison, Narsaq and Qaqortoq's reductions of 8.5% appear less dramatic. Importantly, the

[13] Hamilton, et. al. (2010)

greatest decline in population in Kommune Kujalleq has been witnessed in the settlements and rural communities. As these smaller communities reduce in size, the viability of maintaining education, health and other essential services is made challenging, often causing higher costs for municipal service delivery as the rural population declines.

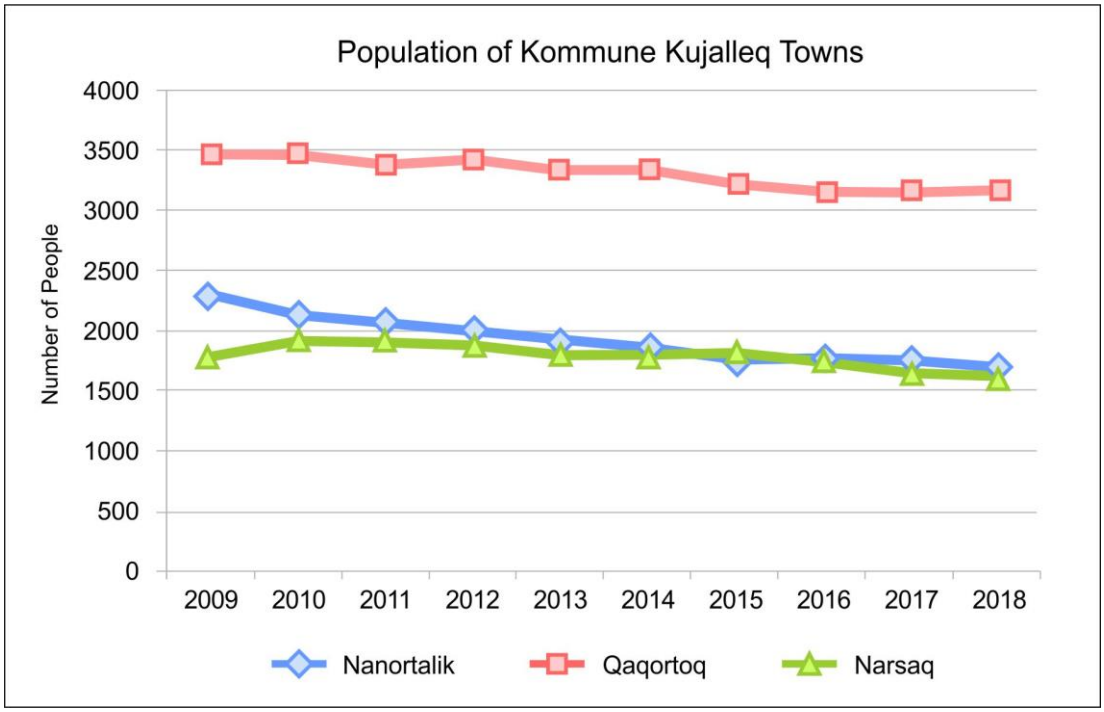

Figure 6.3 Total Population of Kommune Kujalleq Towns (Source, Statistics Greenland, 2017)

Figure 6.4 Map of Kommune Kujalleq showing towns and settlements (Source: www.kujalleq.gl)

As reported in the SLiCA (Poppel, 2011), the average household size in Greenland has reduced considerably over the last half century. In 1945, the average Greenlandic household consisted of almost six people, whereas in 2009 it had decreased to little more than 2 people.

6.2.1 Age and Gender Distribution

As noted earlier, Greenland has a distinct gender bias in its population statistics, with a larger number of males than females, as can be seen in Figure 6.5. The Greenlandic population pyramid is similar to that of many developed countries, demonstrating an aging population with a lower birth rate. This population demographic is also seen in Kommune Kujalleq, and is further reinforced by official population projections which indicate that by 2024, the municipality will have 8.2% fewer children and adolescents, 12.4% fewer working age people and a 21.7% increase in the population of the elderly (as compared to 2014)[14]. Narsaq reported a sex ratio of 1.09 in 2014, which while higher than that of Qaqortoq (1.075) remains considerably lower than that of Nanortalik (1.22)[15].

[14] Kommune Kujalleq (2014 unpublished)

[15] ibid

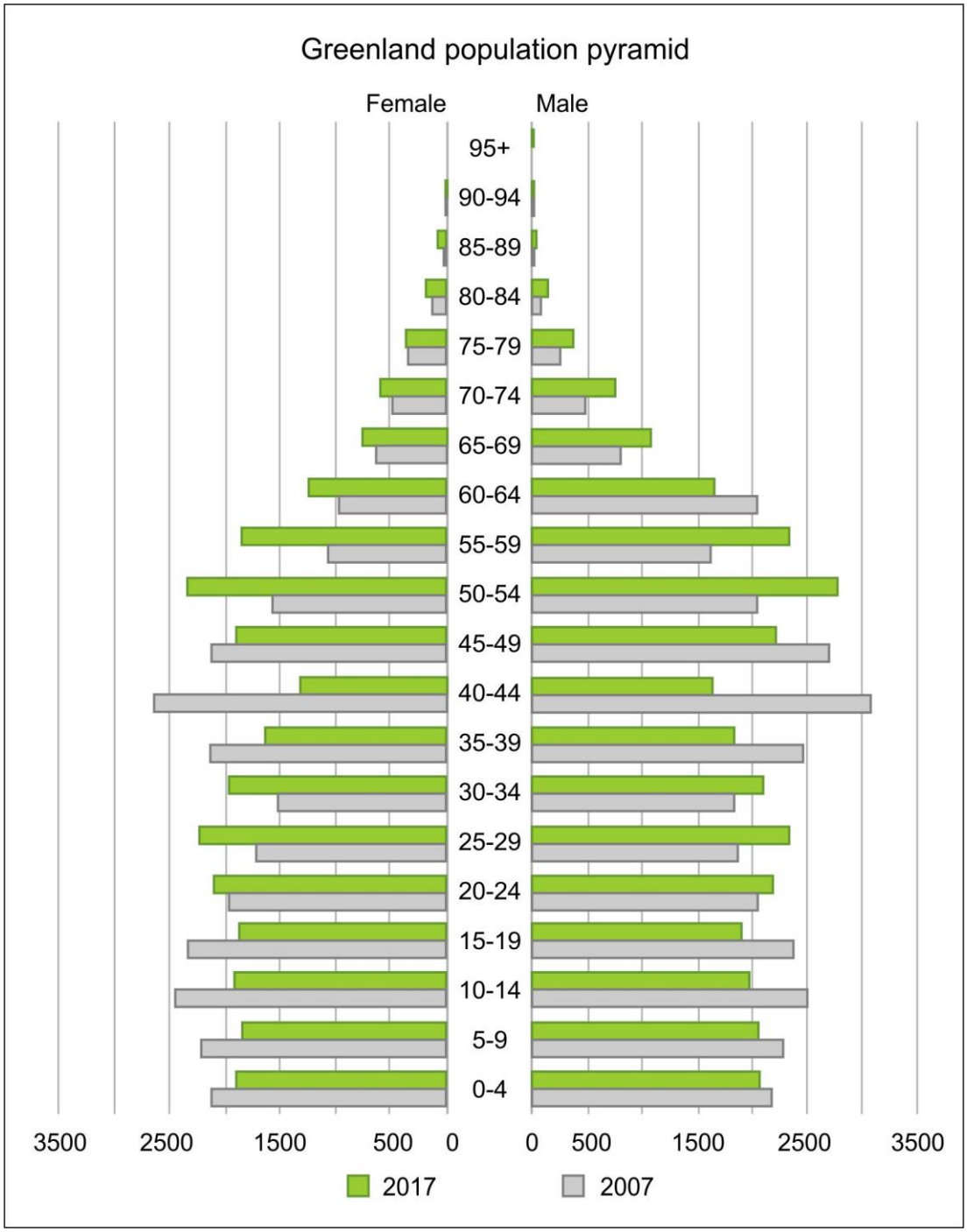

Figure 6.5 Greenland Population Pyramid (Source: Statistics Greenland, 2017)

The demographic statistics presented in

Table 6.4 highlight the relatively low birth rate in Greenland, estimated for 2017. The birth rate in Kommune Kujalleq was estimated to be 2.3 in 2014, making it higher than the national average[16].

[16] ibid

Table 6.4 Greenland Demographic Figures for 2017 (Source: CIA World Factbook, 2018)

Demographic Indicator	Figure
Fertility Rate (children per women)	1.99
Life expectancy female	75.5 years
Life expectancy male	69.9 years
Death rate per 1,000 inhabitants	8.7
Infant mortality per 1,000 new-borns	8.9

6.2.2 Migration and Mobility in the Population

During the past decade, emigration from Greenland has been higher than immigration, as seen in Table 6.5. Emigration is strongly linked to the history of Greenland as an autonomous territory of Denmark, with the majority (more than 9 out of 10 emigrating persons) emigrating from Greenland to Denmark. Greenland maintains emigration and immigration statistics for both persons born in Greenland and persons born outside of Greenland: for people born in Greenland, there has been a consistent trend of net emigration, by comparison, the situation fluctuates for people born outside of Greenland.

Table 6.5 Migration (Source: Statistics Greenland (2017) and Greenland in Statistics, 2018)

	2010	2011	2012	2013	2014	2015	2016	2017
Net Immigration	-160	-159	-709	-447	-585	-505	-312	-449
Immigration (Total)	2,491	2,283	2,191	2,066	2,148	2,186	2,451	2,248
Persons born in Greenland	1,061	917	871	975	1,055	1,019	1,108	1,035
Persons born outside of Greenland	1,387	1,364	1,317	1,088	1,091	1,158	1,339	1,209
Emigration (Total)	2,651	2,442	2,900	2,513	2,733	2,691	2,763	2,580
Persons born in Greenland	1,337	1,220	1,486	1,311	1,504	1,544	1,468	1,343
Persons born outside of Greenland	1,270	1,214	1,414	1,200	1,225	1,144	1,285	1,229

In general Greenlanders have always had a high level of mobility. Historically Greenlanders followed whales and seals along the coast however mobility is currently primarily tied to education and employment opportunities. Table 6.6 highlights the dominance of town to town internal migration in recent years, a significant proportion of which is understood to be migration from regional towns to Nuuk.

Table 6.6 Internal Migration (Source: Greenland in Statistics, 2018)

	2010	2011	2012	2013	2014	2015	2016	2018
Same town	13,755	13,200	13,129	14,000	14,322	13,791	14,383	14,158
Same settlement	1,215	1,316	1,191	1,219	1,119	1,232	1,045	993
Between towns	4,553	4,507	4,440	4,672	4,695	4,875	4,926	4,919
Between settlements	346	370	418	332	345	363	397	417
From settlement to town	1,325	1,392	1,359	1,272	1,403	1,306	1,264	1,317
From town to settlement	1,070	1,124	1,079	1,150	1,201	1,242	1,138	1,082
Other	49	32	82	56	25	22	26	16

Kommune Kujalleq assessed the total mobility of the municipality's population in 2013 (population approximately 7,000), with the following results:

- 569 people relocated to Kommune Kujalleq from other municipalities
- 192 people immigrated into the Kommune
- 112 births were recorded
- 81 deaths were recorded
- 601 relocated away from Kommune Kujalleq to other municipalities
- 250 people emigrated away from the Kommune.

Kommune Kujalleq collected similar internal migration data in 2013 to that presented at a national level in Table 6.6, as seen in Table 6.7. It is evident from this data that after internal movements within the same town, the greatest trend of movement is seen in movement between towns.

Table 6.7 Internal Migration in Kommune Kujalleq, 2013 (Source: Kommune Kujalleq, 2014)

Internal Migration	Number of people
Same town	1,752
Same settlement	143
Between towns	324
Between settlements	12
From settlement to town	130
From town to settlement	117
Other	-
Total	2,478

6.3 Economy

Greenland's economy depends on exports of fish and shrimp and on a "block grant" from the Danish government. The value of the block grant is frozen at the 2007 level of contribution (DKK 3.2 Bn), however it is adjusted for Danish inflation. The block grant was valued at € 470 million[17] (DKK 3.5 Bn at current exchange rates) in 2017 and is generally considered to be approximately half of the GoG's revenue.

6.3.1 National economy

Greenland's economy is small, diverse and vulnerable to shocks, especially from the fishing industry which remains the primary industry and the most important export industry[18]. In recent years Greenland's GDP has fluctuated around an average of DKK 16 Bn (current prices) as seen in Figure 6.6.

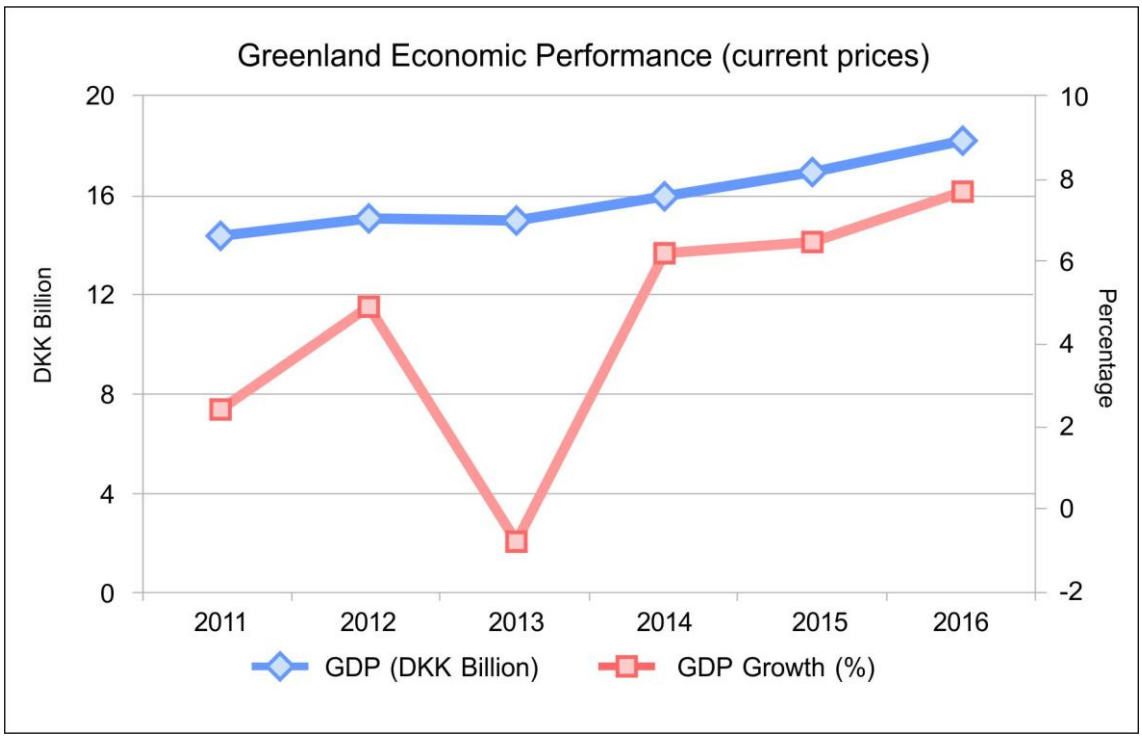

Figure 6.6 Greenland Economic Performance (Source: Greenland in Statistics, 2018)

Economic activity slowed in in 2013-14 primarily due to the contraction of several industries, including fisheries, mining / extraction and tourism. This trend has reversed in recent years due to a rebound in the construction industry, healthy revenues from fishing[19] and growth in tourism. Table 6.8 illustrates the fluctuating profitability of different business sectors in recent years.

[17] https://naalakkersuisut.gl/en/About-government-of-greenland/About-Greenland/Economy-and-Industry-in-Greenland

[18] Ministry of Finance and Taxes, GoG (2017)

[19] ibid

Table 6.8 Business in Greenland - Profit or Loss before Tax (Source: Greenland in Statistics, 2018)

DKK million	2010	2011	2012	2013	2014	2015	2016
Fishing	81.1	179.1	265.8	157.3	142.2	269.3	495.3
Mining	-77.9	120.7	-146.7	-80.3	-28.9	-160.7	-59.3
Industry	54.5	67.7	80.9	36.8	20.7	33.8	62.1
Construction	112.2	76.1	21.1	58.3	3.9	92.7	82.3
Wholesale, retail trade and repair work	229.2	407.1	415.2	380.0	407.9	633.7	630.3
Hotels and restaurants	24.4	18.6	15.4	4.9	9.4	15.1	32.6
Transport	196.9	281.7	226.3	141.1	196.3	268.5	332.0
Finance and insurance	114.3	82.0	158.6	131.9	123.7	38.1	150.2
Real estate and business services	58.9	60.8	24.8	74.9	68.6	-166.1	226.5

Shrimp fishing alone accounts for approximately 35% of total export value, however returns vary significantly due to changing annual quotas. Quotas affect all three primary species caught for export in Greenland: halibut, mackerel and shrimp. According to the Ministry of Finance, recent catch histories suggest that, in the short term there is potential for growth in fishing as a whole, however the profitability of the industry remains challenging. Given this variability, the Greenland government notes the importance of continuing to work to develop other private industries in addition to fishing[20].

In addition to fishing, the Greenland government has prioritised tourism and resource exploration as areas with potential for growth in the coming years. Tourism is evaluated from a combination of the number of cruise ship passengers, national and international travellers taking flights to and around Greenland and hotel stays. Assessing these indicators, the tourism industry contracted between 2010-2014, however as illustrated in Figure 6.7, 2015-17 witnessed increasing numbers of foreign air passengers and cruise ship passengers.

[20] ibid

Figure 6.7 Tourism Statistics for Greenland (Source: Greenland in Statistics, 2018)

The third area of potential economic growth, the minerals sector, has experienced decline in Greenland in recent years. This is considered by the GoG to be primarily due to the decline of prices for metals, minerals and oil. The number of mineral licenses allocated in 2015-16 exceeded the number granted between 2010 – 2014, however the majority of the growth has been in small-scale licenses. Notably, the number of prospecting licences fell from 25 licences in 2012, to 11 in 2016, matched by a similar decrease in the number of exploration licenses (from 79 to 58 over the same period). 2017 did, however, mark the commencement of production of Greenland's newest mine: LNS Greenland Gems A/S's ruby and sapphire project located at Aappaluttoq.

Table 6.9 Status of Mineral Projects as at 2018

Project	Owner	Status	Expected no. of jobs from (construction) operation
Aappaluttoq (rubies and pink sapphires)	LNS	Production phase	Approximately 80 in 2017
Naajat / Søndre Strømfjord (anorthosit)	Hudson Resources Inc	Construction	(20 in 2017) 61 in 2017
Citronen Fjord (Zn, Pb)	Ironbark Zinc Ltd	Exploitation permit granted in 2016	(300 in construction) and 475 in operations
Kuannersuit / Kvanefjeld (REE, U, Zn, Fluorite)	Greenland Minerals Ltd	Planning Phase	(1,170 in construction) and 715 in operations
Isukasia (Fe)	General Nice	Exploitation permit granted in 2013	(1,500-3,300 in construction) and 680-810 in operations
Killavaat Alannguat / Kringlerne (Zr, REE, Nb, Ta, Y)	Tanbreez	Most recent application received in 2016	Awaiting result of application processing

Maarmorilik (Zn, Pb)	Arctic Resources	Prospecting	Awaiting prospecting results
Nalunaq A/S (Au)	AEX Gold	Prospecting	Awaiting prospecting results
Maniitsoq (Ni, Co, PGM)	North American Nickel	Prospecting	Awaiting prospecting results

6.3.1.1 Description of business activity

The GoG is heavily represented in Greenland's business sector and has an ownership interest in most of Greenland's larger companies. The companies often have monopoly control on provision of services and are also responsible for a large part of the employment and production in the country. Privately owned companies are often smaller in size and may operate seasonally.

As of January 2018, all businesses registered in Greenland will be listed in the Danish Central Business Registry (CVR - this will replace the Greenlandic Business Registry (GER)). In 2016, 4,055 businesses were registered in Greenland, of which 43.1% were within the fishing sector. Just over a third of the businesses registered in 2015 were registered in Kommuneqarfik Sermsersooq (assumed to be registered in Nuuk), however over 40% were registered in Qaasuitsup Kommunia. Only 8.6% of businesses were registered in Kommune Kujalleq in 2015 (352 businesses), which has experienced a 10% reduction in the number of registered businesses since 2009.

Table 6.10 Number of Registered Businesses (Source: Statistics Greenland, 2017)

Business Sector	2009	2015
Agriculture, hunting etc	95	121
Fishing	1808	1750
Mining	10	20
Industry	101	115
Electricity and water supply	5	3
Construction	298	279
Wholesale, retail trade and repair work	306	371
Hotels and restaurants	122	129
Transport	257	299
Finance and Insurance	14	17
Real estate and business services	324	440
Education	23	48
Health and welfare institutions etc	54	87
Public and personal services	209	295
No information given	149	81
Total	3775	4055

The Greenlandic business environment is characterised by many small companies (sole proprietorship companies accounted for 73% of all registered businesses in 2012), with businesses opening and closing based on a variety of factors beyond profitability alone. Infrastructure (both communication and traditional infrastructure) can be challenging for businesses operating in

Greenland, coupled with significant transport and logistics costs for companies operating across more than one location.

As part of the baseline survey, businesses potentially capable of supporting or working with the Project have been identified. These businesses are summarised in Appendix A.

6.3.1.2 Challenges to the public budget

The Greenland Economic Council anticipate that by 2040 public expenditure will comprise close to 61% of the GDP, while public income is expected to drop to 65% of GDP. Public expenditure is expected to rise primarily due to an aging population combined with net migration of the working age population, resulting in a smaller tax income base and a greater demand on the Greenland public welfare system.

Public income is generated from three primary sources: the Danish block grant, taxes and royalties. The aggregate personal income tax paid in Greenland is made up of three separate tax rates: municipal tax (varies between 25-28%), a central tax (11%) and a joint-municipal tax (6%). This corresponds to an aggregate personal tax of between 42-45%. As the income level in Greenland is generally low, and only taxable when based on non-traditional income sources, the public income generated from income taxes is also generally low.

The public sector comprises three sub-sectors in Greenland: 1) the municipal sector; 2) the self-government sector; and 3) the state sector. The state sector incorporates both services administered by Greenland and those managed from Denmark. Public sector activities are primarily financed through taxes and the block grant received from Denmark. At the municipal level, the largest expenditure areas are social protection, education and general health services.

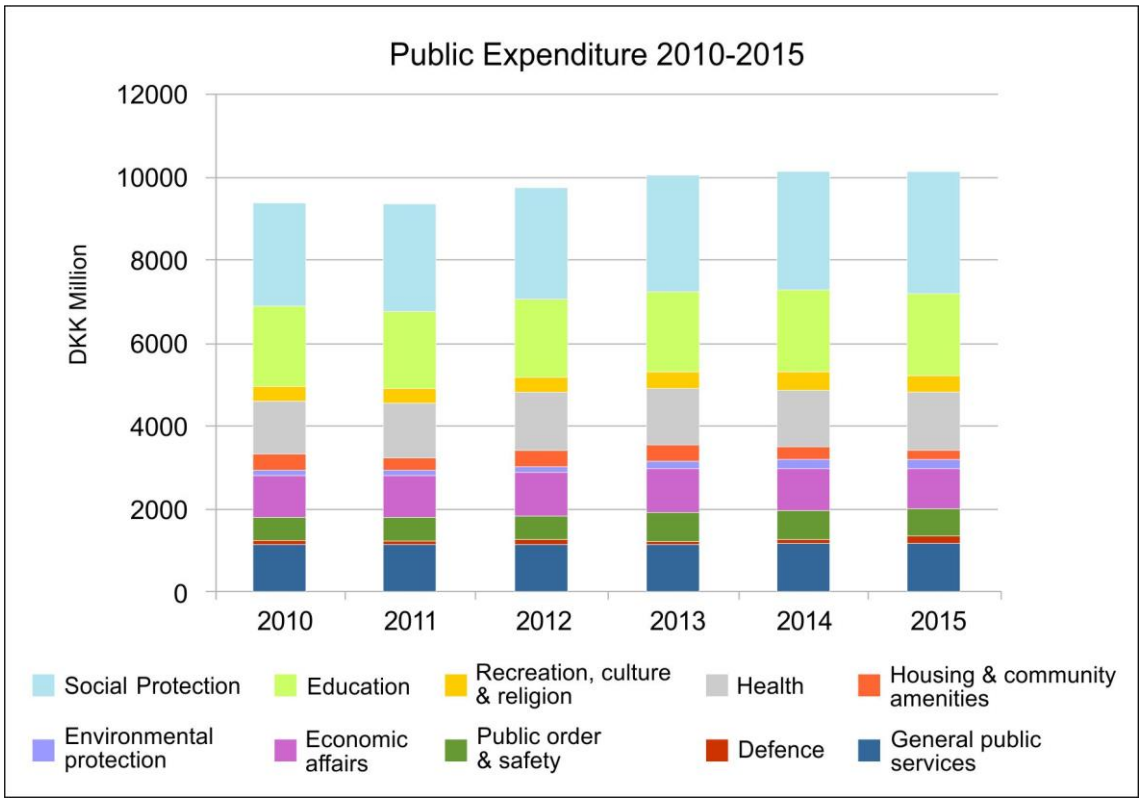

Figure 6.8 Public Expenditure 2010-2015 (Source: Statistics Greenland, 2017)

The consumer price index (CPI) for Greenland as of 1 January 2017, relative to January 2008, is 118.7. Rising food prices, rent, and medical care and health expenses are the primary cause of the increase.

6.3.2 Regional and Local Economy

Many of the challenges identified with the economy of Greenland are replicated at the Kommune Kujalleq level. For 2017, Kommune Kujalleq reported a government budget revenue of approximately DKK 548.5 million. The revenue comprised approximately DKK 318 million from the Danish Block Grant and DKK 219 million generated from personal incomes and company taxes in the municipality (Kommune Kujalleq, 2017).

Comparisons of annual personal gross income across the municipalities highlight the consistently lower level of income in Kommune Kujalleq (and Qaasuitsup Kommunia).

Table 6.11 Annual Personal Gross Income (DKK) (Source: Statistics Greenland, 2018)

DKK	2011	2012	2013	2014	2015	2016	2017
Greenland	207,349	213,126	217,299	218,491	229,056	239,972	245,180
Town	216,593	222,246	226,486	226,892	238,238	248,792	254,833
Settlement	141,029	147,829	151,899	157,958	164,716	177,502	174,332
Kommune Kujalleq	170,157	173,179	177,617	176,163	186,984	192,396	200,895
Town	174,249	178,008	183,138	180,317	192,823	199,049	205,968
Settlement	148,918	147,227	149,679	153,916	156,429	156,729	170,000
Kommuneqarfik Sermersooq	254,280	258,997	264,517	261,535	275,191	282,482	293,052
Town	261,366	266,427	271,841	268,855	283,327	290,514	300,926
Settlement	133,634	134,793	142,825	137,934	142,134	139,209	151,960
Qeqqata Kommunia	200,464	207,257	208,790	214,861	226,246	239,509	240,640
Town	201,414	208,444	209,947	215,594	226,852	240,565	242,188
Settlement	194,653	200,122	202,133	210,462	222,540	232,904	230,839
Qaasuitsup Kommunia	167,248	173,349	176,135	180,704	185,904	201,614	199,793
Town	180,487	185,172	187,365	190,512	195,371	209,433	210,318
Settlement	123,972	134,305	137.699	146,938	154,084	175,500	163,022

Within Kommune Kujalleq, the highest income levels are seen in Qaqortoq, which has also witnessed the most significant increase in income levels in recent years as seen in Figure 6.9.

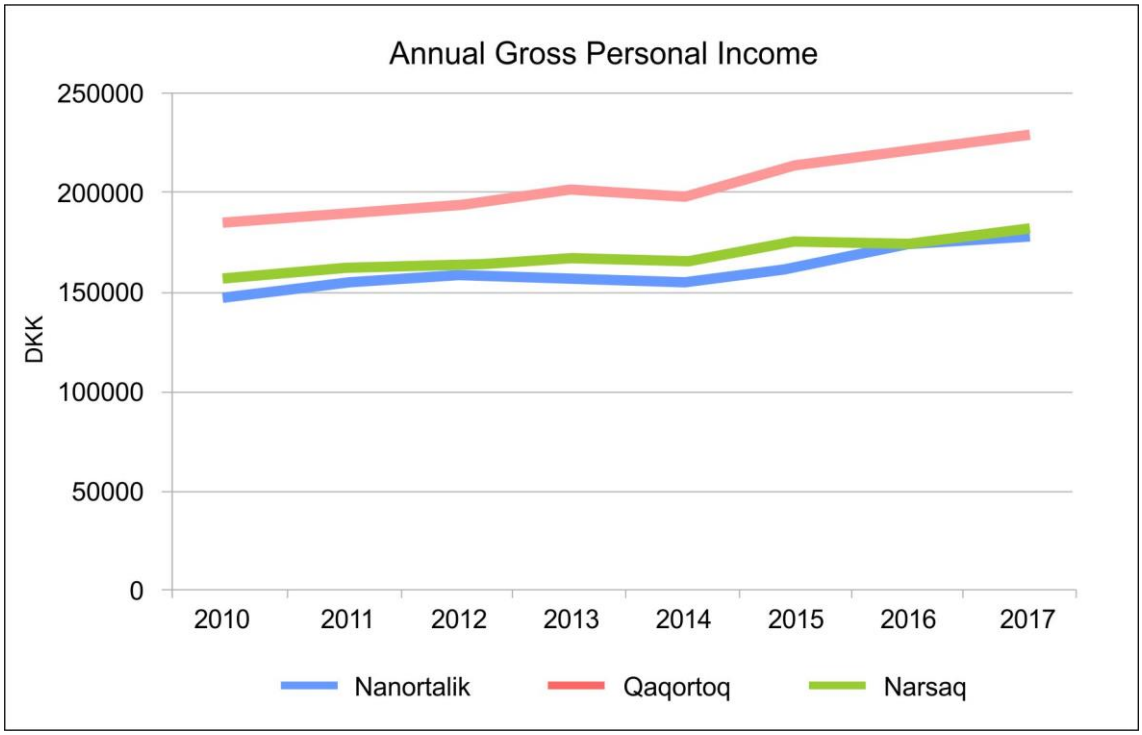

Figure 6.9 Annual Gross Personal Income, DKK (Source: Statistics Greenland, 2017)

The occupation group with the lowest income in Greenland are fishermen and hunters, however it is important to note that many households sustain themselves on a mixed economy of purchased and caught food. According to the Ministry of Industry and Minerals Resources' strategy for employment 2014-2017 (Naalakkersuisut, 2014), fishermen and hunters (especially those under 30 years of age and those above 54 years of age) earn less than the SIK minimum wage. According to the Tax and Welfare Commission (2011), 27% of the 1,668 fishermen and hunters in 2009 reported an income which was so low that they did not pay tax, and 81% had a taxable income similar to the minimum wage or below. Again, it should be noted that these statistics do not include the value of the hunt which is calculated to equate to an average income of 76,000 DKK (in 2009). This is equivalent to nearly half of the annual income of residents in Narsaq.

The private sector in Kommune Kujalleq consists of small enterprises such as retailers, craftsmen, fishermen, hotel and catering services, as well as repair services. Qaqortoq has the most vibrant business life with Narsaq and Nanortalik lagging behind in recent years. For many years, Kommune Kujalleq has hosted a local business forum (Erhvervsforum). The forum meets to debate, cooperate and share business experience.

6.4 Education

All children in Greenland are entitled to ten years of compulsory free education and attend school from ages 6 to 16, comprising both primary and secondary schooling. Throughout the Greenland education system, boys and girls have equal rights to schooling and education opportunities in all areas of study.

Upon completion of secondary school, students have the option of continuing on to upper secondary school, vocational school or higher education. Upper secondary schools (equivalent to gymnasium in Denmark) are designed to help prepare students for higher education. Vocational training is intended to support students to qualify for employment directly after graduation.

Gender distribution assessments conducted as part of mandatory testing in Grades 3, 7 and 10 illustrate a largely balanced participation level in education between boys and girls. When this assessment is carried over to upper secondary, vocation and higher education participation, there is a clear predominance of women participating in upper secondary and higher education (63.5% and 69.3% female participation rates respectively), with a more balanced pattern evident in vocational training (48.5% female participation)[21].

The education level in Greenland has increased over the past decade, with a near 50% increase (to 1445 students) in the number of students enrolled in upper secondary school (general and vocational) between 2003 and 2016. Unfortunately, the number of students completing education is significantly lower than the enrolment figures would suggest, due to a high proportion (nearly 60% in 2016) of students abandoning their education programmes (i.e. dropping out)[22] before completion.

There are 85 schools located across Greenland, with many of the settlement schools having as few as 10 students. The number of schools, and the small class sizes reinforces the challenge of ensuring the quality of the teaching staff is sufficient for the needs of the students. Attracting and retaining teachers in smaller communities is challenging for the Government, with the result that some education is provided by non-qualified teachers.

Primary schools are located in all three of the Kommune Kujalleq towns: Narsaq, Nanortalik and Qaqortoq, however the enrolment trends in these schools are discouraging. A reduction of 31% in the number of school children has been recorded in Nanortalik in the past decade, and in August 2017, only 10 new pupils started the first grade of school in Narsaq[23]. In 2018, Narsaq school had 200 enrolled students, across Grades 1 – 10, with a complement of 23 teachers (13 trained as teachers and 10 temporary support teachers) and two teaching post vacancies.

Narsaq school received government support for an upgrade in recent years, as seen in Figure 6.10. The level of education across the municipality is considered to be relatively low, with two thirds of the workforce “unskilled” or having completed only secondary school education. Of even greater concern is the size of the “residual group”, i.e. students between the ages of 16-18 years of age who do not continue their education beyond secondary school.

[21] GoG, (2013a)

[22] Statistics Greenland (2017)

[23] Personal Communication, Kommune Kujalleq (August 2017)

Figure 6.10 Narsaq School

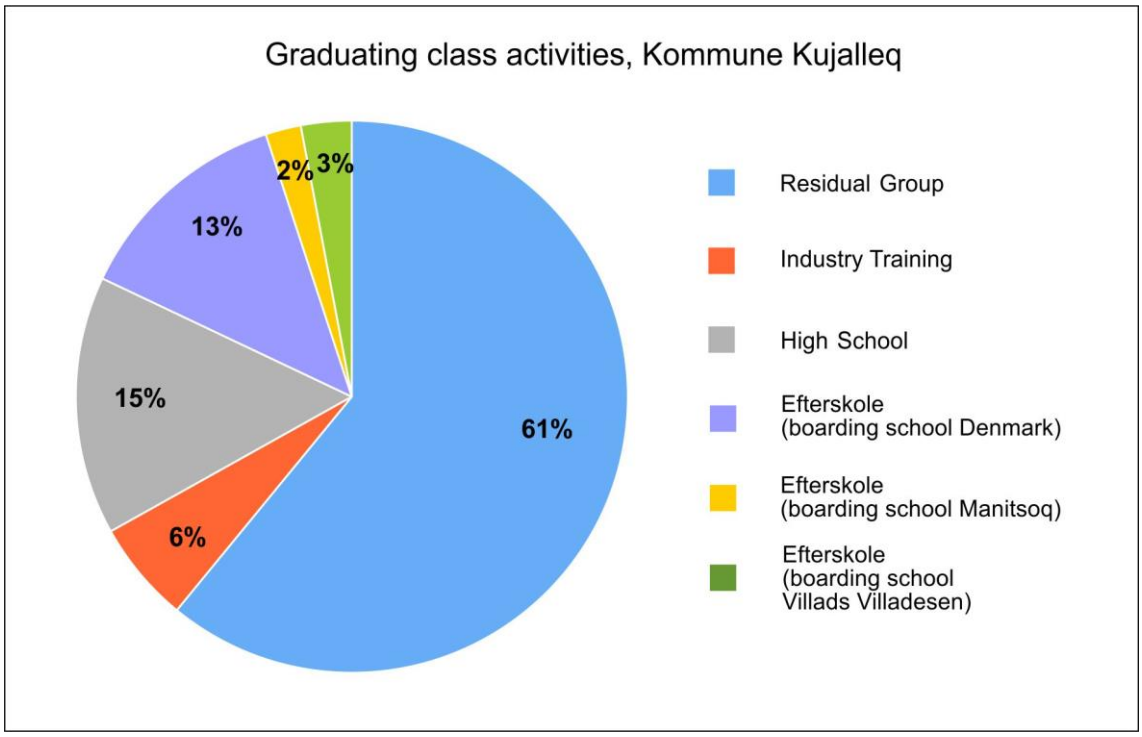

Figure 6.11 Graduating Class Activities, Kommune Kujalleq 2013 (Source: Kommune Kujalleq, 2014)

In Narsaq specifically, a Majoriaq school has been established to support students in the "residual group". School attendance is free, and in 2017, the school had just under 30 students spread across two groups. The first group comprises students who have left school and want to improve knowledge so that can join the job market. The second group is focussed on teaching students some basic life skills to help them better participate in society. Many of the students participating

in this second group have experienced limited parental support during their formative years, which Majoriaq seeks to overcome[24].

6.4.1 Professional Education and Training

Most higher education in Greenland is free for students, being funded by the tax system. Greenland has one university, Ilisimatusarfik, located in Nuuk, with approximately 750 students. The university provides education intended to support private and public sector employment and conducts research in the humanities, social science and health science. A proportion of Greenlandic students wishing to complete university education also travel overseas, primarily to Denmark, to complete higher studies.

Seven education institutions located across Greenland provide business related education (brancheskoler), namely:

- Niuernermik Ilinniarfik (School of Commerce) in Nuuk
- Campus Kujalleq (School of Commerce) located in Qaqortoq
- Kalaallit Nunaanni Teknik Ilinniarfik (School of Iron and Metal, Building and Construction School, Nuuk and Sisimiut)
- Kalaallit Nunaanni Teknik Ilinniarfik (School of Minerals and Petroleum and the GUX, Sisimiut)
- INUILI (hospitality / catering school) located in Narsaq
- Greenland Maritime Centre
- Centre for Health Educators

Details relating to each of these institutions is summarised in Table 6.12.

[24] Personal Communication, Majoriaq in Narsaq (August 2017)

Table 6.12 Education Institutions

School, sector and location	Short description and relevant programmes	Number of yearly internships	Completion rate / drop-out rate
Niuernermik Ilinniarfik (Greenland School of Commerce), Nuuk	Programme for TNI Wholesale and Administration: ▪ Four year programme (includes 2.5 years of internship placement) ▪ Yearly cohort of 96-184 students ▪ Often experiences shortage in internship placements	In 2013: 135 internships In 2014: 149 internships	Around 20-40 students drop out of every cohort, due to lack of internships, or more general reasons such as illness, etc.
	Programme for AU (NI-2) International Sales and Marketing / Economics and Resource Management: ▪ Two year programme (includes 8 weeks internship placement) ▪ Yearly cohort of 48-56 students ▪ Often experiences shortage in internship placements, resulting in students not being able to start education	In 2013: 53 internships In 2014: 68 internships	Around 2-6 students drop out of every cohort, mainly due to failing exams.
Campus Kujalleq (School of Commerce), Qaqortoq	The school is a combination of Greenland's School of Commerce and South Greenland Gymnasium. The school plans to offer additional two year programmes with mandatory internships from 2017 onwards. Programme for Service Sector Assistant with focus on Tourism or Hotel Management ▪ Two year programme (includes 10 weeks internship placement each year) ▪ The programme is very popular and experiences a high supply of internship placements from the sector	2013: 11 internships 2014: 21 internships	Each cohort has a dropout rate of about 50%.
	Programme for TNI Wholesale and Administration: ▪ Four year programme (includes seven rounds of internship placement totalling 2.5 years) ▪ Often experiences shortage in internship placements, resulting in students not being able to start education	Around 40 internships offered each year. Per February 2015 134 students were completing an internship.	Each cohort has a dropout rate of 43%.

School, sector and location	Short description and relevant programmes	Number of yearly internships	Completion rate / drop-out rate
Kaalallit Nunaanni Teknik Ilinniarfik (School of Iron and Metal Construction), Nuuk	The school is part of the Tech College of Greenland (KTI), with headquarters in Sisimiut. All programmes have compulsory internships. Focus areas include: technology and mechanics studies, technology and communication, transport and logistics, etc. In general, there is a large demand for internships (many students who want to follow programmes).	2012: 337 active students with internships during cohort 2013: 327 active students with internships during cohort	The school is awaiting numbers from the Greenland Statistics
Kaalallit Nunaanni Teknik Ilinniarfik (School of Construction), Sisimut	All programmes have a mandatory internship placements as part of the education. These must be secured before starting the programmes. ▪ Focus areas include: carpentry, plumbing technician and painter, etc. ▪ Four year programme (includes 15 months of internship placement)	2011: 71 active students with internships during cohort 2012: 43 active students with internships during cohort 2013: 38 active students with internships during cohort 2014: 64 active students with internships during cohort	2011: 69% completion 2012: 93% completion 2013: 79% completion 2014: 48% completion
Kalaallit Nunaanni Teknik Ilinniarfik (School of Minerals and Petroleum and the GUX), Sisimiut	The school was established in 2008, with main focus of supplying trained staff to the mining sector in Greenland. The school is part of the Tech College of Greenland (KTI). Programmes include minerals, iron and metal, building and construction, etc. ▪ Various lengths of programmes, including two years' internship ▪ The school also offers shorter courses within machine operation, core rare earth minerals knowledge, geology, blasting, core drilling, safety, etc. Refer to Table 6.13 for Sisimut Mining School Courses and numbers of participants for 2018.	15-20 students yearly	35-40 % dropout rate
Inuussutissalerinermik Ilinniarfik (INIULI) (Catering School), Narsaq	Established in 1989, it is a school for the hotel and restaurant services. Students live in one of three modern dormitories in Narsaq (61 beds). Each autumn the school hosts the Greenland championship for professional chefs from all of Greenland's top restaurants.	Employers can sponsor students through an apprenticeship programme. Students receive a stipend in line with SIK wage requirements.	

School, sector and location	Short description and relevant programmes	Number of yearly internships	Completion rate / drop-out rate
Peqqissanermik Ilinniarfik (Centre for Health Educators), Nuuk	Vocational training in in the following fields: ambulance assistant, health worker, health care assistant, health assistant, dental clinician, dentist, childcare consultant and administrative staff. The School has 22 employees.		
Imarsiornermik Ilinniarfik (Greenland Maritime Centre), Nuuk, Paamiut and Uummannaq	Established as a collective organisation in 2013, the centre provides basic education for fisheries and maritime topics. After completing "basic education" students can apply to become a fishing assistant or a qualified ship assistant. Students must have completed primary school graduation with a satisfactory result, be older than 15 ½ years of age and be in good health to apply for course. Basic training is a 5 month course.	140 students on average.	Approximately 40% drop-out rate

Table 6.13 Courses at the Sisimut Mining School, 2018 (Source: Sisimut Mining School, 2018)

	Number of Participants	Course Length	
		Days	Weeks
Drill Rig Course	8	15	3
Common Core	13	50	10
Machine Operators – Upgrade	5	10	2
Machine Operators – Surface Mining 1	9	20	4
Rigging and Lifting	12	10	2
Machine Operators – Surface Mining 2	10	25	5
Blasting	11	10	2
Rock Crushing and Sorting	8	10	2
Core Drilling	7	30	6
Blasting Follow Up	6	5	1
Drill Machine	4	15	3
Total	93	200	40

6.5 Community Health

This section of the baseline has been developed based on the Health Profile prepared by International SOS (2011). Data has been updated where appropriate and practical, however care has been taken to retain the health observations derived from interviews conducted with local stakeholders in the 2011 study. In this section, health is defied "broadly and includes well-being and not just illness", recognising the main types of well-being are physical, social, mental and spiritual.

The Department for Health is the highest political and administrative authority for the health sector in Greenland. Health care, including medication, check-ups, hospitalisation and / or treatment is provided free of charge to individuals registered and resident in Greenland. The Greenlandic health system comprises three components:

1. Health care promotion and prevention
2. Treatment, and
3. Dental care.

The Government of Greenland introduced the first comprehensive public health programme, Inuuneritta I, in 2007. The programme ran until 2012 and a second programme (Inuuneritta II) was launched in 2013 and will conclude in 2019. Inuuneritta II is focussed on four themes: smoking; physical activity; diet; and alcohol and marijuana.

6.5.1 Health Infrastructure

Greenland is divided into five health regions: Avannaa; Disko; Qeqqa; Sermersooq and Kujataa. The Directorate of Health and Prevention is in charge of the health care services in all five regions. Each health region has a regional hospital / regional health centre as well as one or more health centres, nursing stations and settlement consultations. The main health care institutions across the country include:

- Queen Ingrid's Hospital, located in Nuuk, is Greenland's main hospital and acts as both the regional hospital for Nuuk and the referral hospital for all of Greenland. With 191 beds, it was classified by ISOS as a Tier 3 medium care facility which meets international standards of care. QIH has five primary areas of expertise: medicinal, psychiatric, operational, surgical and emergency. In complex cases, patients are evacuated from QIH to Reykjavik or Copenhagen for treatment.
- Primary health care centres are located in 16 towns. These centres act as both local hospitals and serve the surrounding settlements. The regional hospital in Kujataa is located in Qaqortoq, and two health centres are located in Narsaq and Nanortalik.
- Nurse stations and settlement consultations are located in many settlements. In the study area, this includes Alluitsup Paa, Tasiusaq, Narsamiut, Aappilattoq, Ammassivik, Qassimiut, Saarloq, Eqalugaarsuit, Narsarsuaq, Qassiarsuk and Igaliku. The nurse stations and settlement consultations provide treatment, prevention and health promotion services, health staff from district hospitals regularly visit the small settlements and provide consultations, preventative examinations, counselling and supervision.
- Telemedicine (PIPALUK) is an important tool for health staff throughout the health care system. PIPALUK was fully implemented at the end of 2010 across all settlements with more than 50 residents, resulting in more than 70 settlements gaining access to the system[25].
- Health research and coordination is carried out by the Greenland Institute for Circumpolar Health Research (GIHR). The GIHR was established in 2008 with the objective of improving cooperation between researchers from other countries and health care professionals in Greenland. The institute is based in Nuuk.
- Dental health – there are 17 dental clinics across Greenland (one in each town). All citizens have access to free treatment at a dentist in their municipality.

6.5.2 Health Services

Greenland had approximately 1.73 physicians per 1000 people in 2014, and 8.2 hospital beds per 1000 people in 2015[26]. By comparison, 44% of World Health Organisation (WHO) member states reported having less than 1 physician per 1000 people in 2017[27]. The challenge in Greenland is less related to the number of physicians and caregivers and more closely linked to the vast geographical

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[25] Niclasen et. al. (2010)

[26] CIA Factbook (2018)

[27] WHO (2018)

regions these staff need to cover. As indicated in Table 6.14, across Greenland as a whole, caregivers make up the majority of health care staff. When looking at the study area specifically, it is evident that the same trend applies in the Kommune Kujalleq towns, however these town also have a higher reliance on unskilled staff than is seen at the national level.

Table 6.14 Staffing in Health Care (Source: Statistics Yearbook, 2014)

Figures for 2013	Total No. of positions	Doctors	Caregivers[28]	Other skilled staff	Unskilled staff
Total in Greenland	1,241	100	596	316	229
Administration	39	3	3	32	1
Queen Ingrid Hospital	492	44	252	121	75
Nanortalik	25	1	12	4	8
Qaqortoq	64	6	28	22	9
Narsaq	32	1	16	5	10

Table 6.15 presents the total number of admissions and bed days in the three towns of Kommune Kujalleq between 2011 and 2013. It is evident that Qaqortoq has consistently experienced the highest number of admissions and longer average bed days compared to Narsaq and Nanortalik due to its status as the regional hospital.

Table 6.15 Hospital Admissions and Bed Days by hospital in Kommune Kujalleq, 2011-2013 (Source: Statistics Greenland, 2014)

	Admissions			Bed days			Average bed days		
	2011	2012	2013	2011	2012	2013	2011	2012	2013
Total	15,039	14,226	18,397	94,073	85,275	98,788	6	6	6
Nanortalik	433	344	319	1,666	1,164	1,223	3.8	3.4	3.8
Qaqortoq	575	518	866	2,632	2,412	4,070	4.6	4.7	4.7
Narsaq	396	424	447	1,294	1,572	1,718	3.3	3.7	3.8

Staffing for the dental clinics in Kommune Kujalleq can be seen in Table 6.16.

Table 6.16 Dental Care Staffing Level, FTEs in Kommune Kujalleq in 2013

	Total No. of Positions	Dentists	Other Skilled Staff	Unskilled Staff
Total	139.66	30.49	88.32	20.85
Nanortalik	6.67	1.31	5.00	0.36
Qaqortoq	6.61	1.42	4.34	0.85
Narsaq	4.16	1.00	3.12	0.04

[28] Notes: Figures for Administration: Department of Health care and the Board of Health and Prevention are Full Time Equivalent figures. Caregivers: chief nurse, principal, vice principal, nurse, district nurse, health visitor, first assistant, midwife, midwifery, nurse, health assistants, health worker, social worker, and 3) Other Skilled Staff: bio-analysts, physiotherapists, as well as staff with technical, service and support functions and administration, and 4) Unskilled staff: hourly workers and village health workers.

6.5.3 Health Status

The health baseline presented in this report is broken by down into a number of health categories: communicable diseases; non-communicable diseases; and socio and emotional well-being.

6.5.3.1 Communicable Diseases

Communicable diseases are defined as diseases which "spread from one person to another or from an animal to a person"[29]. Despite its geographical isolation, Greenland experiences significant levels of some communicable diseases, notably tuberculosis and sexually transmitted diseases (STDs), with figures occasionally paralleling those seen in developing country contexts.

While the level of communicable diseases appears, in general, to be increasing (see Table 6.17), mortality associated with communicable diseases has been on the decline[30].

Table 6.17 Reported Infectious Diseases 2008 - 2012 (Source: Greenland in Figures, 2014 and 2018)

	2008	2009	2010	2011	2012	2017
	---------- Number of persons ----------					
Meningitis	…	12	10	10	7	
Hepatitis	…	…	…	2	2	
Tuberculosis	62	63	116	112	89	
HIV positive	1	4	3	1	2	
Aids	…	…	…	-	-	
Syphilis	…	-	-	3	10	21
Gonorrhoea	927	1,105	1,239	1,355	1,435	1,223
Chlamydia	2,504	2,864	3,007	3,225	3,150	3,447

The greatest increases appear to be linked to sexually transmitted diseases. Data collected by Statistics Greenland indicate that the prevalence of new cases of sexually transmitted disease (specifically gonorrhoea, chlamydia and syphilis) is primarily affecting the population aged between 15-24. For females, the peak incidence between 2009-2013 was reported in the 15-19 year old group, while for males the peak incidence was recorded in the 20-24 year age group.

Data from the study area illustrates fluctuations in STD cases across the three towns in the last decade. No clear trends are evident within the local datasets.

[29] Global Health (2014)

[30] Statistics Greenland (2014)

Table 6.18 Sexually Transmitted Diseases by Disease, Time, Place and Sex (Source: Statistics Greenland, 2018)

		2009		2013		2017	
		Male	Female	Male	Female	Male	Female
Gonorrhoea	Nanortalik	13	28	34	31	17	16
	Qaqortoq	33	36	59	60	48	63
	Narsaq	25	28	15	18	12	19
Chlamydia	Nanortalik	22	47	31	65	27	42
	Qaqortoq	83	120	109	185	90	174
	Narsaq	54	75	36	47	42	65
Syphilis	Nanortalik	0	0	0	0	0	0
	Qaqortoq	0	0	0	0	0	0
	Narsaq	0	0	0	0	0	0

While HIV is present in Greenland, the number of cases remain well below epidemic levels. As of 2012, 163 people were infected with HIV, of which approximately 36% had advanced to AIDS. These rates equate to an incidence level of 0.08% and a prevalence of 0.15%, which is considered low when compared to the prevalence of 0.4% in the European region and 0.8% worldwide, as estimated by the WHO in 2010. Notably, these rates are similar to those seen in Denmark[31].

HIV levels in Greenland are closely monitored due to the high incidence of sexually transmitted diseases. Interestingly, even as the incidence of STDs has increased in recent years, the incidence of HIV has either remained stable or fallen. One explanation for this is that the population reporting higher levels of STDs tend to be young, while the cohort experiencing HIV have tended to be older. HIV is predominantly transmitted heterosexually in Greenland[32].

As indicated in Table 6.17, tuberculosis (TB) is a significant infectious disease in Greenland. At their peak, in the 1950s, TB rates were in the order of 1,800 per 100,000, however a dramatic reduction was achieved by the 1980s, reducing rates to 20 per 100,000. Unfortunately, TB prevalence then rose again in the 1980s, and has continued to remain high. In 2014, the TB incidence rate for Greenland was 200 cases per 100,000 people, compared to an average of 37 per 100,000 across the 53 countries in the WHO European region, and a rate of 7 per 100,000 in Denmark, and the trend in the WHO European region is of decreasing prevalence (5.2% reduction per year since 2010)[33].

As with TB all over the world, the risk of TB is higher for people who are less well off. Studies have indicated that several socio-medical factors influence the development of TB in Greenland, with the greater risk associated with:

- People living in small villages with no access to running water, baths or flushing toilets;

[31] Bjorg-Mortensen et. al. (2013)

[32] ibid

[33] WHO (2016)

- The unemployed;
- People who consume more than average amounts of tobacco and alcohol; and
- Homelessness (which can make compliance with TB medication extremely difficult)[34].

The TB burden in Greenland is not evenly distributed, with significant regional differences identified tied to specific outbreaks. An outbreak was recorded in Upernavik in 1994 and another in Tasiilaq in 2011-12[35]. Tasiilaq continues to experience one of the highest TB notification rates as seen in Table 6.19, however it is important to note that the highest TB notification rate across the country in 2015 was recorded in Narsaq (536 per 100,000 people).

Table 6.19 TB Notifications in Greenland per capita, 2015 (Source: WHO Regional Office for Europe, 2016)

Municipality	Town / Settlement	Population	TB Cases	TB notification rate / 100,000 people
Kujalleq	Nanortalik	1774	4	225
	Narsaq	1679	9	536
	Qaqortoq	3218	10	311
	Total	6671	23	345
Qassuitsup	Aasiaat	3275	6	183
	Ilulissat	4803	1	21
	Kangaatsiaq	1174	0	0
	Qaanaaq	761	0	0
	Qasigiannguit	1193	0	0
	Qeqertarsuaq	866	0	0
	Upernavik	2740	6	219
	Uummannaq	2196	0	0
	Total	17008	13	76
Qeqqata	Maniitsoq	3187	4	126
	Sisimiut	6236	6	96
	Total	9423	10	106
Sermersooq	Ittoqqortoormiit	381	3	787
	Nuuk	17588	14	80
	Paamiut	1527	6	393
	Tasiilaq	2977	12	403
	Total	22473	35	156

[34] ibid

[35] WHO Regional Office for Europe (2016)

Pneumonia is one of the most common lung diseases in the world and can be caused by either viral or bacterial infection. According to statistics gathered between 1983 and 2010, 288 people died of pneumonia in Greenland, of which 58 lived in the three towns of Kommune Kujalleq. Given the proportion of the Greenlandic population resident in Kommune Kujalleq (approximately 12%), the mortality associated with pneumonia in Kommune Kujalleq considerably exceeds the national average. The majority of the deaths were in individuals aged 55 years or older.

6.5.3.2 Non-Communicable Diseases

The rapid transition from a traditional to a modern society has resulted in changes in lifestyle and eating habits, which have subsequently led to an increasing prevalence of non-communicable diseases. Specifically, rates of obesity, cardiovascular disease and type 2 diabetes have all increased in recent years. "The traditional lifestyle in Greenland was characterised by physically demanding activities, such as subsistence hunting and fishing, berry picking, kayaking, dog sledding and transportation of water to the household. Today, these activities are still widespread all over Greenland, but more often as a leisure activity in the larger towns. Sedentary occupations have become more prevalent and mechanisation of equipment, such as motorised boats, cars, snow mobiles, washing machines and computers have resulted in a less physically challenging daily life"[36].

Recent studies have identified that central and general obesity levels are increasing among the Inuit of Greenland, with positive correlations between obesity and social position for both men and women. General obesity is typically identified by consideration of the body mass index, regardless of where the weight is located. Central obesity is obesity linked to weight carried around the abdomen, which has a correlation with cardiovascular disease. Central obesity among Greenlandic men rose from 16% in 1993-94 to 25.4% in 2005-2010. Among women, general and central obesity increased over the same period, with a central obesity level of 31.3% in 1993-94 rising to 52.4% between 2005-2010. The high prevalence of obesity is considered a serious health problem which has the potential to affect the prevalence of type 2 diabetes and cardiovascular disease[37].

Until 50 years ago, Type 2 Diabetes Mellitus was almost non-existent in Greenland (and also among Inuit in Canada and Alaska). However, by 2010, a prevalence of diagnosed diabetes at 2.7% was recorded among Greenlanders aged 40 years or over. While this remains below the level seen in the Inuit population of Alaska (3.4%), Greenland is considered to demonstrate the same trend as seen in much of the rest of the world where the number of patients has doubled since 2000[38].

While there are many causes of cancer, increasing cancer prevalence of certain types of cancer can be closely linked to changes in lifestyle. Studies combining Inuit from Greenland, Alaska, Northwest Territories and Nunavut (referred to as "the circumpolar Inuit population") and comparing their cancer prevalence to global averages, indicate that Inuit are at extremely high risk for lung and colorectal cancers, as well as rare forms of cancer such as nasopharyngeal cancer[39]. Figure 6.12 illustrates the strikingly high level of lung cancer seen in Greenland compared to other arctic states for both men and women, some of which is attributed to smoking.

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[36] Dahl-Pedersen (2013)

[37] Bjerregaard (2013)

[38] Pedersen (2012)

[39] Kue Young et. al. (2016)

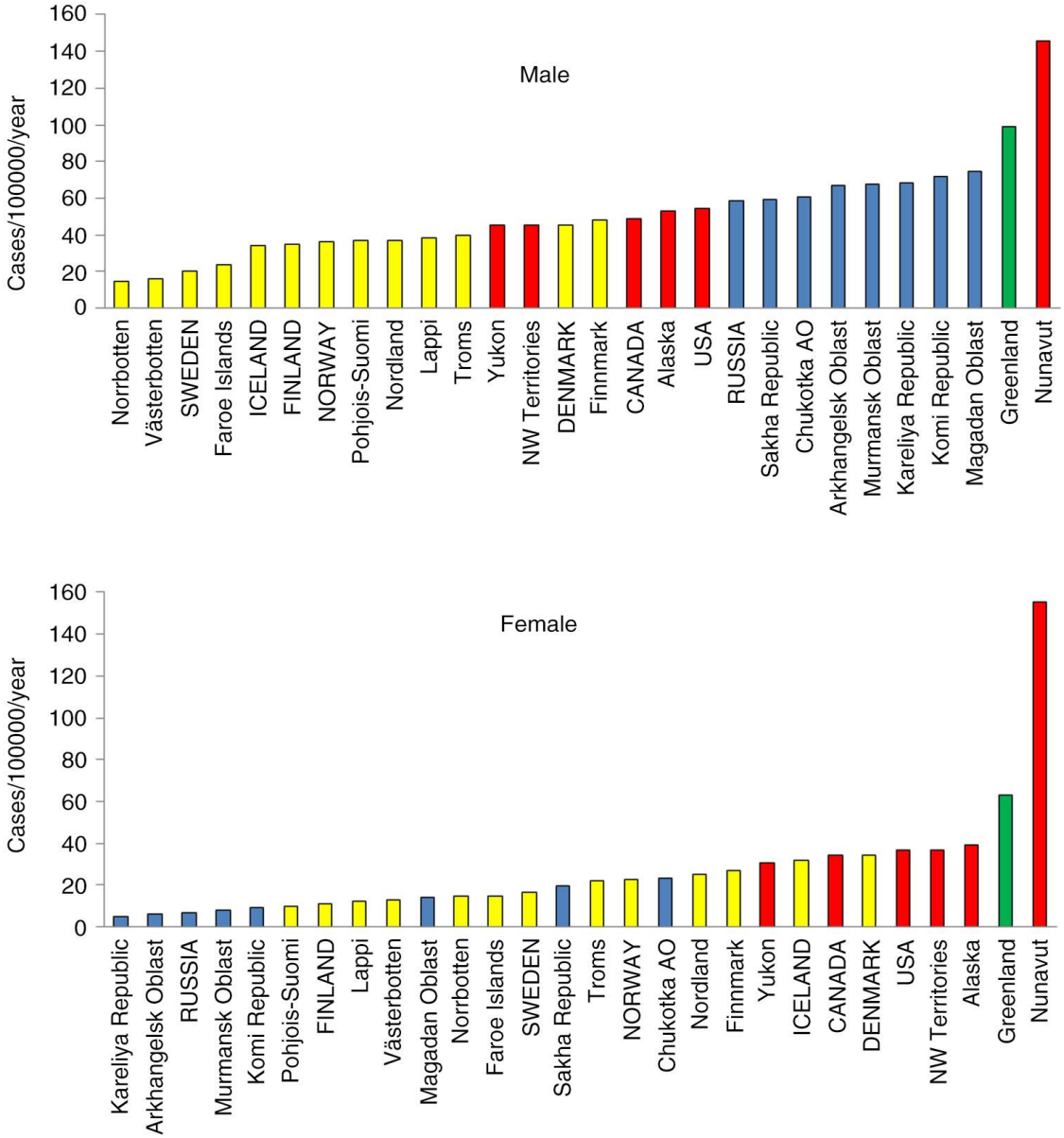

Figure 6.12 Age standardized incidence rates of lung cancer among men and women in the Arctic States and their northern regions, 2000-2009 (Source: Kue Young, T et. al. (2016)

6.5.3.3 Social and Emotional Wellbeing

According to the SLiCA survey in South Greenland[40], the following social issues play a role in Greenland society:

- Unemployment
- Alcohol abuse
- Drug abuse
- Suicide
- Violence in the family
- Sexual abuse

[40] Poppel (2011)

Alcohol consumption levels in Greenland have fluctuated significantly since alcohol became available to the Greenland Inuit in the 1950s. After the introduction of alcohol, consumption levels rose gradually initially, before reaching very high levels in the 1980s when consumption was almost double the level seen in Denmark. Since then, consumption has declined, with consumption levels below those seen in Denmark, in part due to the high prices applied to alcohol in Greenland[41]. Alcohol consumption remains a social concern, with significant levels of alcohol abuse evident in towns and settlements.

Smoking levels in Greenland are also high, with approximately 60% of the adult population smoking. Table 6.20 highlights positive declining trends in both alcohol consumption and smoking levels in Greenland in recent years.

Table 6.20 Weekly Consumption per individual over 14 years of age (Source: Statistics Yearbook, 2016 Archive)

	2000	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
	Amount											
Beverages	17	15	15	15	13	14	13	13	12	11	11	11
Cigarettes	52	44	42	42	33	30	32	28	30	19	21	19

The Home Rule Government has, through the Department of Prevention (PAARISA), carried out several campaigns to highlight the risks of smoking and drinking alcohol, and the reduction in consumption seen in the table above may reflect the success of some of these measures, particularly when combined with price pressures. However, anecdotal reports indicate an increasing level of consumption of marijuana and hashish. Use of harder narcotics remains relatively limited due to supply limitations related to the geographical isolation of Greenland. The police station in Narsaq report that cannabis consumption remains a significant challenge in the town.

Suicide is considered one of the main challenges for public health in Greenland. Japan is commonly known as the country with the highest suicide epidemic averaging around 50 cases per 100,000, however figures from Greenland indicate an average of 100 cases per 100,000 inhabitants from 1980 onwards[42]. Data indicates higher suicide rates amongst males than female, with a distinct peak in the 20-24 year age group.

[41] Aage (2012)

[42] Bjerregaard, et. al. (2015)

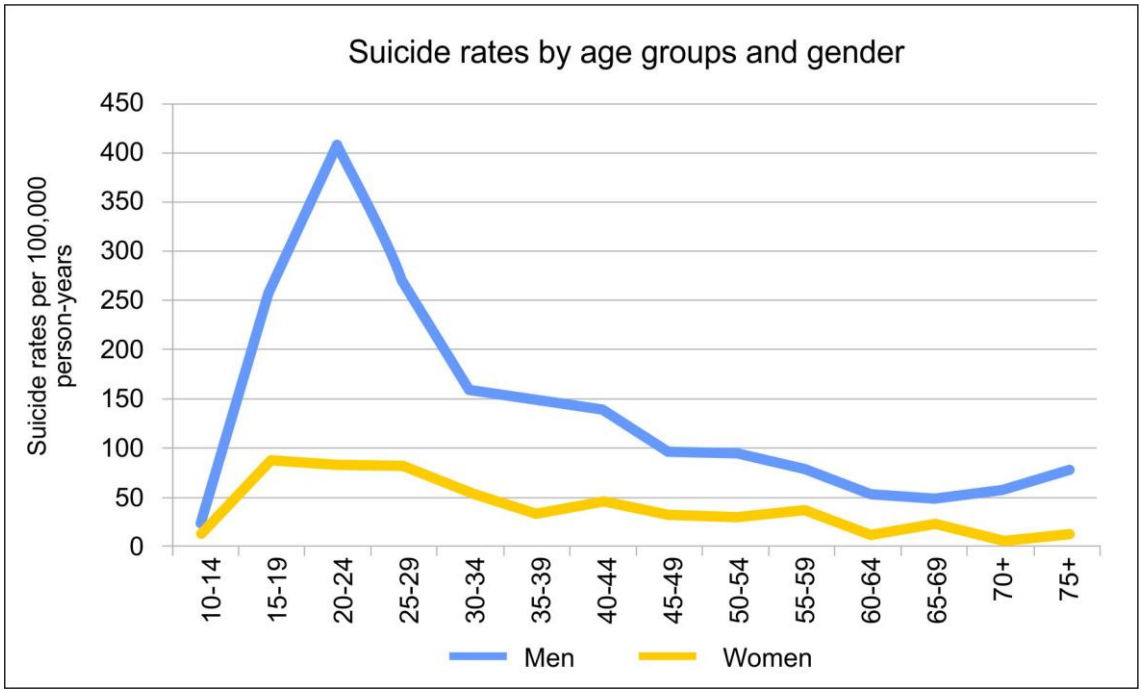

Figure 6.13 Suicides per 100,000 person-years by age group among Inuit men and women in Greenland 1970-2011 (Source: Bjerregaard et.al, 2015)

Current research on suicide in the circumpolar regions indicates the cause of the high suicide rates are complex and multi-faceted. Factors such as upbringing, personal crisis (e.g. crisis with a boy/girlfriend and / or family), sexual assault, suicides among friends and family, and problems associated with alcohol and drug abuse are all likely to contribute to the decision to commit suicide[43].

Violence and sexual assault have a high occurrence in Greenland, with negative public health outcomes. It is estimated that 59% of the population has been, at some time in their adult life, subjected to various forms of violence or threats[44]. When compared to Denmark and the Faroe Islands, the ratio of crimes against sexual morality[45] in Greenland is high (6 per 1000 inhabitants in Greenland, 0.4 and 0.5 in Denmark and the Faroes respectively). Data specific to the study area is illustrated in Figure 6.14.

[43] Bjerregaard (2015)

[44] Bjerregaard et. al. (2010)

[45] Such crimes include: rape, sexual relations of a minor under the age of 15; sexual relations by seduction of a person under 18; sexual exploitation in a relationship of dependency; and indecent exposure.

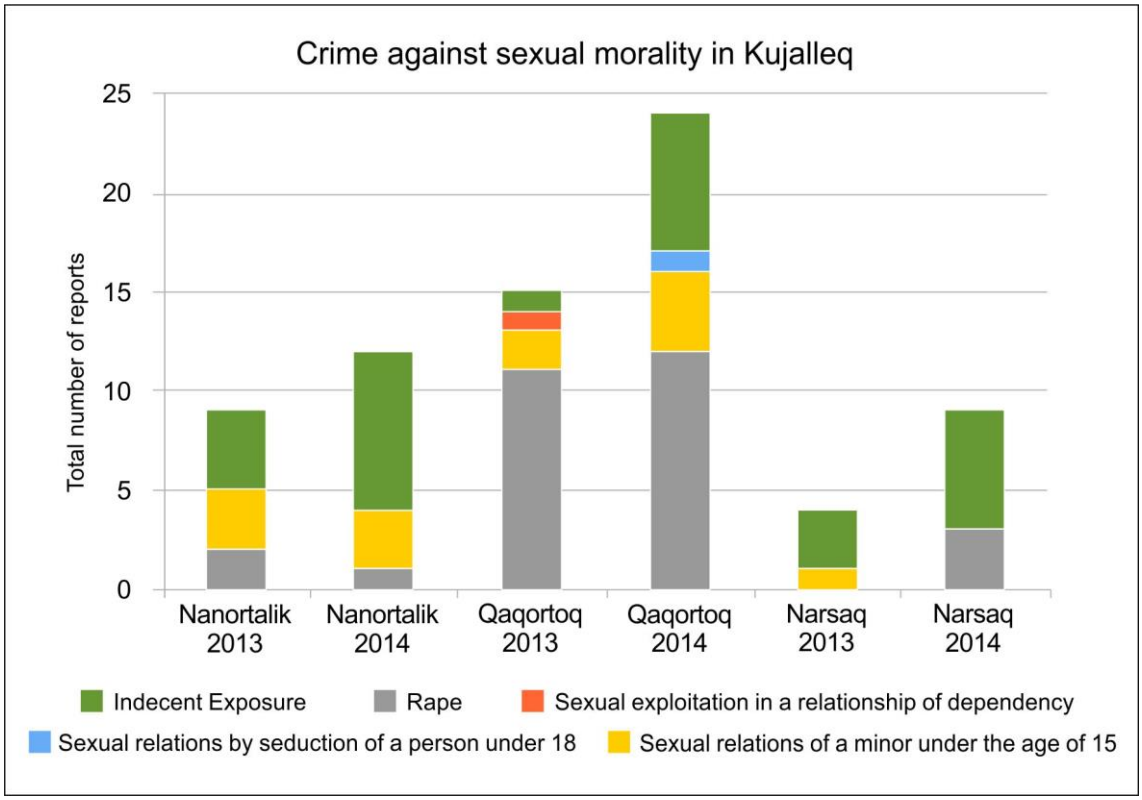

Figure 6.14 Crimes Against Sexual Morality in Kujalleq, 2013 - 2014 (Source: Greenland Police)

6.6 Land Use, Ecosystem Services and Socio-Cultural Values

6.6.1 Land Use and Tenure

There is no private right of land ownership in Greenland, with land considered "commons" to be shared responsibly by all Greenlandic people. Where land use is required by a specific group, for example sheep farmers, the Government requires that the group be jointly responsible for agreeing the terms of the right to use the land. Where individuals build houses, they can potentially own the building but will only rent the land upon which it is built.

The majority of the landmass in Greenland is covered by the ice cap (81%, 1,755,637 km2), with 410,449km2 ice free. It is estimated only 0.6% of the landmass is used for agriculture, most, if not all, of which is undertaken in Kommune Kujalleq. In 2014, of the 41 sheep farms operating in Greenland, 35 were located in the areas of Narsaq, Narsarsuaq and Qaqortoq. In 2017, 37 farms were in operation in Kommune Kujalleq, 34 of which were sheep farms, with two reindeer farms and one cattle farm making up the remainder[46]. Farms within the study area are illustrated in Figure 6.15.

[46] Ilua Valley Farmer (2017) Personal Communication

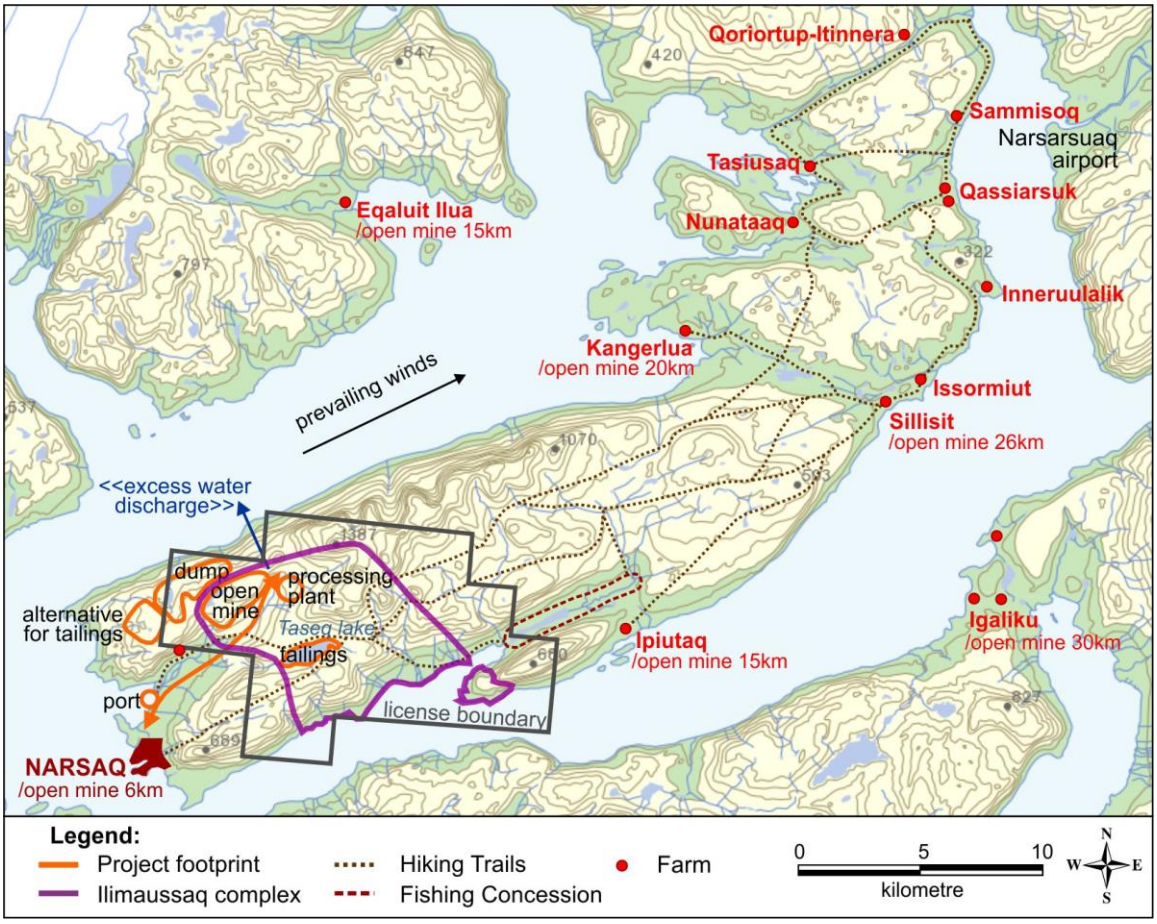

Figure 6.15 Farms located in the study area

Sheep herds are typically managed by individual families with farms using stables for the winter season and the surrounding fields for hay production. Sheep are set to graze freely in the early summer and are herded during September / October. In areas where farms are in proximity to each other, sheep graze on common pastures.

Lambs are typically slaughtered in the Narsaq slaughterhouse (Neqi A/S).

Sheep farming is considered an important cultural activity in Greenland and is subsidized by the Government (the cumulative realised subsides in 2017 were estimated to be in the order of 20 million DKK[47]).

6.6.2 Ecosystem Services

The flora in the study area consists of widely distributed and oceanic species, and changes strongly with altitude. At low altitudes, the vegetation consists mostly of scrub, dwarf shrub heath and grasslands. At higher altitudes and on steeper slopes, windswept ridges, barren rocks and terraces little vegetation exists with the exception of sedges and lichen. The diversity of plant species is typically greater at lower altitudes.

Mammal fauna is relatively species poor and consists of species typical for south Greenland. Only two land mammals occur (the arctic fox and the arctic hare) in the study area, however the number

[47] ibid

of marine mammals is considerably higher (seals and whales primarily). Bird fauna is considered common and widespread. Most breeding birds are found in lush vegetation at low altitudes along the fjords and rivers.

Arctic char is the only freshwater fish in the study area, with large populations present in the lower part of the Narsaq and Ilua rivers and in Lake Ilua. The char spend the winter in the rivers and lake with larger fish moving into the surrounding fjords during summer. Low number of common and widespread invertebrates have also been identified in the watercourses in the study area.

A 2015 study undertaken by Orbicon confirmed that a large proportion of the inhabitants in Narsaq make use of local areas for occasional recreational use[48]. Regardless of age, occupation or gender, approximately 95% of the local population has use part of the study area for recreational purposes. The area is used for a variety of activities, including:

- Berry picking (blueberries)
- Hiking
- Fishing
- Hunting (hares and seals), and
- Stone collecting.

The study assessed land and marine use across six study areas (as defined in Figure 6.16). Each of the activities are discussed with reference to the study areas below.

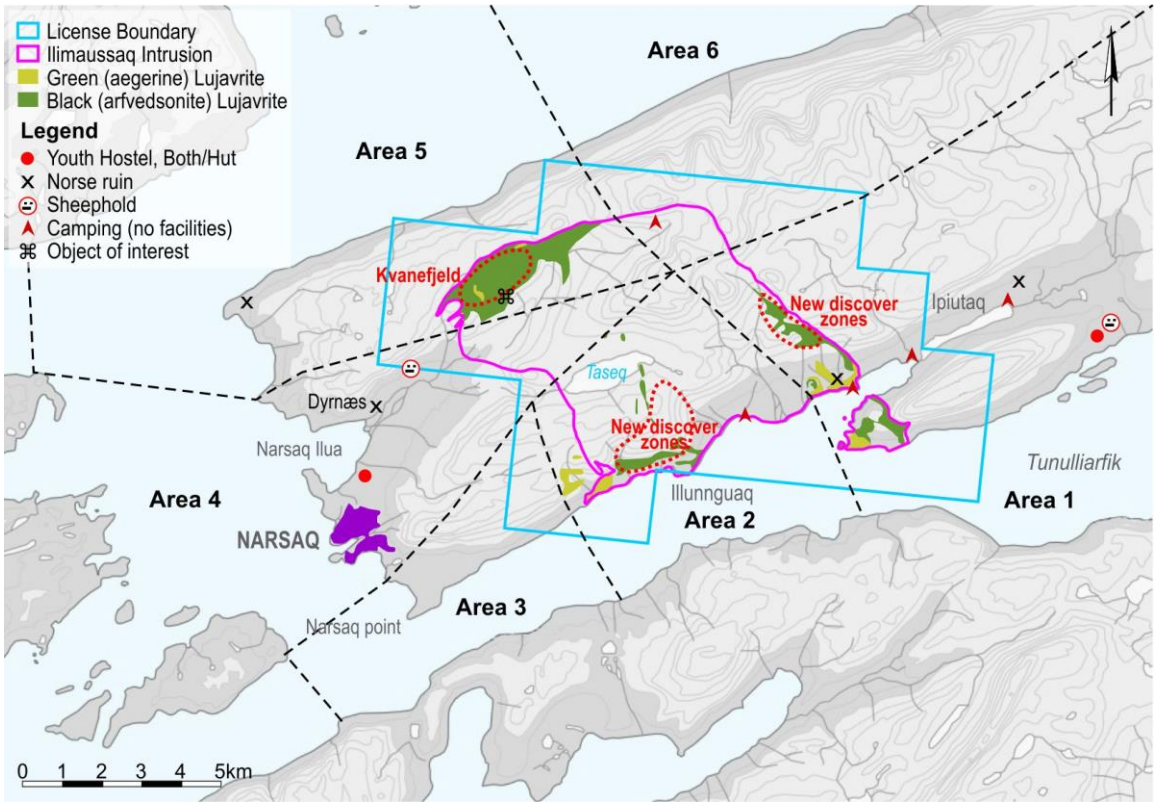

Figure 6.16 Overview of the study areas divided into six areas for the local land and resource use study

[48] Orbicon (2015a)

Berry picking

Berries and other plants (e.g. angelica) are collected across the study areas for personal consumption and sale in Narsaq shops. The berries which are gathered include crowberries (revling) and bilberries (mosebøllebaer). Approximately half of the surveyed population participated in berry gathering in the previous year, with more women participating in this activity than men and the activity favouring older generations. The best berry picking areas are considered to be in close proximity to Narsaq town, with activity focussed in Areas 3 and 4.

Figure 6.17 Berry picking near Narsaq town, Summer 2017

Hiking and Recreational Use

The study area is widely used by the residents of Narsaq for hiking and recreational purposes. Approximately 70% of surveyed individuals indicated they had visited the areas beyond town for recreational purposes in the past year. Favoured destinations include Narsaq Ilua and Narsaq river, both within easy walking distance from town.

Nine summer houses are located in the Ilua Valley, as indicated in Figure 6.18, although not all are in use or maintained. It is understood the summer houses are owned by residents of Narsaq town who choose to spend time in the valley on occasion to appreciate the space and tranquillity.

Figure 6.18 also indicates the location of an old mink farm which has been converted into a kayaking storage area for foreign tourist providers. Kayaking tours are launched from Narsaq Ilua Bay (immediately in front of the old mink farm), with kayakers paddling to the ice cap and overnighting on the ice.

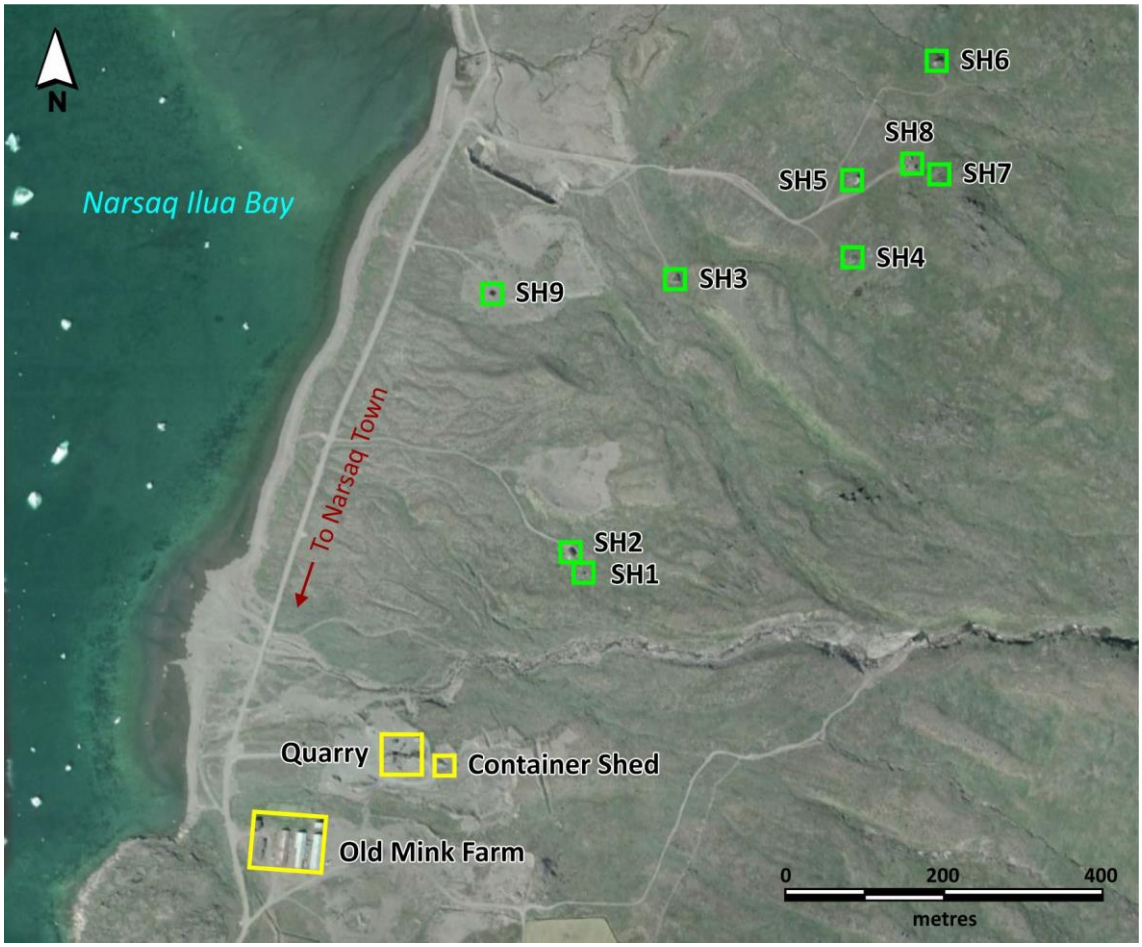

Figure 6.18 Summer house locations in Ilua Valley (indicated by SH label)

Figure 6.19 Example of a summer house in Ilua Valley

Fishing

Results from the survey indicated approximately two-thirds of the population are involved in recreational fishing for arctic char. While many people engage in fishing, the frequency of fishing is relatively low (between 5 – 10 times per year)[49], with an estimated 9-10,000 arctic char caught annually. Referencing the studies areas identified in Figure 6.16, Area 1 contains the best arctic char river, the Ilua, and while it is popular with fishers, a boat is required to access this area. A little over a third of fishers reported fishing with nets in Area 2, catching fish which had spawned in the Ilua river. Approximately 50% of the fishers interviewed reported fishing at Narsaq Point in Area 3, using either a net or a rod. This area is popular as it can be accessed by boat, car or foot. Approximately a third of fishers also indicated they fished in the Narsaq river, which is also accessible by boat, car and foot, although this area typically provides smaller catches. Areas 5 and 6 were only used infrequently for arctic char fishing and required the use of a net.

Fishing is also undertaken in the fjords, with approximately half of the fishers interviewed reporting that they had fished in the fjords in the Project area over the previous two years. They specifically target cod, redfish and catfish, which can be caught either from land or from a boat. The survey estimated approximately 8,000 fish were caught in the fjords by residents of Narsaq annually. Fjord fishing was primarily concentrated in Areas 3, 4 and to a lesser extent Area 5, due to their greater accessibility.

In 2011, the municipality's local labour market official and leader of Piareersarfik, estimated 30 people in the Narsaq area relied upon hunting and fishing as their primary source of income. Areas 2, 3 and 5 are most commonly used by professional fishers. In additional to professional fishermen, there is a group of people with a commercial fishing licence who are primarily wage earners who occasionally supplement their incomes by selling their catch privately or on the local market.

Hunting

Seal hunting, primarily targeting ringed and harp seals, is undertaken in the fjords in the vicinity of Narsaq and Kvanefjeld. Approximately a third of the surveyed individuals had participated in a non-professional[50] seal hunt in the past two years, with individuals participating in between 7-9 hunts per year on average. Based on survey feedback, it was estimated that between 2,000 and 3,000 seals are caught by recreational seal hunters in the study area each year. Seal hunters frequent more than one area for seal hunting, however more than 80% of interviewed seal hunters indicted they used Area 5, followed by more than 50% using Area 4.

Hunting undertaken on land primarily targets ptarmigan and hares, intended for personal consumption. Approximately 25% (mostly men) of the surveyed individuals indicated they participated in this activity. Hunting occurs in the mountains, with most hunting occurring in Areas 4 and 5.

A former seal skin merchant estimates that there are five professional sealers in Narsaq who catch between 500-700 seals per year, another five who catch between 200-300 seals and a final group of five who catch between 50-100 seals per annum.

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[49] This does not include professional anglers who fish more frequently.

[50] Professional hunters are defined as those with catches of 80 seals or more.

Professional land hunting businesses have been established in the area with international hunting groups travelling to Narsaq as part of a tourism initiative. The majority of these groups are understood to travel on to Tuttutooq Island southwest of Narsaq where caribou and reindeer are hunted.

Stone Collecting

The gem stone Tugtupit is predominantly located in the Kvanefjeld area and a number of individuals fossick for the gem. Three individuals hold licences for small-scale mining of tugtupit, although in 2017 only one was active. Tugtupit is marketed as the jewel stone of Greenland and attracts a niche following amongst tourists and gemologists alike.

Tourism

A relatively small tourism industry exists in Narsaq, with tours including boat or kayaking trips to the ice cap (Twin Glacier), hiking trips, boat trips to Igaliku or Qaqortoq or an evening iceberg safari. Tourism is generally constrained by the high costs of transport in Greenland, with boat transfer costs indicated in Table 6.21.

Table 6.21 Transportation Costs around Narsaq

Destination (one-way)	DKK per person
Narsaq - Narsarsuaq	550
Narsaq - Qaqortoq	450
Narsaq – Itilleq (Igaliku)	450
Narsaq - Qassiarsuk	550
Narsarsuaq - Qassiarsuk	175
Narsarsuaq – Itilleq	350
Narsarsuaq - Qaqortoq	750
Qaqortoq - Itilleq	600

Tourism levels in Kommune Kujalleq have witnessed an increase in recent years, with a rise in the number of overnight stays recorded in 2017 compared with earlier years (see Figure 6.20).

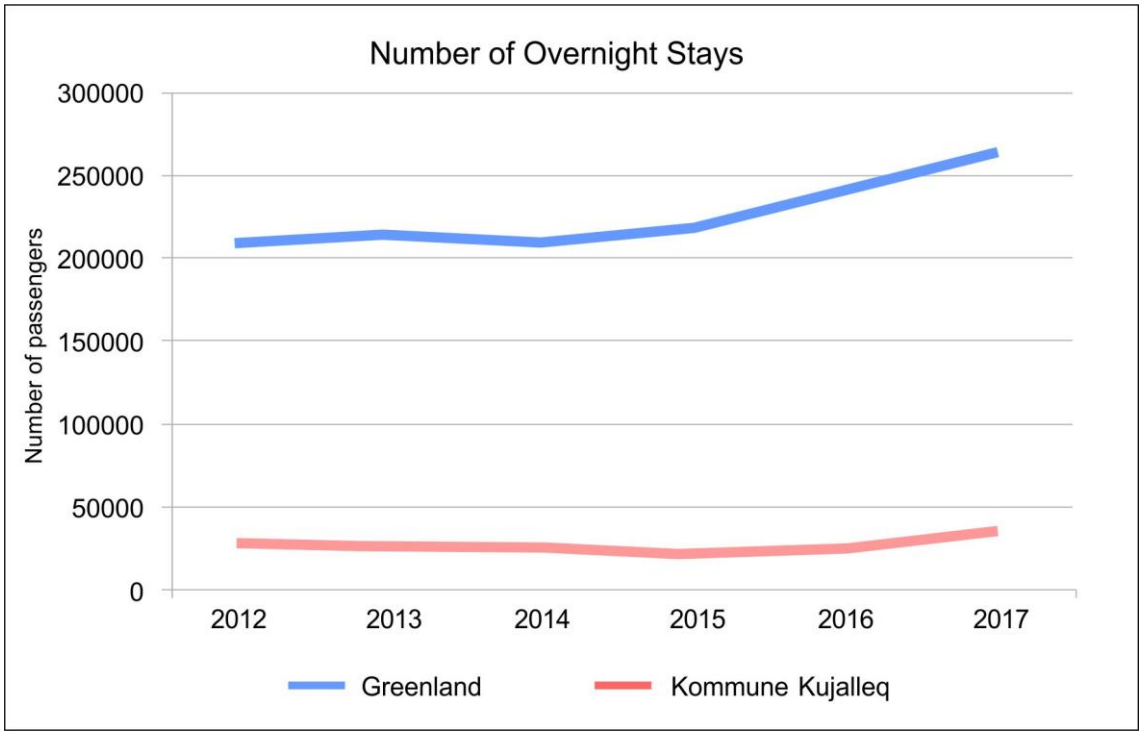

Figure 6.20 Overnight stays

The GoG also reports an increase in the number of cruise ship passengers visiting Kommune Kujalleq over the same period. It should be noted that while the statistics presented in Figure 6.21 do not consistently illustrate this trend, Statistics Greenland is in the process of reviewing this data to include late data submissions for both 2016 and 2017 so the figures are expected to rise.

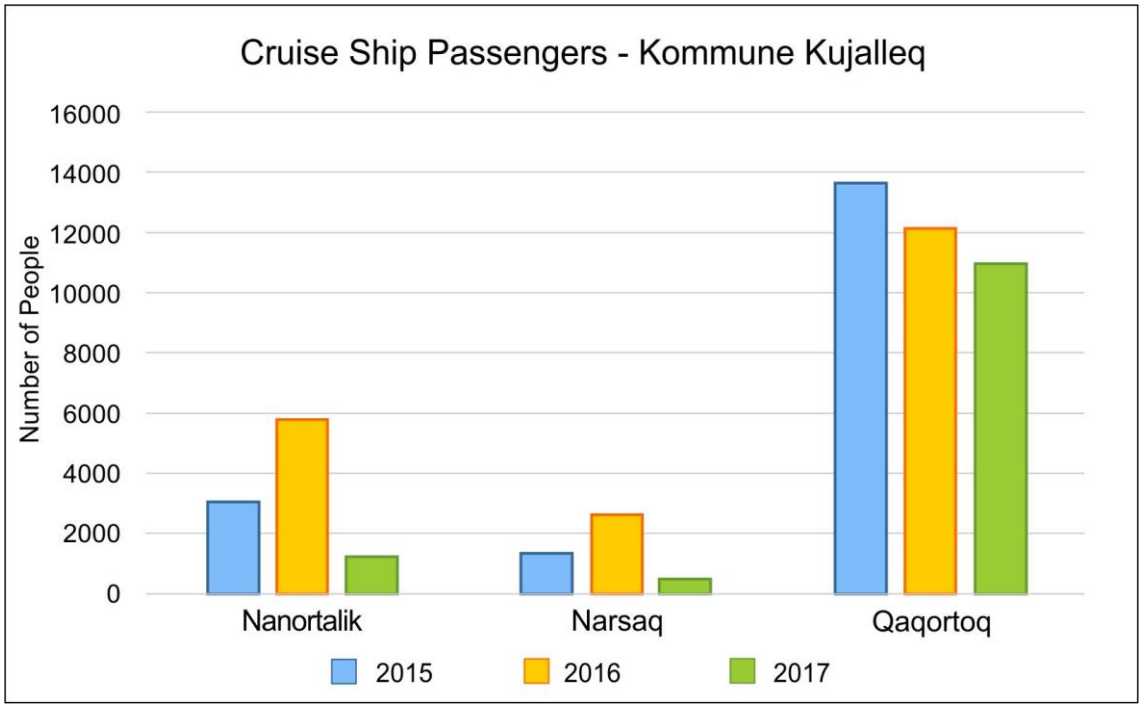

Figure 6.21 Cruise Ship Passengers visiting Kommune Kujalleq

Guests in Narsaq can stay in the Narsaq Hotel, which comprises a main building with 11 rooms and an overflow house with an additional 16 rooms, and a few apartments available across the town. The hotel contains the only restaurant in town, and both the hotel and restaurant operate throughout the year. A bar operates in the colonial buildings in the centre of Narsaq on certain nights of the week and Narsaq produces its own craft beer (Qajaq Beer) which is increasingly being sold in other parts of the country.

Tourists who come to Narsaq are typically part of a south Greenland tour, visiting the town for a day or using Narsaq as a launching point for the kayaking activities described above. During summer months, independent travellers will also come to Narsaq to hike in the Narsaq mountains / Qaqqarsuaq.

Narsaq has also received a significant number of geology tourists in the past attracted to the Ilimaussaq intrusion with its diversity of minerals. The popularity of these visits has reduced with tightening legislation regarding the export of stones and minerals out of Greenland.

6.6.3 Socio-Cultural Values and Cultural Heritage Sites

Socio-cultural values of particular importance in Greenland are considered to include:

- Access to nature;
- Use of the Greenlandic language;
- Access to Greenlandic food; and
- Strong family relationships[51].

While Greenlandic society is fast adjusting to a more modern lifestyle, these values continue to be important in society. Traditional activities, and the methods of undertaking them, are respected and are being preserved within Greenlandic society. The prevailing method of living in the arctic can be characterised as "mixed economy" where the traditional, informal sectors such as fishing / hunting and the market economy are integrated.

Consumption of Greenlandic food alongside practicing traditional activities such as fishing, hunting, berry picking and preservation of food are considered important in terms of creating and maintaining Greenlandic identity. Use of the Greenlandic language is also considered an important part of the Greenlandic cultural society. Greenlandic food is undergoing somewhat of a renaissance with the emergence of small-scale gastro-tourism based on local traditional produce.

Solidarity and interdependence are key elements when explaining the string social ties that remain ion Greenlandic society, where family plays a key role.

Cultural heritage and areas of archaeological significance are addressed in detail in the Kvanefjeld Environmental Impact Assessment, however a brief summary of the key sites is provided here.

A significant number of archaeological sites are found along the shore of the Erik Aappalaartup Nunaa peninsula (see Figure 6.22). The majority of these sites are Inuit remains (see Figure 6.23) which date from the Thule culture and historic Inuit settlements. Norse settlements, including a

[51] Poppel (2011)

large farm and church, are located at Narsap Ilua, just north of the mouth of the Narsaq river (see Figure 6.24).

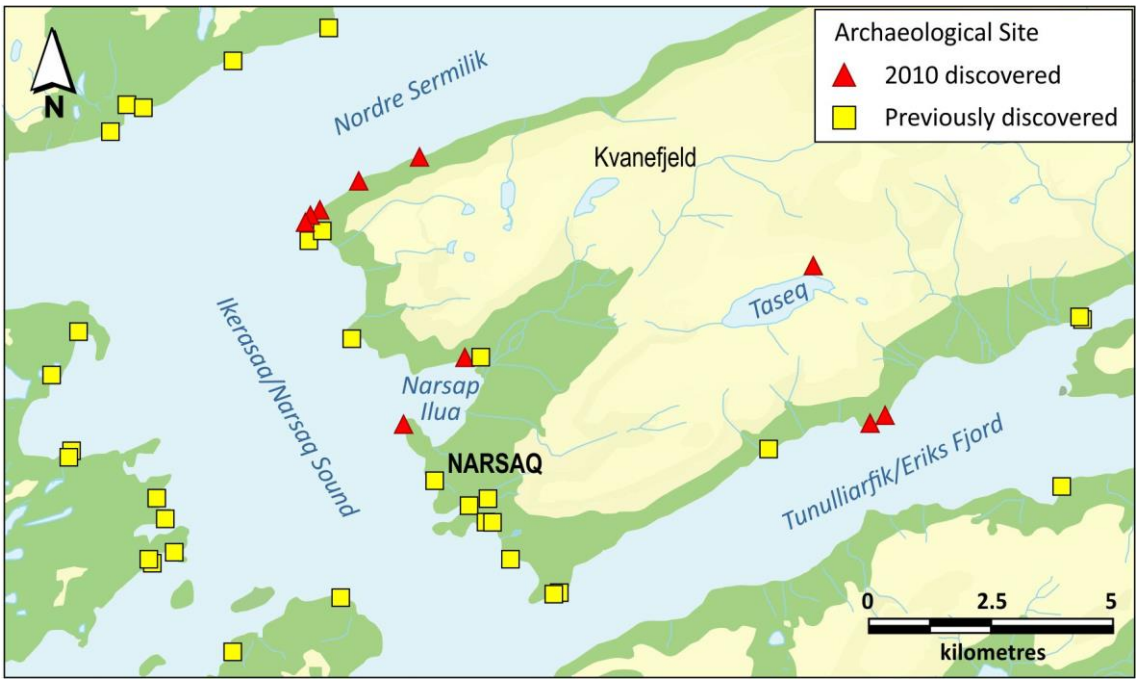

Figure 6.22 Archaeological sites identified in the study area (indicated by yellow squares and red triangles) (Source: Kvanefjeld EIA (2018)

Figure 6.23 Inuit grave (Narsaq Point)

Figure 6.24 Norse ruin (Narsap Ilua)

In 2017, five areas representing subarctic farming landscapes in Greenland, collectively referred to as Kujaata, were admitted to the UNESCO World Heritage. The areas are located in the fjord system around Tunulliarfik and Igaliku Fjord, as seen on Figure 6.25, and comprise:

- Area 1 – Qassiarsuk
- Area 2 – Igaliku
- Area 3 – Sissarluttoq
- Area 4 – Tasikuluulik
- Area 5 – Qaqortukulooq.

The five parts of Kujataa together represent the demographic and administrative core of two farming cultures, a Norse Greenlandic one from the late 10th to the mid 15th century AD and an Inuit one from the 1780s to the present[52]. Area 5 is the closest section to the study area, at a distance of approximately 18km between the area boundary and the Project.

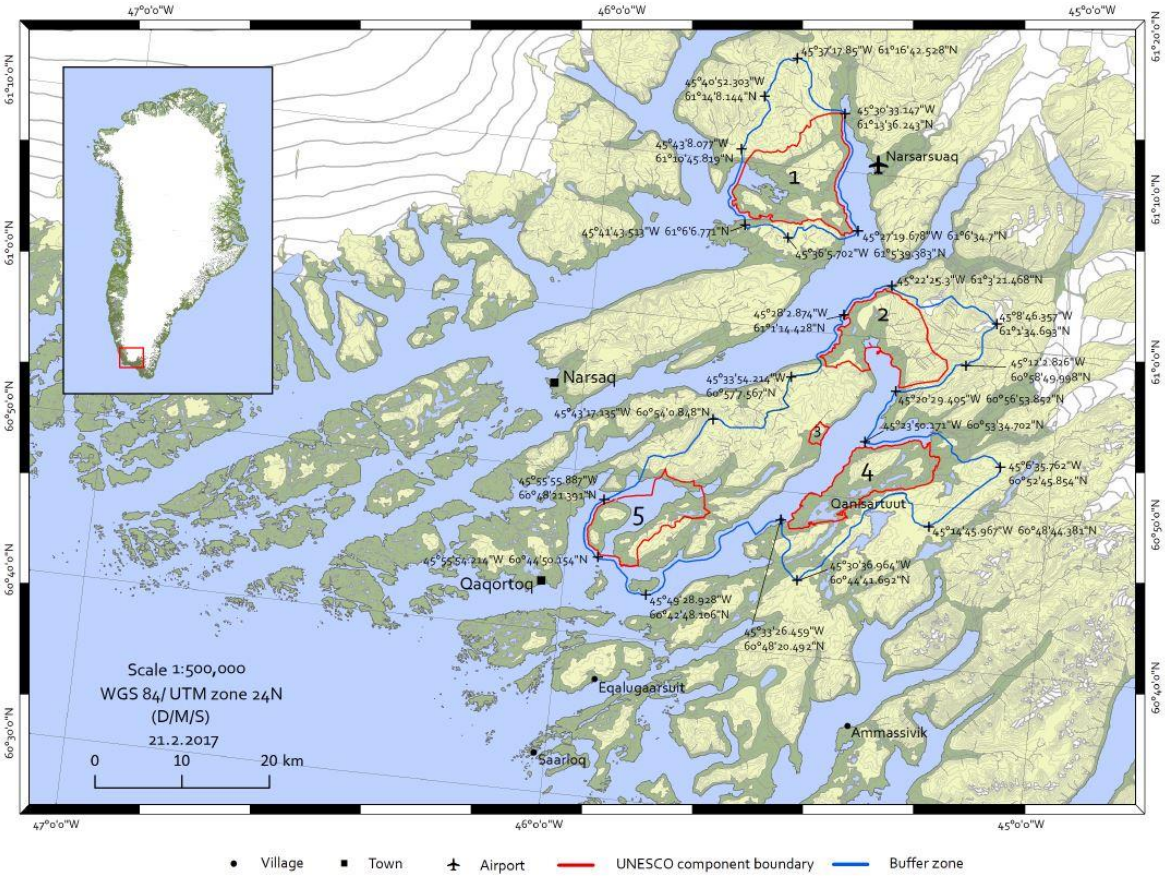

Figure 6.25 Kujaata UNESCO World Heritage Sites (UNESCO, 2017)

6.7 Livelihood Activities and Employment

6.7.1 Employment

Greenland had a labour force of 26,893 people in 2016, accounting for approximately 48% of the population. The labour force is defined as the population aged between 18 and 64 years of age which is either engaged in, or, fit for, work (thus including both those who are employed and those seeking employment). As can be seen in Figure 6.26, the labour force is not evenly comprised of all working age groups, with larger numbers seen in the 45 – 54 year age group, and a shortage evident in the 40-44 year old age group. This trend may be influenced by the practice of people travelling overseas for work opportunities and returning to Greenland as they age.

[52] UNESCO (2017)

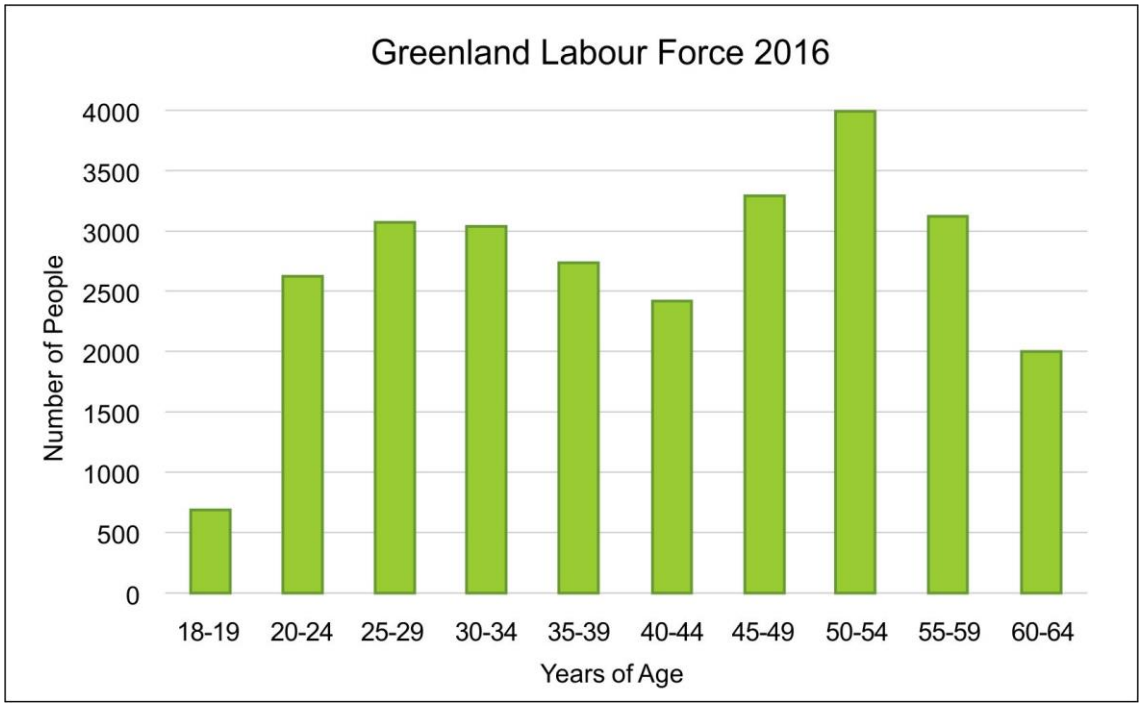

Figure 6.26 Greenland Labour Force by Age Group 2016 (Source: Statistics Greenland)

The male workforce is, at every age scale, larger than the female workforce, as seen in Figure 6.27. This is understood to be caused by a combination of factors, including the immigration of male guest workers from other countries into Greenland, along with a greater number of women travelling abroad to study and then remaining overseas.

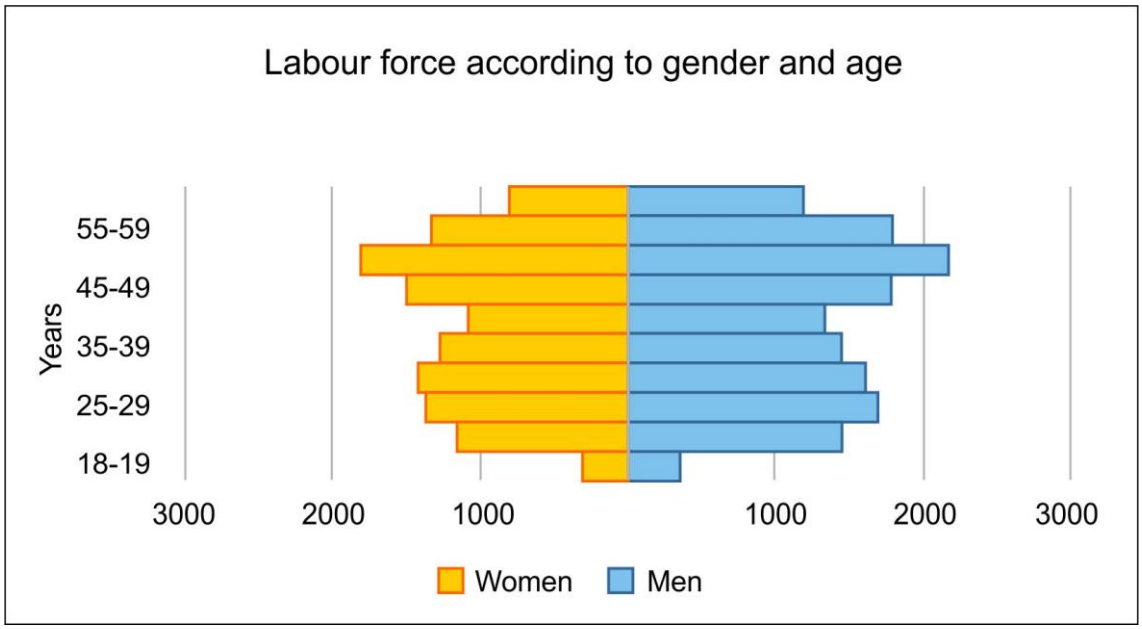

Figure 6.27 Labour force according to gender and age, 2016 (Source: Statistics Greenland)

Within Kommune Kujalleq, 2,846 people were recorded as employed on average during a month in towns in 2016. The breakdown across the three towns is shown in Figure 6.28. Looking at Narsaq specifically, a total of 671 people were recorded as employed (on average per month), representing a lower employment rate than the national average (43% compared to 48%). It is also clear that the majority of the employment in the region is concentrated in Qaqortoq, likely connected to the presence of administrative functions associated with the Qaqortoq's status as capital of the region.

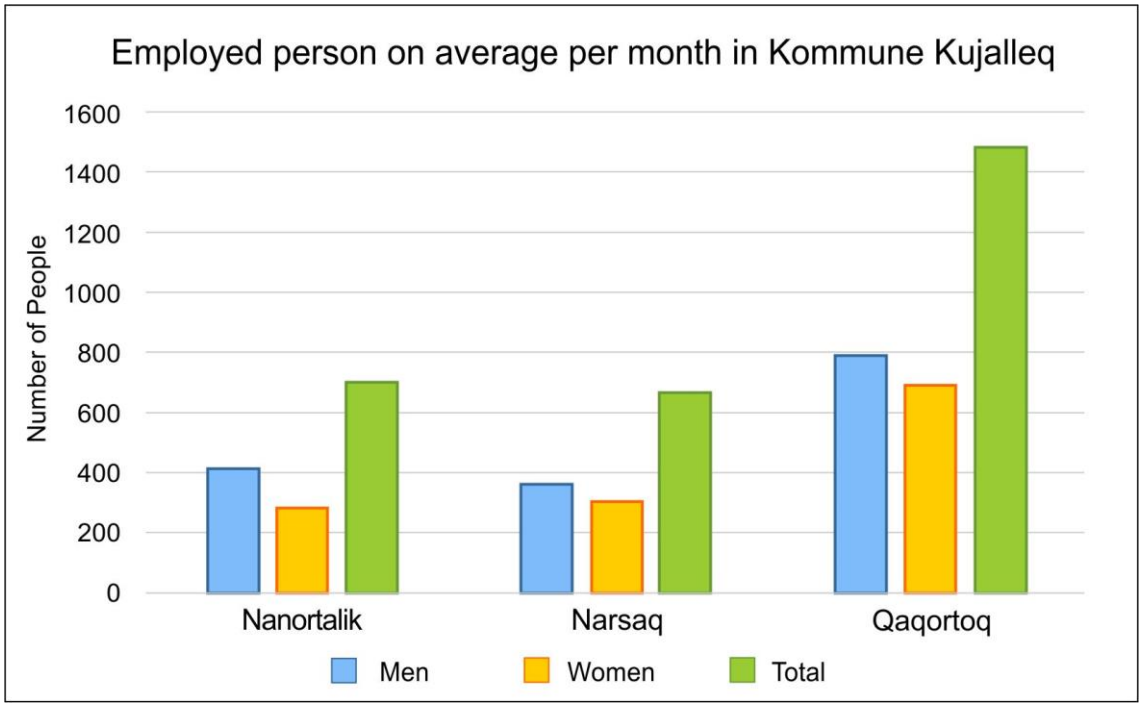

Figure 6.28 Employed persons on average per month in Kommune Kujalleq, 2016 (Source: Statistics Greenland)

According to Figure 6.29, the age distributions of the labour force for both men and women in Narsaq are quite similar. It can also be observed that in general, the labour force in Narsaq is older than the typical Greenland workforce.

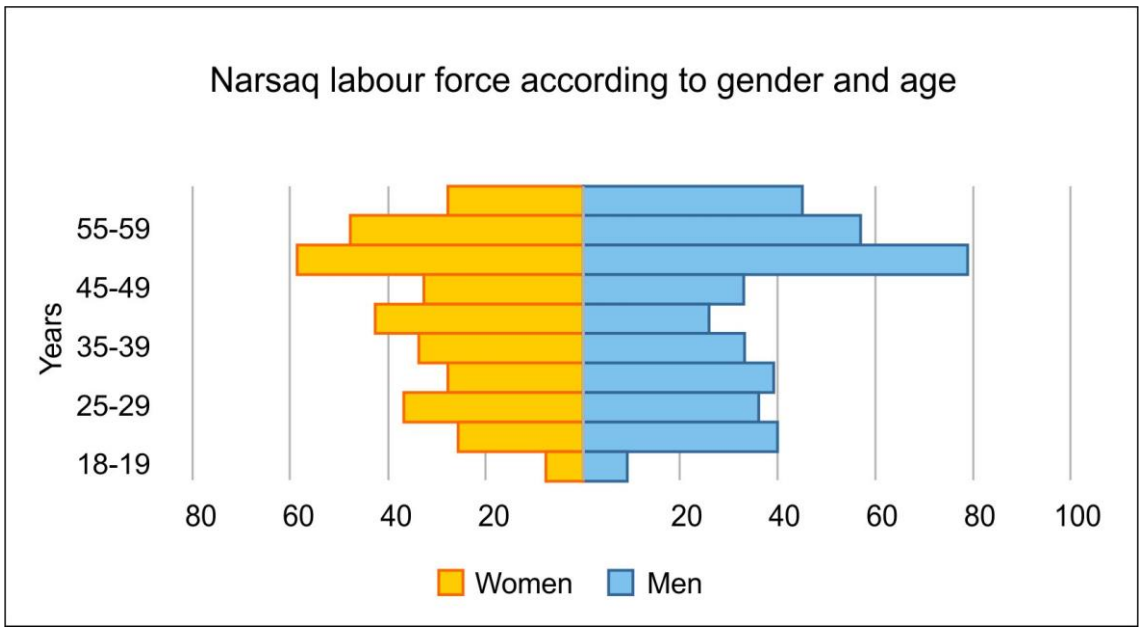

Figure 6.29 Narsaq labour force according to age and gender, 2016 (Source: Statistics Greenland)

Due to the seasonality of employment in Greenland, Statistics Greenland captures employment figures both as measured over a year and based on monthly averages. The data presented in Figure 6.26 is drawn from the annual reports, while the data presented for employment by trade, as seen in Figure 6.30 is drawn from monthly averages. The importance of public administration and services, providing just under 40% of all employment in the country, is clearly evident in Figure 6.30.

Also evident is the continued role of hunting, fishing and agriculture in Greenland, accounting for a further 17% of the labour force.

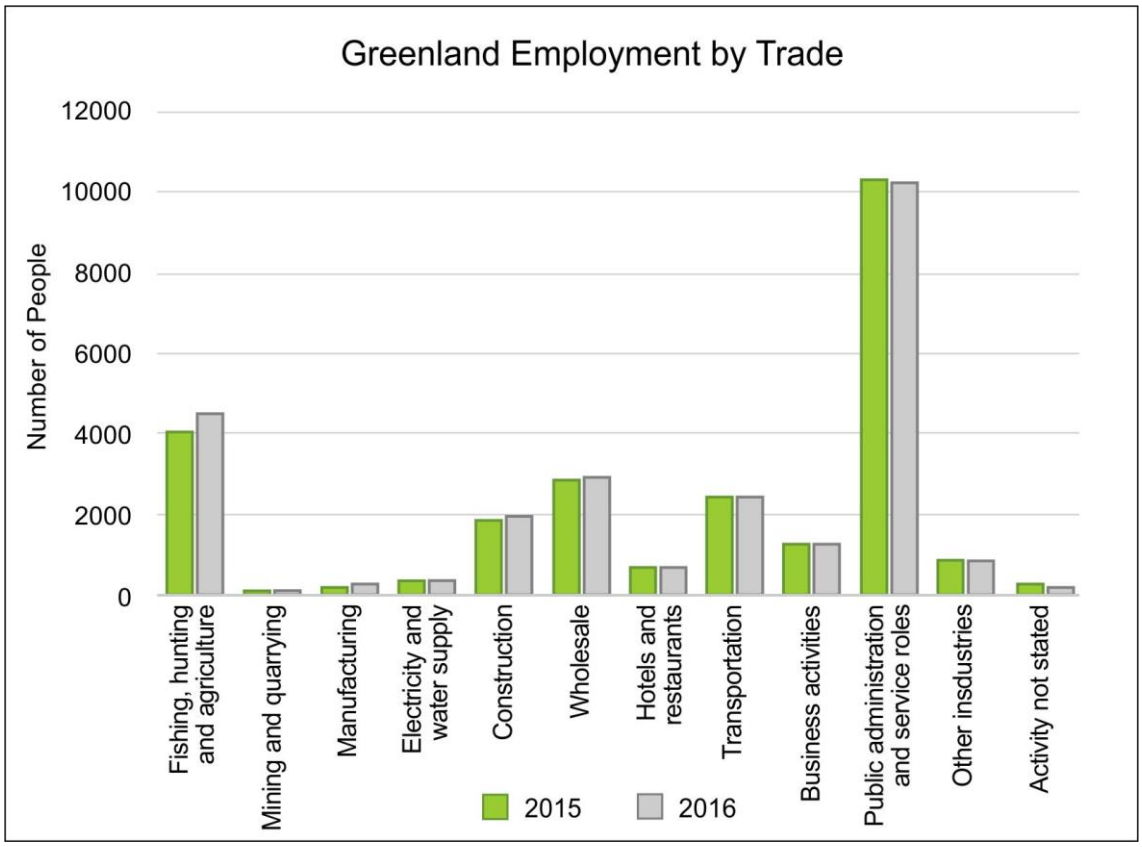

Figure 6.30 Greenland Employment by Trade, 2016 (Source: Statistics Greenland)

Using these same categories of employment, Figure 6.31 presents data for Kommune Kujalleq from 2015. Again, the dominance of public administration and service jobs is evident across the employment statistics, and interestingly, the majority of these roles are occupied by women in Kommune Kujalleq. Figure 6.31 also illustrates the average monthly salary data for each industry, highlighting the elevated salaries paid for mining and quarrying jobs compared to other industries. A gender disparity is also evident between the average wages of men and women in the same industries, with, in general, men earning considerably higher salaries for the same industry.

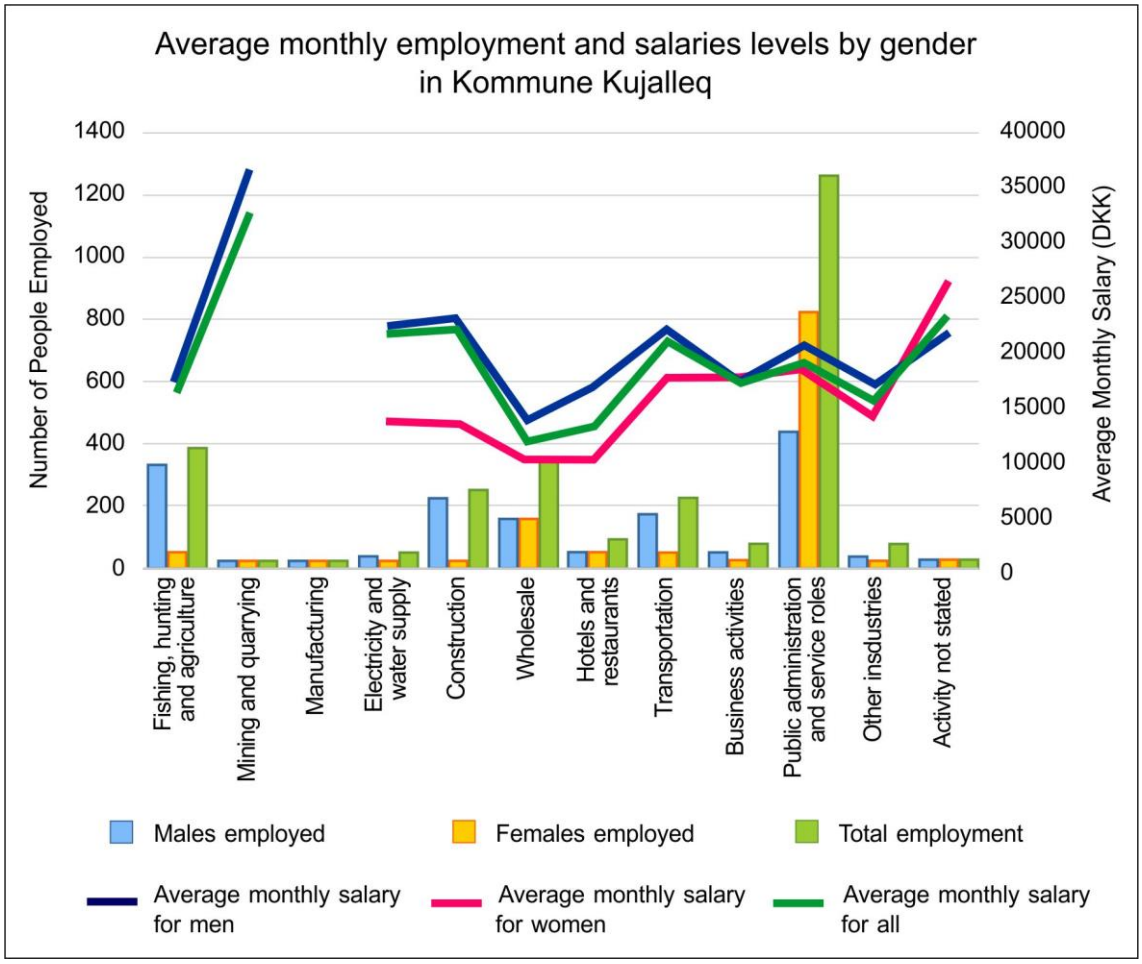

Figure 6.31 Average monthly employment levels and salaries according to gender in Kommune Kujalleq, 2016 (Source: Statistics Greenland)

The size of the labour force in Kommune Kujalleq is reportedly decreasing, with an 11.8% reduction in labour force seen between 2009-2013 according to the Kommune Plan (2010). The Kommune projected a further decrease of 525 people, equivalent to 12%, in the coming years. This Kommune level decrease is evident in the employment statistics illustrated in Figure 6.32.

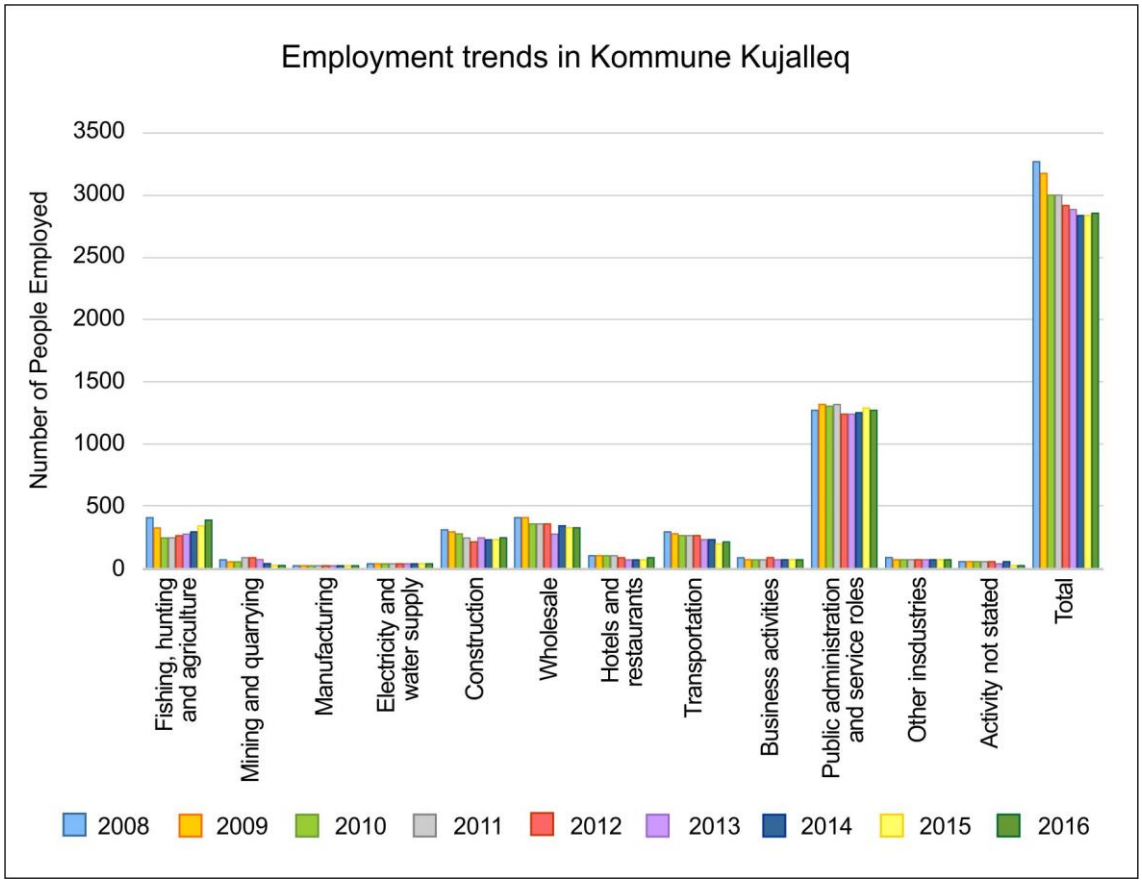

Figure 6.32 Kommune Kujalleq Employment Trends by Industry Over Time

Figure 6.33 provides equivalent data for Narsaq alone, indicating the relatively limited categories of employment, and the dominance of public administration and service roles. Importantly, at both the Kommune Kujalleq and Narsaq level, there is largely an absence of business activities and no manufacturing employment.

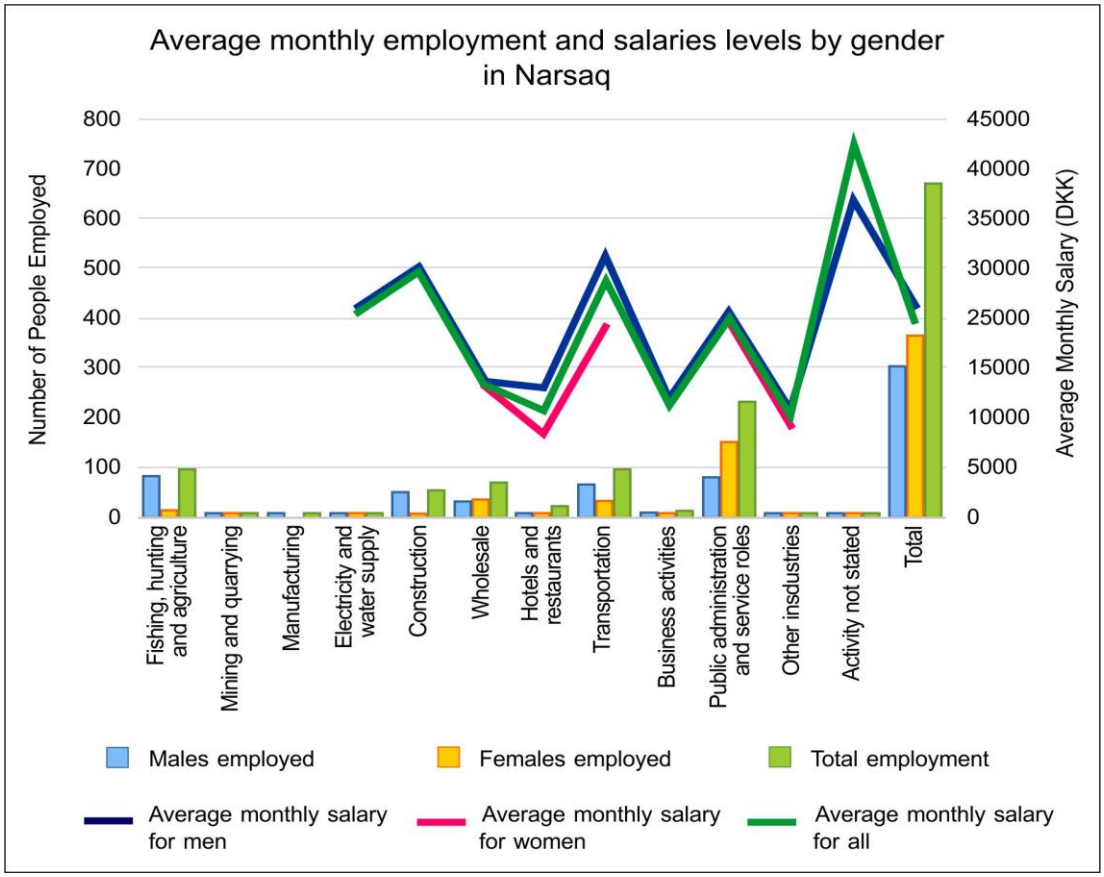

Figure 6.33 Monthly employment and salary levels by gender in Narsaq, 2016 (Source: Statistics Greenland)

6.7.1.1 Unemployment

In 2015, the national unemployment level was recorded as 9.1%: 8.9% for men and 9.3% for women. Figure 6.34 illustrates the distribution of unemployment by age and gender for people who have been unemployed throughout the year in 2016, highlighting the challenge of youth unemployment.

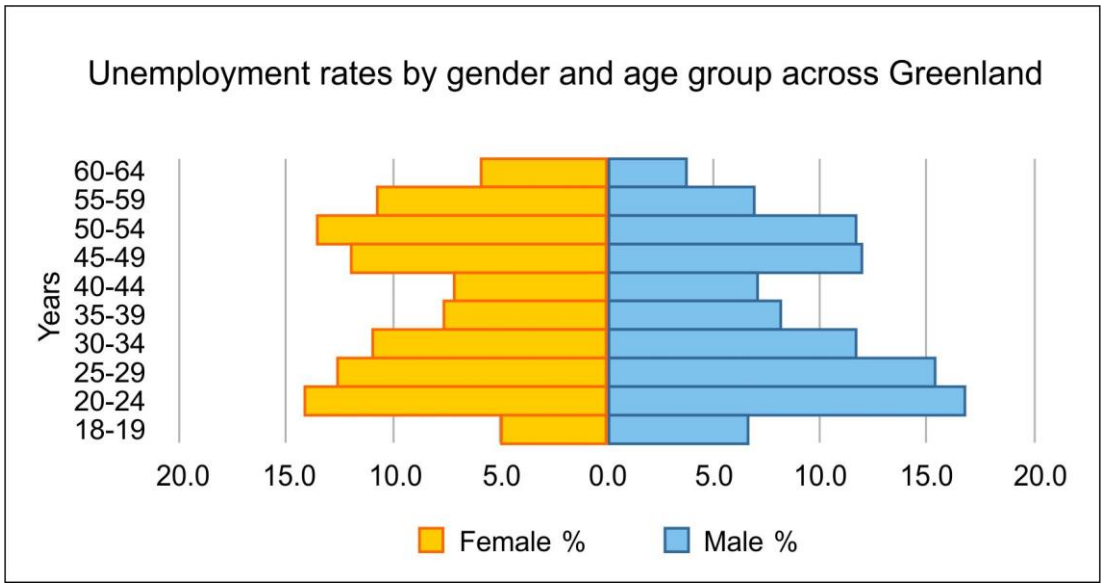

Figure 6.34 Unemployment rates by gender and age group across Greenland, 2016 (Source: Statistics Greenland)

The challenge of youth unemployment is further illustrated in Figure 6.35, where a strong trend of increasing unemployment levels in younger age groups can be seen. The same figure also highlights the challenges created by seasonal work, with many people employed in the fishing sector returning to their towns or settlements in winter, reliant on a mixture of salary from their summer jobs and state support in the winter months.

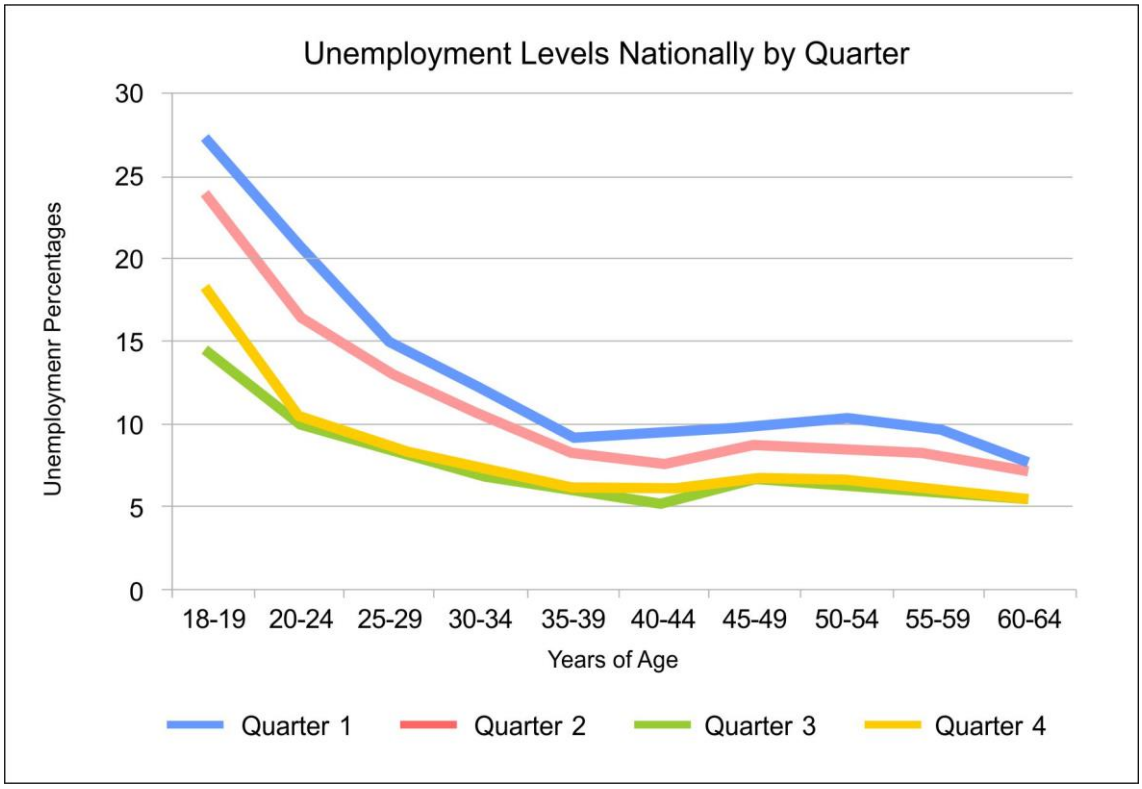

Figure 6.35 National unemployment levels (quarterly), 2016 (Statistics Greenland)

The unemployment rates recorded for the three towns of Kommune Kujalleq were 12.7% for Nanortalik, 9.3% for Qaqortoq and 13.2% in Narsaq in 2016. This represented a reduction from the unemployment data recorded in 2015 (15.5% for Nanortalik, 10% in Qaqortoq and 15.2% in Narsaq). The trend in local unemployment can be seen in Figure 6.36, showing a recent gradual improvement in Nanortalik, Qaqortoq and Narsaq. Amongst the 95 people registered as unemployed in Narsaq in 2016, 59 were men, and 35 women. Notably, more than 50% of the people registered as unemployed were aged between 18 – 29 years of age[53].

[53] Statistics Greenland (2018)

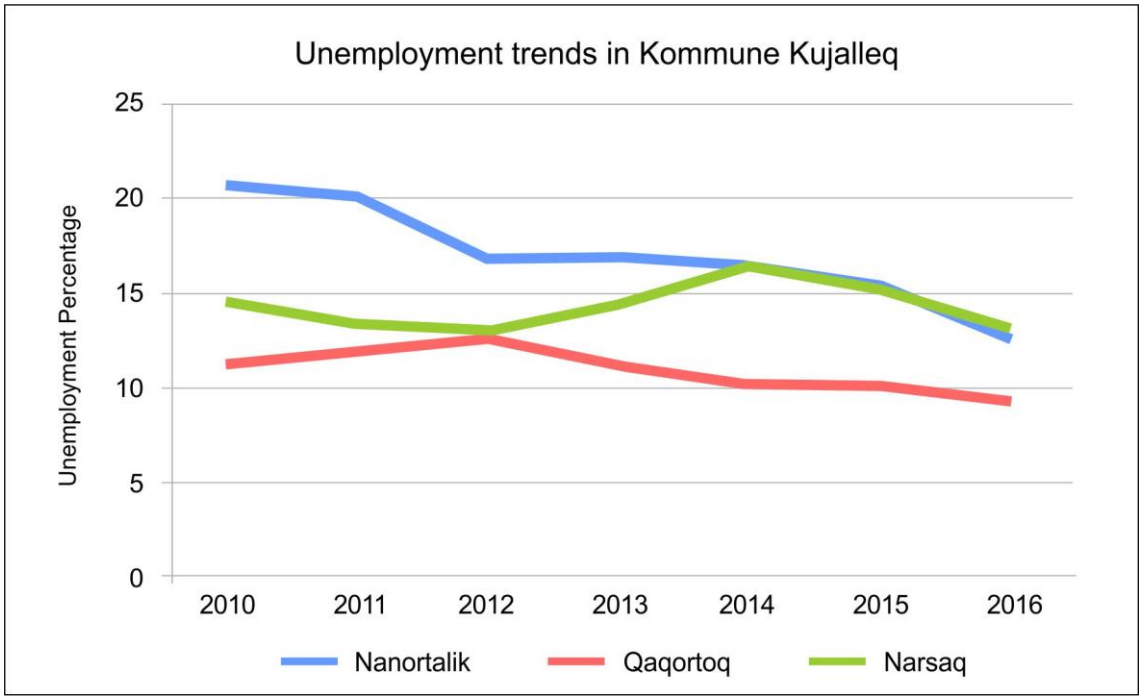

Figure 6.36 Unemployment trends in Kommune Kujalleq 2016 (Source: Statistics Greenland)

The seasonal nature of employment is also evident in the quarterly unemployment records for Narsaq, as seen in Figure 6.37.

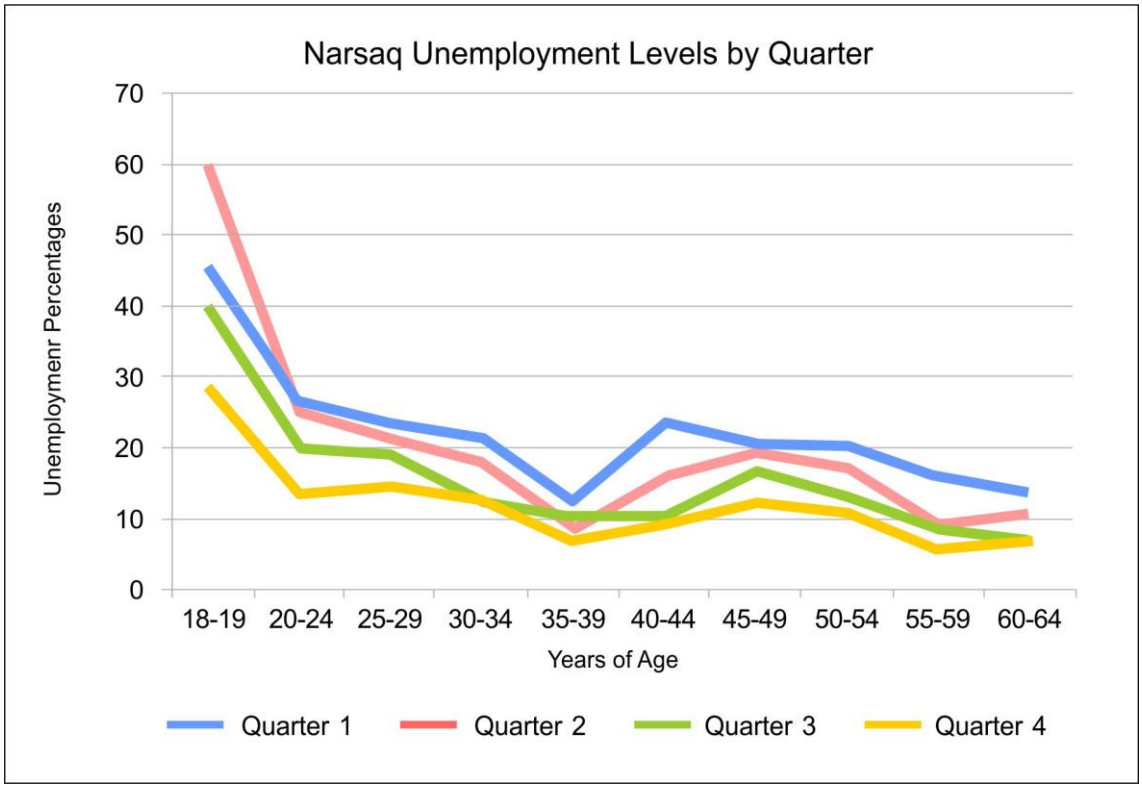

Figure 6.37 Unemployment levels in Narsaq, 2016 (Statistics Greenland)

6.7.1.2 Challenges facing the labour market

One of the key challenges facing the Greenlandic labour market is an absence of or insufficient supply of individuals with specialised education and qualifications. As a result, many of these roles

are undertaken by people of non-Greenlandic origin. The skills shortage is recognised by the Government of Greenland, through Landsting Act No. 27 of 20 October 1992 on the regulation of the influx of labour in Greenland and updated by Act No. 23 of 28 November 2016. The Landsting Act No. 27 permits business owners to apply for permission to employ foreign labour in the event that native Greenlandic labour cannot be found for a position. The Act recognises the priority of Greenlandic labour to work in Greenland and requires an employer to apply to the municipality for a permit to employ foreign labour. This requirement applies to positions whose duties:

- Do not require vocational education
- Require a vocational education equivalent to an apprenticeship, vocational basic education or Siamasissumik Tunngaviusumik Ilinniartitaaneq;
- Require a higher education as a social educator and social worker; and
- Require a higher maritime education[54].

Another characteristic of the workforce is the relatively high level of vulnerable groups within Greenlandic society, including low-income families with small children, and individuals with drug and alcohol abuse problems. The job readiness of these groups depends on the flexibility of working requirements, with shorter job cycle rotations appearing the favour these groups. Kommune Kujalleq estimated that 40% of the currently unemployed individuals in the region would require further general work training or support before they could be considered "job ready"[55].

6.7.1.3 Vocational Training and Job Readiness Initiatives

A number of initiatives have been put in place by the GoG to reduce structural unemployment, while also seeking to meet the demand for labour growth in the construction, tourism and mining sectors. These initiatives include:

- The PKU-Kurser website targets unskilled workers who are unemployed or are employed in endangered professions. Participants in the PKU-Kurser programmes, typically nominated by their employers, are trained to improve their competencies through short-term (usually 1-2 week) courses. All expenses are borne by the Greenland Treasury, including a training allowance for students.
- Arbejdsgivernes Arbejdsmarkedsafgift (AMA) Courses – The cost of the courses is paid for by the employer, with reimbursement by the GoG for travel, accommodation and meals during the course
- A Greenland job portal which was established in 2015 (www.suli.gl) to regulate labour inflow into Greenland.
- The Greenland School of Minerals and Petroleum has hosted PKU courses since its establishment in 2008. Students can participate in common core courses, machine operator courses or machine operator upgrade courses.

[54] GoG (2018)

[55] Kommune Kujalleq (2014 unpublished)

Table 6.22 Courses and Participants in the Mining School, March 2017

Course Name	Participants
PKU Courses	
Common Core	369
Diamond Core Drilling	87
Equipment Operator Upgrading	129
Machine Operator Surface Mining	206
Drill Rig	30
Rigging and Lifting	39
Total	880
AMA Courses	
Re-certification rock blaster /Leader	52
Rock Blaster / Leader	119
Machine Operator Heavy Equipment	31
Diamond Core Drilling	12
Mining Course Module 1 and 2	53
Re-certification Rock Blaster / Leader	10
Blasting Vibration Surface Mining	21
Total	127

- The Greenland Maritime Centres offers a number of training courses including office training, safety at sea and training for ship assistants.
- Apprenticeship programmes in Greenland take four years with 25% of time spent on theory (in courses) and 75% on practical on the job training. The salary of apprentices is typically paid by the employer and is based on a negotiation between the labour market parties with union assistance. Initial apprentice salaries are approximately 5,000-6,000 DKK per month, which rises to approximately 12,000 DKK by the conclusion of the apprenticeship. The employer is reimbursed approximately 4,500 DKK per month via a national education grant scheme (the SU system).

6.7.2 Land–based livelihood activities

The primary land-based livelihood activity (beyond the subsistence and recreational activities described in Section 6.6) undertaken in Greenland is farming, with sheep farming the dominant activity. Of the 37 farms operating in Kommune Kujalleq in 2017, 34 were sheep farms, with two reindeer farms and one cattle farm. Figure 6.15 illustrates the proximity of farms to the Project area, with the closest being located in the Ilua Valley, about 4km from the Plant. This farm transitioned from sheep to cattle a few years ago and in 2017 had between 150-160 head of cattle. The next closest farm is located approximately 12km to the east on the mineralised area at Ipuitaq. This farm runs sheep, cultivates vegetables and offers bed and breakfast facilities at the Ipuitaq guesthouse.

Sheep farming is considered an activity of cultural significance in Greenland, and despite challenging economics, receives considerable support from the government in the form of subsidies and other grants. The majority of meat originating from local sheep farms is sold on the domestic

market, with a small amount exported to Denmark. Table 6.23 illustrates the average annual income per farm in 2015, importantly this income includes subsidies and grants. Data presented in the EWC Statement of Agriculture report for 2016 indicates that only 50% of sheep farm income is derived from the sale of animals[56].

Table 6.23 Income from sheep farms (Source: Neqi A/S 2015)

Year	Quantity		Average Weight	Income from Sales (incl. grants)	
	Lamb	Sheep	Per. Lamb (kg)	Total - 37 farms (DKK)	Average/farm (DKK)
2014	18,541	2,223	14.6	20,248,998	547,270
2015	17,842	1,429	13.3	19,460,900	525,970

In addition to the farms themselves, farming activities also support the Neqi slaughterhouse which employs 6 full time workers for seasonal employment (11 weeks) in Narsaq.

6.7.3 Ocean-based livelihood activities

Ocean-based livelihoods broadly comprise hunting and fishing activities. A description of subsistence and recreational hunting / fishing is provided in Section 6.6, and this section focusses instead on the livelihoods which are supported primarily by hunting and fishing activities.

It is estimated that professional fishing and hunting provides 30 full-time and 10-15 part-time jobs in Narsaq. Hunting and fishing licenses are obtained from the Ministry of Fisheries, Hunting and Agriculture at the municipality level, with quotas set by the GoG. KNAPK is instrumental in negotiating and agreeing these quotas and is represented locally in Narsaq.

Local hunters and fishermen primarily catch seal all year round using rifles. There is one exception, the hooded seal which is only hunted during the ice season. Common minke whales are also caught occasionally (3-4 per year), as are fin whales and harbour porpoises.

South Greenland used to be known for inshore fisheries, however in recent years offshore licenses are increasingly being sought, some of which are held by foreign companies.

6.8 Community Infrastructure

The isolated nature of population bases in Greenland, combined with low population densities, create significant challenges for community infrastructure. Services are typically provided on a per town or settlement basis, with few communities able to increase cost efficiency through shared services.

6.8.1 Housing

Housing is subsidised by the GoG and the municipalities in several ways. Persons with limited financial resources receive direct subsidies. Furthermore, there are a number of indirect subsidies, received through mechanisms such as below market interest rates on housing loans, temporary repayment exemptions on loans, tax deductions on interest payments, the absence of property tax;

[56] EWC (2016)

the absence of tax on capital gains from property sales and no ground rent (where a house is situated on state land). On average, the annual housing support provided per person is calculated to be between DKK 7,800-8,400[57].

In addition to subsidies provided for privately owned houses, the public sector has the option to, and often provides, housing for public-sector employees. In 2010, the public sector (including both the GoG and the municipalities) owned more than 50% of all dwellings in Greenland. In same period, in Narsaq, the Government owned 28.5% of all dwellings, and Kommune Kujalleq owned an additional 24%, matching the national trend.

Of the 761 dwellings reported in Narsaq in 2010, 40% were one family households, 20% townhouses and 40% apartments. Between 2000 and 2010, the annual number of new dwellings reported has been between 2 and 4, typically replacing outdated dwellings instead of adding to the housing stock.

6.8.2 Information and Communication Technology

TELE-Greenland A/S owns and operates the company TELE-POST. TELE-POST has three departments: postal service (Post), Commercial and Technology and Information Technology. Both phone and internet services are available in all towns and most settlements, however internet in particular is expensive as most connections rely upon sea cables from Canada and Iceland.

In Narsaq, internet connections are reliant upon a radio chain that runs along the coast from one mountain top to another, or alternatively, connection is provided directly from a sea cable.

6.8.3 Water Supply

Drinking water is primarily supplied from lakes and rivers in Greenland. Narsaq is supplied with water from the Napasup Kuua, Kuukasik and Langnam rivers, as illustrated in the catchment area map in Figure 6.38. Water is collected in a town reservoir with a capacity of 280,000 cbm (see Figure 6.39). The water is filtered and treated with chlorine. Total yearly consumption of water is approximately 80,000 cbm. The Narsaq water supply is managed by Nukissiorfiit.

[57] Økonomisk Rad (2014)

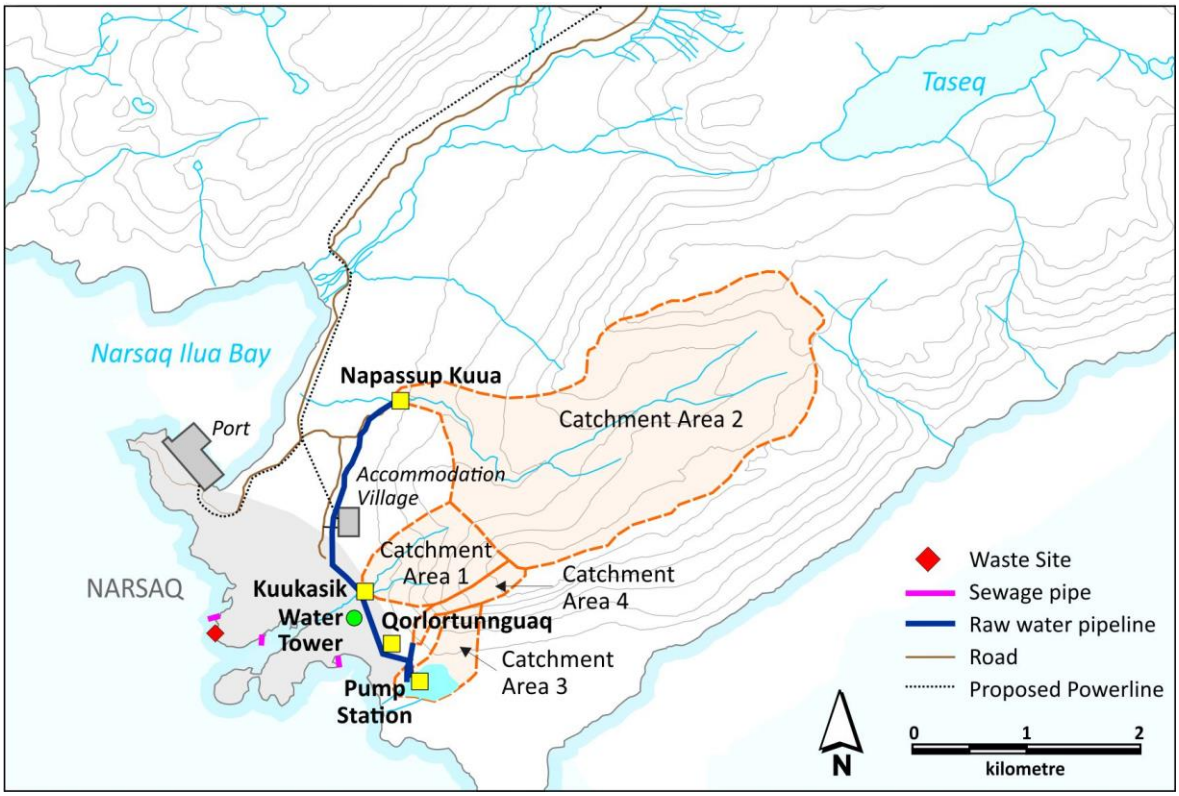

Figure 6.38 Narsaq Catchments and Water Sources

Figure 6.39 Narsaq Water Reservoir (2017)

Sewage is discharged untreated into the fjord via three pipelines as illustrated in Figure 6.40.

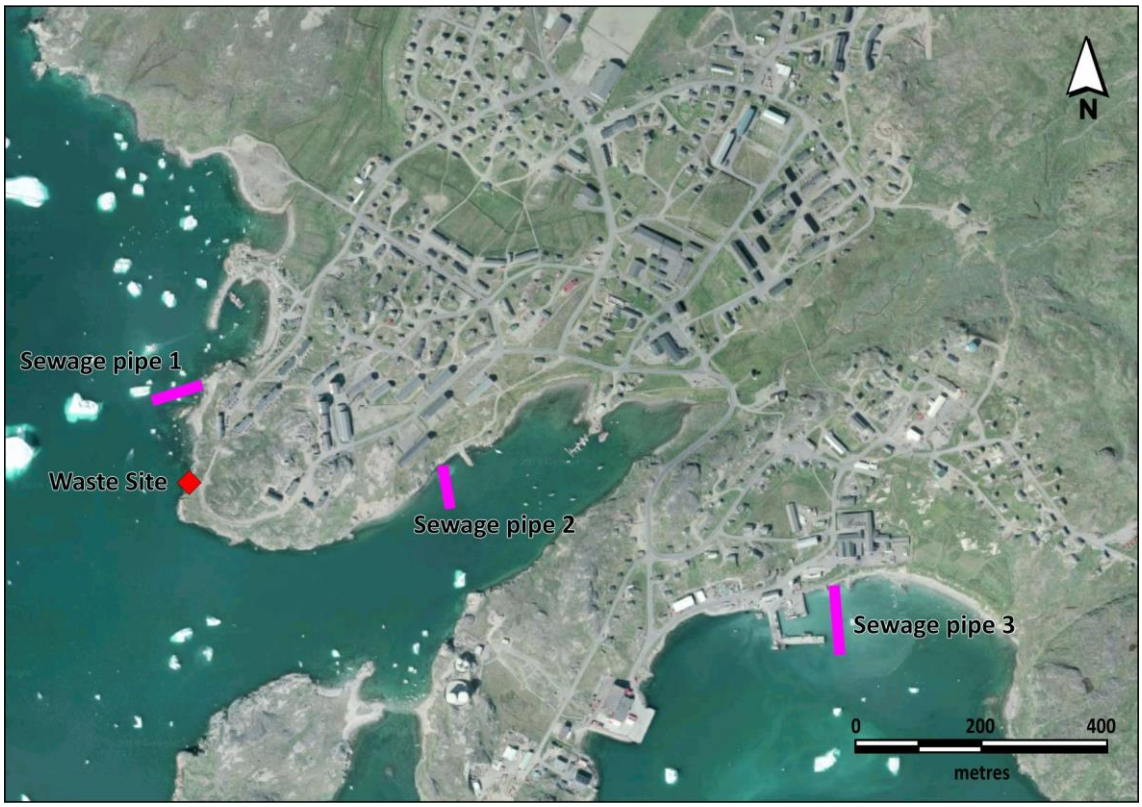

Figure 6.40 Narsaq Sewage Disposal Locations

6.8.4 Power Supply and Heating

Electric power in Narsaq and Qaqortoq is supplied by a hydroelectric plant in Qorlortorsuaq. The hydroelectric plant has two turbines, with a total capacity of 7.2MW/year. The supply is distributed between Narsaq and Qaqortoq by cables strung over the fells and fjord. Total electricity consumption in Narsaq is 0.6MWh/year. Prior to the connection to the hydroelectric plant, power was supplied from a plant using diesel engines. This plant now provides backup and emergency supply. Smaller settlements (as well as Nanortalik) source their power from diesel generators.

The majority of all houses, businesses and institutions in Kommune Kujalleq are heated by individual diesel furnaces. Apartment blocks are often heated by a central heating plant, partly reliant on electricity. In Qaqortoq, excess heat from the incineration plant is used as decentralised heating for some houses[58].

6.8.5 Waste Management

Waste management is an area requiring further support in Greenland. A number of larger towns have waste incinerators, however not all towns and settlements are equipped to burn their waste. Even in towns with incinerators, fly ash generated by the incinerators requires a designated area for storage or must otherwise be transported elsewhere.

[58] Kommune Kujalleq (2015b)

In Narsaq, waste suitable for incineration is collected and transported to Qaqortoq for treatment at the incinerator. Qaqortoq is the regional centre for receiving different waste types transported by ship and boat. All hazardous waste and scrap metal is sent on to Denmark from Qaqortoq.

Putrescible waste is deposited in a Narsaq landfill. This includes food waste and animal carcasses. The landfill is poorly managed, with areas opened up for waste deposition seemingly randomly. There is also no drainage collection system for waste streams (see Figure 6.41). Outfall from the landfill is understood to flow through to the ocean in Narsap Ilua. Under certain wind conditions, the smell from the landfill travels to the town of Narsaq, creating a highly unpleasant environment.

Figure 6.41 Narsaq Landfill (2017)

6.8.6 Transport networks

Travel between different towns and settlements in Greenland is challenging as a consequence of the distances and relatively high costs of services. With large distances, low population densities and challenging terrain, there is no interconnected road network across the country, and goods and passengers are primarily transported via ship, plane or helicopter.

6.8.6.1 Air Transport

Greenland hosts 13 public airports (six with the capacity to receive international flights), four military airports and 46 helicopter landing locations[59]. All public airports and the majority of the heliports are owned and operated by Mittarfeqarfiit.

Narsarsuaq and Kangerlussuaq are the two major international airports, with 1,830m and 2,810m landing strips, respectively. These airports have regular flights arriving and departing from

[59] Mittarfeqarfit (2018)

Denmark, and during summer, from Iceland and Canada. 2017 recorded the highest number of international passengers since data was collected, with 83,487 passengers on scheduled flights. This marked an 11% increase from figures in 2015. The vast majority of international passengers (77% [60]) arrive into Kangerlussuaq airport, and then catch internal air services to onward destinations, including the capital, Nuuk. By comparison, Narsarsuaq received approximately 5.5% of all international passengers in 2017 (4,549 passengers).

Figure 6.42 Transport Hubs in Kommune Kujalleq

Narsarsuaq is the transport hub for all flights to Kommune Kujalleq (as is evident in Figure 6.42). In summer months, direct flights to Narsarsuaq operate from both Copenhagen and Reykjavik. Narsarsuaq airport is a modern CAA approved airport with around 27,000 passengers a year. It can accommodate a variety of aircraft, including Boeing 737. Daily helicopter services operate from Narsarsuaq to Narsaq and Qaqortoq.

Qaqortoq hosts the largest heliport in Greenland, accounting for 3% of all helicopter travel. The helicopter flight time from Narsarsuaq to Narsaq is approximately 15 minutes.

[60] Statistics Greenland (2018)

6.8.6.2 Sea Transport

There are between 180-200 harbours and ports across Greenland, varying in size from small fishing harbours to ports capable of berthing cruise ships. Most container cargo is shipped to Nuuk and then distributed along the coast.

Within Kommune Kujalleq, all three towns have significant harbours. The largest container storage area is in the municipality capital, Qaqortoq, however Narsaq has a fishing and a ship harbour, and Nanortalik has a combined fishing and shipping harbour. GoG owned, Royal Arctic Line, is the primary cargo carrier servicing these towns.

Figure 6.43 Royal Arctic Line ship docked in Narsaq harbour (2017)

Cruise ships are an important component of the tourist industry in Greenland however the number of passengers has fluctuated significantly in recent years. Figure 6.44 illustrates an increase in the number of cruise ship passengers in all Kommune Kujalleq towns in 2016, with a corresponding increase in passengers visiting Nuuk. Statistics reported for 2017 are understood to potentially under-report cruise ship passenger numbers and are currently being revised. As such, the recent downward trend evident in Figure 6.44 is expected to be reversed when the full data-set has been collated (anticipated at the end of February 2019). Of the three towns in the municipality, Narsaq receives the smallest proportion of cruise ship passengers.

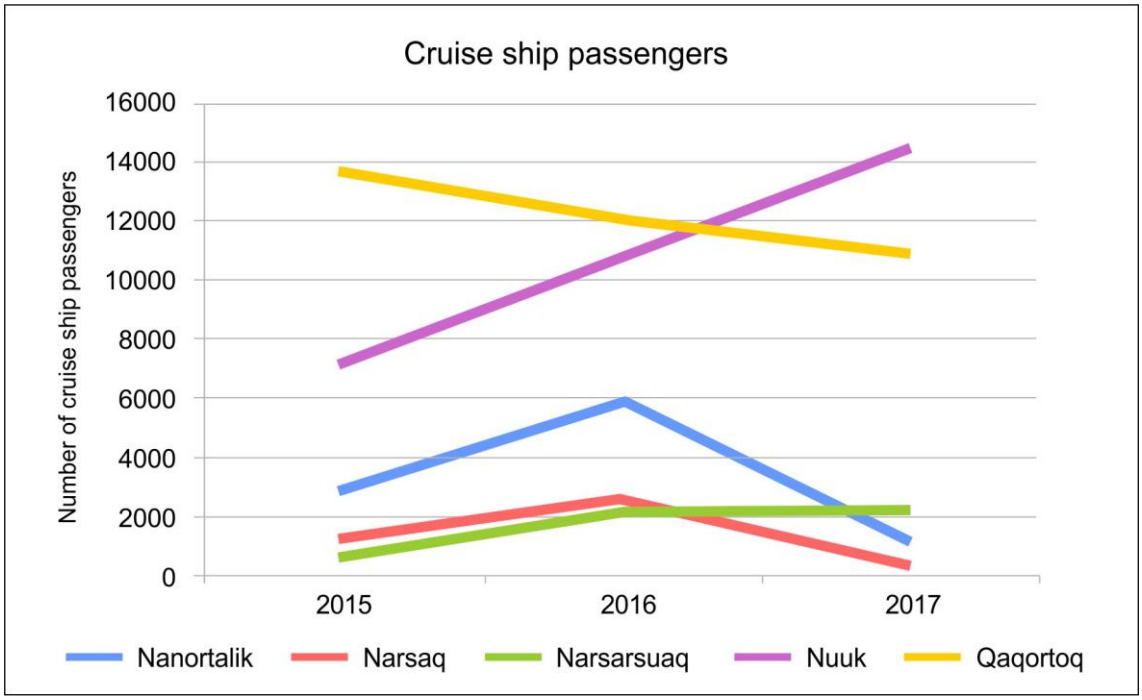

Figure 6.44 Cruise Ship Passengers

In summer time, passenger vessels sail between towns and settlements on a regular basis. Services outside of summer time are irregular and largely unscheduled, but remain the primary means of year-round transport in Kommune Kujalleq. The ferry trip between Narsarsuaq and Narsaq takes approximately 1 hour, while the journey by boat to Qaqortoq takes between 1 ½ and 2 hours depending on the size of the vessel. National company, Disko Line, provides both air and boat services throughout Greenland. In addition to ferry services, many people in Kommune Kujalleq own or have access to a boat and use their personal boats to commute between towns and settlements.

6.8.6.3 Qaqortoq Airport

On the 15th of November, 2018, the legal framework for the construction of three new international airports in Ililissat, Nuuk and Qaqortoq was adopted by parliament, The construction of all three airports is expected to proceed in the beginning of 2019. With the development of an international airport at Qaqortoq, it is anticipated that the existing Narsarsuaq airport will be closed. A socio-economic assessment of the impact of the new airport has been undertaken by Kommune Kujalleq and was made public in October 2018.

6.8.7 Social Services and Facilities

Pre-school is considered an important component of preparation for education in Greenland. Kommune Kujalleq provides financial support to parents to allow them to access child support on a needs basis. Narsaq has two day care facilities: one for children aged between 0-3 years with a maximum capacity of 68 children, and a kindergarten for children aged 3-5, with a maximum capacity of 66 children. Neither facility is operating at maximum capacity. Narsaq also offers a free of charge youth club where older children and teenagers can meet and play games.

Figure 6.45 Kindergarten facility in Narsaq (2017)

Narsaq also has a sports hall which is used for indoor soccer, badminton and handball. An artificial turf outdoor soccer field was installed in Narsaq in 2017, offering additional exercise options for residents of the town.

A museum has been established in Narsaq, detailing the history of the town and Greenland more generally.

6.9 Vulnerable People

Within the practice of social impact assessments, groups or individuals who are considered particularly vulnerable to the nature of the impacts anticipated from a project's development are identified. Pre-existing vulnerabilities specific to regional Greenlandic settings are identified here, and individuals / groups particularly vulnerable to specific impacts are identified in the respective impact assessment sections.

In this context, the following groups have been identified as experiencing pre-existing vulnerabilities in Narsaq and the broader municipality:

- People with mental disabilities or experiencing symptoms of drug and alcohol abuse – Drug and alcohol addiction are known challenges in Narsaq and, as with mental disabilities, addictions can create difficulties for individuals in respect of participating in training and securing employment opportunities;
- Households with no recent history of employment – Inter-generational welfare dependency is a growing issue in Greenland, with children and young adults growing up in households where there is no recent history of anyone having earnt an income. Such an environment can lead to low self-esteem and a lack of awareness of opportunities which could be pursued. This is a challenge which is addressed in the Majoriaq classes, however not all young adults in this situation participate in these classes;

- Unemployed young men – Typically, this group would be considered one of the “least vulnerable” groups in society. The situation Greenland is different due to the extremely high levels of young adult male suicide and the low employment levels within this age group in Narsaq and Kommune Kujalleq.

Interestingly, some of the groups typically identified as vulnerable in other geographic settings, such as the elderly or those reliant upon a subsistence lifestyle, are comparatively less vulnerable in Greenland. For the case of the elderly this is due to the existence of the welfare system and the availability of retirement accommodation options in Narsaq. For households dependent on subsistence lifestyle activities, these activities remain an integral part of Greenlandic society and are supported both socially and economically in Greenland.

7. Impact Assessment

This chapter sets out the potential social impacts of the Project in all its phases (construction, operation and closure). It identifies the sources of impact associated with the Project's infrastructure and activities as set out in the Project Description (Chapter 3). It also considers impacts induced by social changes associated with the Project, including direct employment, economic inputs and demographic changes. The assessment has been organised into the following main subject areas:

- National and local economy
- Employment
- Land use and land-based livelihoods
- Ocean resources and ocean-based livelihoods
- Community health, safety and security
- Occupational health and safety
- Social structures and community life
- Cumulative impacts.

For each subject area, a format is followed which identifies and addresses:

- Project activities – describes the Project activities and / or sources of potential impact for that particular activity;
- Potential impacts – describes the method used within each subject area to assess potential impacts, and explains any assumptions or modifications to the general impact assessment methodology described here;
- Mitigation/Enhancement measures – describes the engineering design and management practices which have been incorporated in the Project to reduce impacts to acceptable levels;
- Residual impacts – re-assesses the significance of impacts after mitigation is applied (assuming effective implementation of mitigation measures); and
- A summary table at the conclusion of the subject area covering all of the impacts in that area.

Mitigation and enhancement measures have been numbered for ease of incorporation into the forthcoming Impact Benefit Agreement. Measures have been coded in reference to the subject area in which they first appear (e.g. EC for economy; EM for employment etc). Where a measure is applied to more than one impact in the SIA, it has been coded with the reference from the first time it was mentioned.

7.1 Social Impact Assessment Methodology

The methodology used to assess socio-economic impacts considers both the likelihood and consequence of the impact, as well as the direction of the impact. The direction of the impact indicates whether the impact is positive, negative or neutral. Some impacts may have mixed

positive and negative dimensions, which will generate a "neutral" prediction prior to mitigation. Likelihood classifications have been defined in Table 7.1.

Table 7.1 Likelihood Classifications

Likelihood	Description
Almost certain	This impact commonly occurs in similar circumstances and / or is expected to occur on this Project
Likely	This impact has occurred in similar circumstances and is likely to occur on this Project
Possible	The impact might occur on this Project and / or there have been some instances in similar circumstances
Unlikely	The impact is not expected but there is a possibility that it could occur
Remote	The impact is rare or practically impossible; it would only occur in exceptional circumstances

Five levels of consequence have been defined to assess the significance of socio-economic impacts. These definitions take into consideration the number of the people affected by the impact, the time duration of the impact and the impact's effect on the affected population, as defined in Table 7.2.

Table 7.2 Consequence Classifications

Consequence	Description (adverse impacts)	Description (positive impacts)
Extreme	Severe and irremediable impairment of social wellbeing for the majority of one or more communities within the area of influence. Serious, irremediable and unmanageable health effects including fatalities and serious injury and / or illness	Extensive long-term enhancement of social well-being for the majority of one or more communities within area of influence.
Major	Severe and irremediable impairment of social wellbeing for a substantial subgroup (but not necessarily a majority) within communities in the area of influence. Serious but manageable cases of injury or illness.	Extensive and long-term enhancement of social wellbeing for a substantial subgroup (but not necessarily a majority) within communities in the area of influence.
Moderate	Substantial impairment of social wellbeing for an individual or a group of individuals. Moderate and manageable cases of injury or illness.	Substantial enhancement of social wellbeing for an individual or group of individuals within the study area.
Minor	Impairment of social wellbeing that will have small effects on individual and community well-being. Minor cases of injury, illness or general deleterious effects on physical or mental wellbeing falling short of identifiable injury or illness.	Enhancement of social wellbeing having a small but appreciable positive effect on individual or community well-being.
Negligible	Little or no impairment of social wellbeing. Negligible effect on physical or mental health.	A small enhancement of social wellbeing for some individuals.

Combining the likelihood and consequence ratings (as per Table 7.3) gives an impact significance rating. In the significance tables which summarise the impacts for each chapter, negative impacts are coloured according to the code below, however positive impacts are all coloured the same shade of blue. The text around the positive impacts indicates the significance of the impact.

Table 7.3 Impact Significance Rating

	Consequence					
Likelihood		Negligible	Minor	Moderate	Major	Extreme
	Remote					
	Unlikely	LOW		MODERATE	HIGH	VERY HIGH
	Possible					
	Likely					
	Almost Certain					

7.2 National and Local Economy

7.2.1 Greenlandic Employment and Procurement

The purpose of this introductory impact assessment chapter is to present the high-level socio-economic impacts of relevance at a Greenland level with specific focus on the topics covered in Sections 18 (1), (2), and (3) of the Minerals Resources Act (use of Greenland workers; use of Greenland enterprises; and extent of mineral processing in Greenland respectively).

A number of the impacts described in this section are addressed in greater detail in subsequent chapters focussing more specifically on impacts at local and regional levels.

7.2.1.1 Project Activities Affecting Greenlandic Employment and Procurement

During the construction, operation and closure phases of the Project, opportunities will be generated for Greenlandic labour and business. Opportunities will include both those directly created by the Project and those generated indirectly to support the Project. In accordance with the Mineral Resources Act, GML will maximise Greenlandic labour and business opportunities where possible.

7.2.1.2 Potential Greenlandic Employment and Procurement Impacts

The direct employment requirements for the Project are discussed in further detail in Section 7.3, however it is anticipated that approximately 134 Greenlandic jobs will be generated in the construction phase, and 328 or more jobs in the operations phase. 41 of the closure phase jobs are expected to be undertaken by Greenlandic labour. This represents approximately 17% of the average construction workforce, 46% of the operations workforce and 85% of the closure workforce.

In addition to direct employment opportunities, the Project is expected to generate indirect employment opportunities for Greenlanders and business opportunities for Greenlandic enterprises. The scale of indirect employment opportunities is discussed in further detail in Section 7.3.2, however it has been concluded that an indirect employment multiplier of 1.3 is appropriate for the Project. This is expected to equate to an additional 930 jobs during the Operation Phase in Greenland.

During the construction, operations and closure phases, a variety of business opportunities will exist for Greenlandic businesses. These are summarised in Table 7.4. The value of business opportunities generated by the Project will depend on the extent to which entrepreneurial activities blossom to meet demand.

Table 7.4 Greenlandic Business Opportunities by Project Phase

Support Area	Local Business Opportunities	Construction	Operations	Closure
Camp Services	Accommodation	X	X	X
	Village management		X	X
	Catering services	X	X	X
	Cleaning services	X	X	X
	Gardening and maintenance		X	X
	Plumbing and construction	X	X	X
	Utility services	X	X	X
Mining and Processing Plant	Minor civil earthworks	X	X	
	Equipment hire	X	X	
	Work training	X	X	
	Sampling services and testing facilities	X	X	X
	Environmental monitoring services	X	X	X
Staff and goods transportation	Boat operators (incl. skippers)	X	X	X
	Helicopter services	X	X	X
	Aviation and airport services (Narsarsuaq or Qaqortoq)	X	X	X
	Sea cargo transportation	X	X	X
	Bus, taxi and car rental services	X	X	
	Fuel supplies and repair services	X	X	X
	Waste management and waste transport	X	X	
General support services	Labour recruitment services	X	X	
	Greenlandic and English language courses	X	X	
	Mine area tours		X	X
	Legal services	X	X	X
	Health and safety services	X	X	X
	IT and communications	X	X	
	Public relations	X	X	X
	Media	X	X	X
	Recreation facility services	X	X	
	Hospitality services	X	X	
	Childcare services	X	X	
	Tourism	X	X	X

7.2.1.3 Mitigation / Enhancement Measures for Greenlandic Employment and Procurement

To maximise the available opportunities for Greenlandic labour and businesses enterprises, the following enhancements measures will be undertaken:

- EC1 - Organisation of a tri-party forum comprising GML, the Government (both regional and national) and the Greenlandic business community to allow for direct communication on business opportunities associated with the Project;
- EC2 - Preparation of a list of goods and services which will need to be sourced during each phase of the Project. These lists will be shared with the Greenlandic business community to help them organise to maximise their participation in the supply chain for the Project;
- EC3 - GML will work with local businesses (both national and regional) to explain the tendering and contract process which will be used by the company;
- EC4 - Provision of support to local businesses on the specific health and safety requirements which will need to be met by supplier companies when working with the Project;
- EC5 - GML will seek to break up large contracts into smaller value contracts which could be won by Greenlandic enterprises;
- EC6 - The GML procurement team will include staff Greenlandic speaking staff familiar with the Greenlandic business environment;
- EC7 - Provision of support to trading organisations such as the recently formed bygge- og anlægs- og råstofklynge in Kommune Kujalleq and Erhvervsforum to coordinate efforts around capacity building of companies; and

Training and recruitment initiatives as described in Sections 7.3.2 and 7.3.3.

7.2.1.4 Residual Greenlandic Employment and Procurement Impacts

The residual Greenlandic employment and procurement impact significance is considered to be high during Construction, very high during operations and moderate during closure.

7.2.2 Greenlandic Processing

7.2.2.1 Project Activities Affecting Greenlandic Processing

Consistent with Section 18(3) of the Minerals Resources Act, GML have assessed the level of mineral processing which can be carried out in Greenland. This is discussed further in Section 5 (Alternatives Assessment) and is only summarised here. The specific focus of Section 18 (3) is the employment, business opportunities and pubic revenues which could be generated by mineral processing in Greenland and these are the topics considered in this impact assessment.

The Project includes the development of an open cut mine and two stages of processing through a concentrator and a refinery. Following mining, ore will be passed through a crushing and milling circuit to reduce ore size particles. The ore will then pass through to the concentrator which uses froth flotation to concentrate the value bearing minerals in the Kvanefjeld orebody. The concentrator will produce two saleable products: zinc concentrate and fluorspar, as well as a REP concentrate which will undergo further processing in the refinery. The refinery will generate four rare earth products: lanthanum oxide; cerium hydroxide, a mixed lanthanum and cerium oxide; and a mixed rare earth oxide. A uranium by-product will also be produced as part of the refinery

process, with uranium peroxide (UO_4) being produced as a by-product. Figure 7.1 summarises the products which will be produced in Greenland and abroad under the proposed Project.

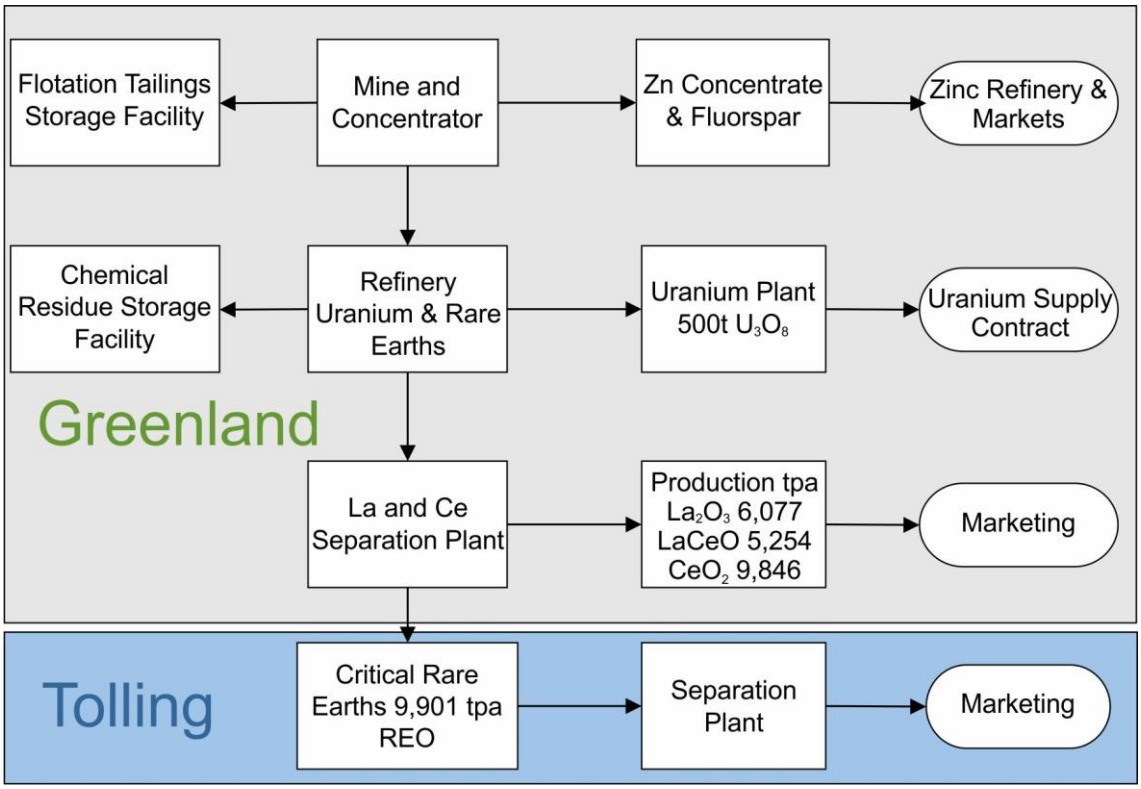

Figure 7.1 Mining and Processing in Greenland and Abroad

In the draft ToR for the SIA (2014) which was published for public hearing in 2014, three processing scenarios were presented for consideration:

Scenario	Social benefit attributed to the processing activities
Scenario 1	Mechanical processing (concentrator only) Under this scenario, ore would be crushed, milled and mechanically separated into two concentrates. The first concentrate would contain a mixture of REE and uranium, and the second would be a zinc concentrate. Under the scenario the refinery (described above) would be located outside of Greenland. This scenario would be expected to generate 1000 construction jobs and 458 operations jobs.
Scenario 2	Mechanical (concentrator) and chemical (refinery) processing REE and uranium are chemically separated into products and both are further refined to produce a uranium oxide (yellowcake) product and four REE products. Both the concentrator and the refinery would be located in Greenland in this scenario. This scenario is expected to generate 1171 construction jobs and 715 operations jobs.

Scenario	Social benefit attributed to the processing activities
Scenario 3	Mechanical (concentrator) and more extensive chemical (refinery and separation plant) processing Additional chemical processing would be undertaken to separate the mixed rare earth oxide product into 15 different REO. While theoretically this is a potential scenario, practical considerations currently constrain this scenario from being implemented[61].

The level of processing which can be undertaken in Greenland is constrained by the feasibility of processing activities. Studies conducted by GML indicate that Scenario 2 is the most feasible option and show that it provides a significant socio-economic contribution over and above the contributions identified for Scenario 1. As noted in the table above, the processing of mixed REO into individual oxides, as envisaged in Scenario 3, has been shown, from a practical perspective, to be infeasible in Greenland and as such, this scenario was not pursued beyond the original concept level.

Scenario 2 will require a larger capital investment in Greenland than Scenario 1. Scenario 1 was estimated to cost USD 450m to construct, while the proposed Scenario 2 option will require investment of USD 1,238m to construct of which GML's share of the expenditure will be approximately 65%. Additionally, the tax paid to the GoG under Scenario 2 is considerably greater than that paid under Scenario 1. From a social and economic perspective, the proposed Project (Scenario 2) will generate close to an additional 200 jobs during construction and an additional 257 jobs during operations.

7.2.2.2 Potential Greenlandic Processing Impacts

The contribution made to Greenlandic society from a mineral development will vary across a range of parameters, with the ideal situation found when feasible projects can maximise their use of Greenlandic labour and Greenlandic enterprises. The analysis summarised above indicates that Scenario 2 (the proposed Project) best meets these criteria.

7.2.2.3 Mitigation / Enhancement Measures Affecting Greenlandic Processing

As described in the previous section, GML have investigated options related to the level of processing to be completed in Greenland and have selected the proposed Project (Scenario 2) as the most feasible option delivering the greatest benefit to Greenland. No further mitigation or enhancement measures are required.

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[61] The separation of rare earth oxides into 15 specific oxide products in Greenland is made challenging for the following reasons: 1) The technology for the separation of rare earth oxides is proprietary and would need to be specifically developed for the Project. Commercially proven separation technology is not available for sale and full separation of rare earths currently occurs almost exclusively in China. 2) The 15 REO typically need to be customised for their intended customer / use and such customisation services is normally carried out in proximity to the intended customer. 3) Separating the REO in Greenland would generate significant transport costs, compared to the transport of less refined products to an industrial centre where rare earth oxides are traded. 4) The separation of REO requires a number of support industries reliant upon speciality chemicals. These industries do not currently exist in Greenland and would need to be developed to support the separation and value addition for rare earth minerals.

7.2.2.4 Residual Greenlandic Processing Impacts

The level of Greenlandic processing is considered to be a very high positive impact during the operations phase of the Project.

7.2.3 Government Revenue

7.2.3.1 Project Activities Affecting Government Revenue

The construction and operation of Project will generate significant economic activity, which will in turn lead to the generation of significant tax income for the GoG. Tax income will stem from a number of sources, with the vast majority coming from corporate taxes, while a smaller amount will accrue from income taxes. Taxes will be allocated to the Greenland Self Government and Municipalities. The Danish Government's subsidy (block grant) to the Greenland Self-Government authorities shall be reduced by an amount corresponding to half the revenue derived from mineral resource activities in Greenland accruing to the Greenland Self-Government authorities where such revenue in the year concerned exceeds DKK 75 million.

7.2.3.2 Potential Government Revenue Impacts

Calculations of potential government revenue from the development and operation of the Project presented in this section are based on the expected cash flows from the feasibility study of the Project prepared by GML.

Taking each revenue stream in turn:

Corporate taxes – GML will be liable to pay corporate tax on the profits accruing from the Project at a tax rate of 30% (Deloitte, 2011)[62] as defined in the Minerals Resources Act. Based on these regulations, the total present value of the estimated corporate taxes during the life of the operation is estimated to be USD 3.8Bn. The first corporate taxes are expected to be paid in the sixth year of production. Corporate taxes are paid to the central Government and between years 6 and 37 of production will average USD 100 million /annum.

Income taxes – Income taxes will be paid by Project for the duration of its activity. Income taxes will arise from two different sources: income taxes from domestically-based employees, and income taxes from foreign-based employees. The revenue from these taxes will be split between the central Government and Kommune Kujalleq.

Income tax for domestically-based employees is based on the following three elements:

- A tax exemption for the first DKK 58,000 earned (Kommune Kujalleq, 2015)
- Greenland Government taxes of 10%
- Kommune Kujalleq municipal taxes of 28%
- Common Municipality Fund 6% - paid to the Central Government and redistributed to the municipalities[63]

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[62] Companies holding a mineral license may further carry forward tax losses indefinitely which will allow GMEL to deduct all deficits incurred during the exploration and construction phases of the Project.

[63] Akileraatarnermut Aqutsisoqarfik (2014)

Income tax for foreign workers, according to Section 72b of Act No. 20 of 18 November 2010, is taxed at a flat rate of 35% with all funds being directed to the Greenlandic Government. Estimates of the income tax generated by the Project on an annual basis across the Project's phases are indicated in Table 7.5.

Table 7.5 Annual Income Tax Contribution Estimates for all Project Phases

	Construction (average)	Operation	Closure
# of Greenlandic Employees	134	328	41
# of Foreign Employees	649	387	7
Estimated municipal taxes (USD M)	0.6	3.3	0.5
Estimated state taxes (USD M)	8.0	12.2	0.5
Estimated total tax income (USD M)	8.6	15.4	1.0

Considering both the corporate and income tax annual payments, income tax contributions are less than one fifth of the value of corporate tax payments. Income taxes (highest during the operations phase due to the higher proportion of Greenlandic labour) will have a minor positive impact on municipal revenue, increasing it by an average of more than USD 3 million per annum during the mine life. Considering the municipal revenue derived from income taxes in 2017 (DKK 219 million or USD 34 million)[64], this would equate to an increase of approximately 10%.

Royalties – The fiscal schedule for the development of the Project will be discussed with the Government of Greenland as part of the negotiation of the terms of the Company's exploitation license. Depending on the structure of the fiscal arrangement which is agreed between the parties to the IBA, a royalty (a regular payment usually based on the volume or price of mineral extracted) may be payable to the Government of Greenland.

7.2.3.3 Mitigation / Enhancement Measures Related to Government Revenue

To further boost the benefit derived from increased government revenue, the following enhancement measure will be undertaken:

- EC8 - GML will make public the tax values paid on an annual basis.

7.2.3.4 Residual Government Revenue Impacts

Following the implementation of the enhancement measures identified above, impacts to government revenue, at both a state and municipal level, are considered to positive moderate in the construction phase and positive high during operations.

[64] Kommune Kujalleq (2018)

7.2.4 Inequitable Distribution of Benefits

7.2.4.1 Project Activities Affecting the Distribution of Benefits

The development of a mineral project typically generates benefit at the immediate local area, for the administrative region and at the national level. Geographic distance and the isolation of population centres has the potential to limit the natural flow of benefits from one region to another in Greenland.

7.2.4.2 Potential Distribution of Benefits Impacts

As discussed in Section 7.2.3, the Project will generate tax revenue at both the national and Kommune Kujalleq levels. The positive aspects of these revenue streams have been assessed earlier this impact specifically considers the potential for impacts related to the distribution of benefits. At a national and regional level, the following impacts could occur:

- Sense of frustration from other municipalities as they watch the tax revenue in Kommune Kujalleq increase with the development of the Project;
- Tension within Greenlandic society over how national revenue generated by the mineral sector should best be used; and
- Potential mis-management of additional revenue at municipal or national levels.

At a local level, the potential impacts are more nuanced and follow on from some of the impacts described above:

- In the event of local inflation in Narsaq, vulnerable households (as defined in Section 6.9) may be exposed to the effects of inflation while at the same time missing out on the distribution of benefits if they are unable to gain employment or other benefits associated with the Project;
- The higher salaries associated with mineral sector projects have the potential to generate jealousy or anti-social behaviour in Narsaq and in Kommune Kujalleq more broadly;
- Even with proactive gender hiring practices, most mineral sector projects employ more males than females. Given the higher salaries associated with the mineral sector this has the potential to exacerbate the existing gender pay gap in Narsaq and Kommune Kujalleq.

7.2.4.3 Mitigation / Enhancement Measures Related to Distribution of Benefits

The following mitigation measures will be implemented to minimise these impacts:

- EC8 - GML will make public the tax values paid on an annual basis;
- EC9 - Community development activities targeting vulnerable households will be implemented as part of the Project's community programs;
- EC10 - All employees, contractors and visitors will be required to sign the Project Code of Conduct, minimising the risk of anti-social spending (i.e. spending on drugs, alcohol, prostitution, and gambling etc) in Narsaq; and
- EC11 - Women living in Narsaq will be specifically targeted for participation in vocational training courses relevant to indirect employment opportunities.

7.2.4.4 Residual Distribution of Benefits Impact

Following the implementation of the mitigation measures identified above, the residual inequitable distribution of benefits impact significance during the operations phase is considered to be moderate negative.

Table 7.6 National and Local Economy Impact Summary

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Greenlandic employment and procurement	Construction	Moderate	EC1, EC2, EC3, EC4, EC5, EC6, EC7	Possible	Moderate	High
	Operations	Moderate	EC1, EC2, EC3, EC4, EC5, EC6, EC7	Likely	Moderate	Very High
	Closure	Moderate	EC1, EC2, EC3, EC4, EC5, EC6, EC7	Likely	Minor	Moderate
Greenlandic Processing	Operations	High	N/A	Almost certain	Major	Very High
Government Revenue	Construction	Moderate	EC8	Likely	Minor	Moderate
	Operations	Moderate	EC8	Likely	Minor	Moderate
Distribution of Benefits	Operations	High	EC8, EC9, EC10, EC11	Likely	Minor	Moderate

7.3 Employment and Labour Conditions

The development of the Project will generate a number of employment opportunities during the construction, operations and to a lesser extent, closure phases. Key impacts addressed in this section are therefore:

- Greenlandic employment levels;
- Training and work skills capacity building;
- Indirect employment and local procurement;
- Labour conditions; and
- Workforce accommodation.

Each of these potential impacts is addressed below.

7.3.1 Greenlandic Employment Levels

7.3.1.1 Project Activities Affecting Greenlandic Employment Levels

The Project will employ (either directly or through contractors) close to an average of 800 people in the construction phase. The construction phase is expected to last for an estimated three years, with a peak workforce of 1,171 during this time. Direct employment generated by the Project during the operations phase is also expected to be in the order of 700 people. During closure a small workforce of approximately fifty people is anticipated. A summary of Project labour requirements is illustrated in Table 7.7. In this table assumptions have been made regarding the proportion of Greenlandic and foreign labour forces required to implement the work program. In line with Greenlandic legislation, Greenlandic labour will be prioritised wherever possible, and GML anticipate the proportion of Greenlandic labour in the workforce will increase over time.

Table 7.7 Project Labour Requirements by Phase

Labour Requirements			
		Average Workforce	Peak Workforce
Construction Phase	Greenlandic workers (local or FIFO)	134	200
	Foreign workers	649	971
Construction Phase Total		783	1171
Operations Phase	Greenlandic workers (local or FIFO)	328	
	Foreign workers	387	
Operations Phase Total		715	
Closure Phase	Greenlandic workers (local or FIFO)	41	
	Foreign workers	7	
Closure Phase Total		48	

Given the size of the labour requirements during, the Company believes the fastest way to ensure that Greenlandic people gain the necessary skills will be through importing foreign labour and employing Greenlandic staff to work side by side to allow for a transfer of skills. The Project is of sufficient scale to apply the Large-Scale Act, and has used the Large-Scale Act as a basis to inform payment conditions for foreign workers.

The salaries for foreign workers will be calculated according to the guiding rules within:

- The Large-Scale Act, Act no 25 of 18 December 2012; and
- Parliamentary Act no 13 of 29 November 2013 amending the Large-Scale Act in relation to foreign workers' pay and working conditions of collective agreements and the exercise of labour rights.

These provisions ensure, amongst others, that foreign workers' salary, employment and working conditions are acceptable, objectively and factually justified and allow foreign workers to join labour organisations. Critically, these provisions ensure that that the minimum wage for a foreign worker (per hour) cannot be lower than the basic salary resulting from collective agreements with

Greenlandic labour, with allowances for some supplements and deductions. The objective of these provisions is to ensure that there is no labour cost disadvantage to Greenlandic businesses competing for construction work.

During the operations phase, greater opportunities will be available for Greenlandic labour. Of the estimated 328 Greenlandic workers required in this phase, it is anticipated that 270 will be recruited locally from Narsaq town and Kommune Kujalleq more broadly.

It is anticipated that during the construction phase, the workforce will operate on a 12 hour shift roster, working four weeks on and two weeks off for foreign construction labour and two weeks on and one week off for Greenlandic labour.

During the operations phase it is assumed the workforce will operate a combination of rosters:

- 10 hours a day for technical and support personnel, on a two weeks on and one week off (2/1) FIFO roster for foreign personnel, and a five days on and two days off (5/2), or a seven days on and seven days off (7/7) roster for local personnel; and
- 12 hours a day on a two weeks on and one week off (2/1) roster for local and FIFO operations personnel.

Labour requirements for the operations phase have been assessed based on categories of labour, and locations of work as illustrated in Table 7.8 and Table 7.9. These figures represent the assumed workforce breakdown at the commencement of the operations phase. It is anticipated that the proportion of Greenlandic labour in the Project workforce will increase over the duration of the Project.

Table 7.8 Mine, Concentrator and Refinery Operations Phase Labour Requirements

Function	Point of Hire	No. Employees per shift	Total Employees
Category 1 - Managers	Greenlandic	0	0
	Foreign	8	8
Category 2 - Professionals	Greenlandic	3	5
	Foreign	31	46
Category 3 – Technical and associate professionals	Greenlandic	3	6
	Foreign	50	113
Category 4 – Clerical Support Workers	Greenlandic	11	11
	Foreign	7	12
Category 5 – Service Workers	Greenlandic	20	39
	Foreign	16	32
Category 6 – Craft and related trade workers	Greenlandic	23	48
	Foreign	20	64
Category 7 – Plant and machine operators and assemblers	Greenlandic	34	95
	Foreign	31	112
Category 8 – Elementary Occupations	Greenlandic	53	124
	Foreign	0	0
Total		319	715

Table 7.9 Indicative Operations Labour Requirements by Category and Location

Category	Description	Mining	Processing	Village	Port
1	Managers	2	4	1	1
2	Professionals	15	34	2	0
3	Technical and associated professionals	5	111	0	3
4	Clerical support workers	6	14	2	1
5	Service workers	2	44	23	2
6	Craft and related trade workers	0	106	6	0
7	Plant and machine operators and assemblers	49	155	0	3
8	Elementary occupations	6	86	28	4
Total		85	554	62	14

The GoG articulated a national vision for employment on mineral projects in its "Employment Strategy 2015 – A Safe Labour Market". Within this strategy, a number of initiatives have been launched to increase Greenlandic employment on mineral projects, including:

- Initiative 3 – Increased upskilling of Greenlandic labour to better participate in mining and construction sector projects;
- Initiative 5 – Mobility of workers, making it easier for workers to move locations for jobs; and
- Initiative 12 – Impact Benefit Agreements between mining companies, the GoG and municipalities will target the reduction of unemployment through ensuring greater involvement of local labour and businesses in mining projects.

The GOG defined a national Oil and Minerals Strategy 2014-18 (GoG, 2014a) which highlights the need to ensure the best interaction possible between the mineral resources sector and other parts of Greenland society (training, labour market, infrastructure and the health and social sectors). The Strategy identified a number of priorities with respect to the labour market, training and employment:

- Focus on the IBA agreement, with close co-ordination between the minerals resources industry, the social partners and the public authorities, with the aim of increasing local employment through recruitment programs, upskilling, and involvement of Greenland contractors;
- Job matching efforts were to be intensified in order to assign relevant labour to the mineral resource sector;
- Increased participation levels in qualifying courses designed to support people without an education (PKU);
- Assignment of vacant position on national join public job portal, which would also provide information about new job types, reskilling possibilities, upskilling courses;
- Upskilling of young people who are currently unemployed through Piareersarfiit centres;

- Training and upskilling initiatives and programmes in the building and construction industries with the objective of increasing Greenlandic employment in the construction phase activities of mineral sector projects;
- Increased focus on apprentice / trainee jobs to increase the levels of skilled artisans in readiness for increased demand for key skillsets, e.g. mechanics and electricians;
- Upskilling programmes for semi-skilled workers so that can learn to operate a wide range of mechanises and vehicles being used around a mining project; and
- Capacity building of industry schools to provide school apprenticeships.

The recruitment of Greenlandic labour for the mineral resources sector will be a key element of the negotiations around the Impact and Benefit Agreement for the Project.

Related initiatives led by the GoG include:

- The establishment of the "PKU-Kurser" website (http://piareersarfik.gl/da/Vejledning/PKU) as a means of reducing structural unemployment and at the same time meeting the demand of labour in growth sectors of construction, mining and tourism. The primary target for the PKU-Kurser are unskilled workers who are unemployed or are employed in endangered professions. The Greenland School of Minerals and Petroleum has been offering PKU courses since its establishment in 2008.
- The Greenland School of Minerals and Petroleum has also been delivering youth training for the mining industry. These courses are provided in Sisimiut.
- A Greenland job portal has been established at www.suli.gl, under Parliament Act no. 5 of 8 June 2014.
- Kommune Kujalleq has also launched various initiatives to prepare the local work force for the arrival of the mining industry. These have included the enrolment of more than 300 students in courses designed for the mining industry, with an additional number enrolling in English language courses.

The level of Greenlandic employment outlined in the tables above is based on an assumed supply of skills. Through prior upskilling and reskilling, there may be opportunities to increase the level of Greenlandic labour in the operations period in particular.

7.3.1.2 Potential Greenlandic Employment Level Impacts

Opportunities for salaried employment in Kommune Kujalleq, and in Narsaq in particular, are limited, raising the value attributed to new salaried jobs in the area. In 2016, 2,846 people were recorded as being in the labour force in Kommune Kujalleq, with 671 in Narsaq specifically. Nationally, the total labour force was reported as 26,214 people in 2016, accounting for 47% of the population. In this context, the creation of 783 jobs in the construction phase, 715 in the operations phase and approximately 50 jobs in the closure and decommissioning phase is significant at a local, regional and national scale. As indicated in the tables above, only a proportion of these jobs are expected to be undertaken by Greenlandic labour due to the shortage of skills nationally.

As noted in Section 6.7 (livelihood activities baseline), salaries paid for mining and quarrying activities in Kommune Kujalleq in the past have typically exceeded the average salaries for other

professions. The salaries paid by GML will be in line with national norms, will meet requirements established by SIK and are likely to continue to be higher than the average salaries in Narsaq at present.

The number of employees required to support the Project could also significantly reduce the level of unemployment amongst job-ready individuals within Kommune Kujalleq.

These impacts will also be reversed to an extent after mine closure, with significant retrenchment of employees and contractors as the workforce size is reduced.

7.3.1.3 Mitigation / Enhancement of Greenland Employment Level Impacts

GML will seek to recruit workers locally (within Narsaq area and Kommune Kujalleq) and nationally where possible. To improve opportunities for Greenlandic labour, GML intends to implement the following mitigation / enhancement measures:

- EM1 - Coordination with the GoG to sponsor students through the PKU-Kurser program in fields of relevance to the development of the Project. The range of courses to be made available are likely to include as a minimum: environmental science, mining, geology, engineering, management, human resources and language;
- EM2 - Providing information sessions in Narsaq, the other towns and larger settlements in Kommune Kujalleq and in Nuuk on career opportunities at GML;
- EM3 - Working with vocational institutions (such as the School of Minerals and Petroleum, INUILI among others) to help develop coursework to support Greenlandic students to gain either direct or indirect employment associated with the development of the Project. The goal is to recruit at least 40 graduates from the School of Minerals and Petroleum;
- EM4 - Development of promotional material showcasing role model Greenlandic employees;
- EM5 - Establishment of an apprentice training program to train approximately 15 apprentices a year during the operations phase;
- EM6 - Establishment of a Kvanefjeld human resources department with appropriate Greenlandic language speaking personnel, with responsibility for negotiating contracts with local mediators and unions;
- EM7 - Preferential hiring of women when male and female candidates are equally qualified for a position;
- EM8 - Continuing to conduct open days to engage with the community and provide information on the Company's goals and labour requirements;
- EM9 - Implementing a mentoring program for junior staff to ensure progression through the workforce overtime, with a view to increasing the proportion of Greenlandic labour in management positions;
- EM10 – Development of up-skilling and retraining programmes for employees (also accessible to contractors) to facilitate their transition into future employment at mine closure; and

- EM11 – A social exit strategy will be developed at least 5 years in advance of closure to address the transition process for employees (both direct and indirect), implement job-matching support services provided to employees to assist them to secure future employment after mine closure and to address socio-economic impacts associated with the closure of the Project.

7.3.1.4 Residual Impacts of Greenlandic Employment Levels

Through implementing the measures outlined above, the Greenlandic employment level impacts are expected to be of high positive significance in the construction phase and of very high positive significance in the operations phase, reducing to a moderate positive impact in the closure phase. It should be noted that the transition from an operations phase workforce to a closure phase workforce will result in the cessation of employment for many individuals, with likely negative impacts on their well-being at that time.

7.3.2 Training and Work Skills Capacity Building

7.3.2.1 Project Activities Affecting Training and Work Skills Capacity Building

GML will require a skilled workforce to construct and operate the Project. Some of the skills required will be highly specialised and will need to be provided by existing specialists. Others, however, will require skills which can be acquired through training within a reasonable period of time. Opportunities for training and capacity building are likely to be greater during the operations phase than the construction phase.

GML developed a trainee program during its exploration programme to train local workers to work as drillers and support staff for the Company's exploration activities. This training was developed in cooperation with the Greenland School of Minerals and Petroleum in Sisimiut.

7.3.2.2 Potential Training and Work Skills Capacity Building Impacts

As noted in the previous impact description, GML is committed to maximising the use of Greenlandic labour in the Project. Training is considered the gateway through which Greenlandic labour will be able to gain access to employment opportunities and to progress through the management ranks of the Project during the operations phase.

Given the limited recent experience of working on mining projects in Greenland, and in particular the limited experience held within Kommune Kujalleq, effective training programs will be needed to achieve this goal. Training will need to be targeted to develop skills which are needed in the long-term and which are transferable for future employment opportunities when the Project closes.

7.3.2.3 Mitigation/ Enhancement of Training and Work Skills Capacity Building

To increase the training the work skills capacity building opportunities from the Project, the following actions will be undertaken by GML:

- EM12 - Operational staff will be hired at least 6 months in advance of the commencement of operations in order to allow effective training to be conducted;
- EM3 - Working with vocational institutions (such as the School of Minerals and Petroleum, INUILI among others) to help develop coursework to support Greenlandic students to gain

either direct or indirect employment associated with the development of the Project. The goal is to recruit at least 40 graduates from the School of Minerals and Petroleum;

- EM13 - Coordination with Kommune Kujalleq administrators to enhance the training opportunities provided within the municipality to better support the development of the mineral industry;
- EM1 - Coordination with the GoG to sponsor students through the PKU-Kurser program in fields of relevance to the development of the Project. The range of courses to be made available are likely to include as a minimum: environmental science, mining, geology, engineering, management, human resources and language;
- EM14 - Work with Majoriaq and the local schools in Kommune Kujalleq to help students understand the job opportunities available at the Project (and indirectly generated by the Project) to see how they can best prepare themselves to secure employment in the future;
- EM15 - Development of a comprehensive internal training and mentoring program to accelerate the progression of Greenlandic workers within the company. This may involve partial duplication of some roles in the early stages of operations in order to expose junior workers to the experience of more senior, potentially foreign, workers. The objective of these programs will be to steadily increase the proportion of Greenlandic workers (and consequently, reduce the proportion of foreign workers) across every level of the Company as time progresses;
- EM4 - Development of promotional material showcasing Greenlandic role model employees;
- EM16 - Engagement with other training centres across Greenland to explain the nature of roles which will be required by the Project and to determine how best to develop this capacity within Greenland;
- EM11 – A social exit strategy will be developed at least 5 years in advance of closure to address the transition process for employees (both direct and indirect), implement job-matching support services provided to employees to assist them to secure future employment after mine closure and to address socio-economic impacts associated with the closure of the Project.

7.3.2.4 Residual Training and Work Skills Capacity Building

Following the implementation of the enhancement measures outlined above, the residual impact during the construction phase is expected to be a moderate positive, and in the operations phase is expected to be a high positive impact. While the transition from an operations level workforce to a closure level workforce (a 95% reduction in workforce size) will clearly have negative impacts on the workforce, the closure phase impacts associated with training and work skills capacity are expected to be moderate positive as these activities will continue, albeit on a significantly smaller scale.

7.3.3 Indirect Employment and Local Procurement

7.3.3.1 Project Activities Affecting Indirect Employment and Local Procurement

In addition to the direct employment and procurement opportunities generated by the Project, a number of indirect opportunities are also likely to be generated. The level of indirect employment is typically assessed by estimating a multiplier based on input-output tables. Multipliers are used to assess the ratio of additional jobs which may be generated by the creation of a single job on the Project. Multipliers are typically sector and country specific and vary depending on the level of interlinkage between industries, the level of local production which can support an industry and the availability of skills to meet increased demand.

Various studies have been conducted in Greenland to determine an appropriate employment multiplier for Greenland's mining sector. This work has been complicated by the absence of recent large-scale mining projects against which such estimates could be tested. Notwithstanding this limitation, a summary of the results determined through other studies is summarised below:

- Copenhagen Economics (2012)[65] determined an indirect employment multiplier of 1.39 for the mining industry in 2012 which was expected to reduce to 1.33 in 2030.
- The indirect employment multiplier assumed for the aluminium smelter at Maniitsoq was assumed to be 1.2 (NIRAS, 2010)[66].
- In 2009, the indirect employment multiplier for the proposed gold mine at Nalunaq was estimated to be 1.276[67].
- London Mining in their SIA (Grontmij, 2013b) predicted a multiplier of 1.3 for the Isua Iron Ore Project during its operational phase.

Based on these assessment, a multiplier of 1.3 appears to be a central estimate upon which to estimate the indirect employment generated by the Project. Positively influencing the multiplier is the relative density of population in the area in which the Project is located (compared to some of the other examples cited above). However this may be compromised by the technical complexity of the process plant which may limit local opportunities.

Local procurement opportunities were discussed in Section 7.2.1 and the potential business opportunities are identified in Table 7.4. The value of local procurement (where local is defined as procurement from Greenlandic enterprises) has not been defined and will be dependent on both the capacity for Greenlandic enterprises to meet Project demands and on the use of modular construction technologies by the Project.

7.3.3.2 Potential Indirect Employment and Local Procurement

Applying an indirect employment multiplier of 1.3, up to 930 indirect jobs could be generated through the development of the Project. This includes jobs generated through local procurement.

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[65] Copenhagen Economics (2012)

[66] NIRAS (2010)

[67] Watkinson (2009)

7.3.3.3 Mitigation / Enhancement Measures for Indirect Employment and Local Procurement

The economic assessments undertaken by Copenhagen Economics (2012) to determine an appropriate multiplier for Greenland highlight the sensitivity of the multiplier to the consumption patterns of foreign labour working on Greenland mining projects. A relatively modest increase in the consumption level of foreign workers can have a significant effect on the employment generated by a project. On this basis, the following enhancement measures are proposed for Project:

- EM17 - Stocking of the "general store" within the Village with Greenlandic products where possible, and if local production is not possible, sourcing goods from Greenlandic suppliers;
- EM18 - Support for home-based industry which can support the Project, e.g., the development of sewing businesses which could manufacture uniforms and cold weather clothing;
- EM19 - Encouraging local procurement by contractors through establishing contractual language to support this activity. Local procurement should only be given preference where the local product is largely comparable in terms of quality and cost to internationally available alternatives.

7.3.3.4 Residual Indirect Employment and Local Procurement Impacts

Once the enhancement measures defined above are implemented, the residual indirect employment and local procurement impact is considered to be of high positive significance.

7.3.4 Labour Conditions

7.3.4.1 Project Activities Affecting Labour Conditions

As a significant future employer, GML will be responsible for establishing labour conditions which are fair, attractive to employees and consistent with norms and standards required by relevant government authorities and Greenland's major labour union, SIK. Three government authorities administer labour and working conditions:

- Danish Working Environment Authority – occupational health and safety considerations in the workplace;
- Greenland Ministry of Mineral Resources, Labour and Interior; and
- Danish Agency for International Recruitment and Integration – responsible for processing applications for residence permits in Greenland based on work or studies.

7.3.4.2 Potential Labour Conditions Impacts

At the time of the writing of this SIA, no large-scale mining projects were in operation in Greenland. Essentially, this will place the responsibility of setting wage standards and labour conditions for the minerals sector on the Project. Further to this, the following potential negative impacts on labour conditions have been identified:

- Differential treatment/conditions between foreign and Greenlandic labour resulting in tension within the workforce;

- Workforce rosters and rotations which may make maintaining family structures and meeting family responsibilities challenging; and
- The higher salaries typical of mining projects have the potential distort the local labour market by drawing skilled workers away from critical local service provision (e.g. teachers, nurses etc).

7.3.4.3 Mitigation / Enhancement affecting Labour Conditions

To ensure labour conditions are well managed and all workers are treated equitably, GML will implement the following measures:

- EM20 - Early and continuous engagement with SIK and other Greenlandic labour unions to establish working conditions which meet Greenlandic requirements and which will avoid distorting the local labour market;
- EM21 - Engagement with SIK and the GoG to agree a "skilled workers" wage which be sufficient to attract and retain top quality local employees. This agreement will also be topped up with supplements for shift work and overtime as necessary. The salary agreement will be negotiated with the GoG and SIK prior to the commencement of employment;
- EM22 - Workforce rotations will be developed to support family-friendly employment and will take into consideration the frequency of home visits necessary to maintain semi-traditional lifestyles.

7.3.4.4 Residual Labour Conditions Impacts

Following the implementation of the mitigation measures outlined above, the residual labour conditions impact is evaluated to be a low negative impact in the construction, operations and closure phases.

7.3.5 Workforce Accommodation

7.3.5.1 Project Activities Affecting Workforce Accommodation

During the construction phase it is anticipated that close to 520 foreign workers (at peak), and approximately 200 Greenlandic workers will need to be accommodated in proximity to the Project site. During the Operations phase, the steady-state employment level is expected to be in the order of 715 workers, of which approximately 328 are expected to be Greenlandic and of whom approximately 450 will need to be accommodated in Narsaq at any time. During closure, a workforce of 48 people is expected, and this is expected to be mostly comprised (85%) of Greenlanders resident in Narsaq.

Different accommodation options are planned for the construction and operations phases, as described below:

- Construction phase – Within the construction phase, two levels of activity will occur: a pioneering period during which time initial earthworks will conducted (1st year of construction); and the main construction periods during which time the refinery, concentrator and mining buildings will be constructed (2nd and 3rd years of the construction phase). In the "pioneering period", the workforce will be accommodated in Narsaq and

Narsarsuaq in existing accommodation, with workers primarily working on a FIFO basis. During this period, a temporary construction camp will be constructed at the mine site, next to the concentrator. This temporary construction camp will provide accommodation for the majority of the foreign labour force in the second period of the construction phase (estimated to require close to 500 beds during peak construction). Greenlandic labour will again be accommodated in existing facilities in Narsaq and Narsarsuaq. It is estimated that just over 300 beds will be required in Narsaq and Narsarsuaq during the course of the construction phase.

- Operations phase – The Village will be constructed on the north-west limit of Narsaq town. The Village will be sized to accommodate:
    - All Greenlandic and foreign FIFO personnel during their roster period; and
    - All locally recruited personnel working at the mine, concentrator or refinery during their roster period (they will return to their own homes during their off-roster periods).

Clerical workers and all locally recruited personnel employed at the Port, the Village and involved in other activities based in Narsaq will continue to live in their own homes in Narsaq.

The Village will provide accommodation for approximately 450 workers per shift during the operations phase.

The accommodation facilities (both construction camp and the Village) will operate under a no-alcohol policy and smoking will not be permitted inside the buildings.

The location of the temporary construction worker's camp and the Village can be seen Figure 3.6.

In addition to accommodation facilities, the Village will incorporate the following:

- A reception area;
- Administration offices;
- A training / induction centre;
- A dining area for residents;
- A small general store;
- A first aid station;
- A recreation room;
- A gymnasium;
- A movie theatre; and
- A multi-purpose indoor sports court.

The following supporting infrastructure for the Village will also be established:

- Power will be supplied to the Village by the power station located at the processing facility via an 11kV transmission line from the processing facility to the Port and Village;
- The Village will source water from the Narsaq town supply;

- High-speed, high capacity internet connections and phone lines will be supplied to the Village;
- All solid waste from the Village will be compressed into bales and shipped to Qaqortoq for incineration (pending the construction of an incinerator in Narsaq). Hazardous wastes such as batteries and chemicals will be segregated for separate collection.
- A sewerage waste water treatment plant will be installed to treat all sewage prior to discharge to the ocean (consistent with current practice in Narsaq). Discharges will meet all environmental guidelines.

7.3.5.2 Potential Workforce Accommodation Impacts

The introduction of a significant workforce into a relatively small community has the potential to generate a range of impacts, including:

Potential negative impacts:

- Social tension generated by the introduction of a large non-local workforce – Un-managed, this impact could be exacerbated by the relatively high proportion of foreign labourers working on the Project in the construction phase in particular. There is potential for significant population change with a likely high proportion of males working on the Project, and the introduction of many people who are from other countries or other regions in Greenland moving into the town of Narsaq. To an extent, Narsaq is better prepared for this change than many communities in Greenland, having developed as a town to service the fishing industry and having experienced significant inflows (and outflows) of population as job opportunities have waxed and waned over the intervening years. Internal migration of Greenlanders is also a key aspect of Greenlandic society and is not expected to generate significant issues;
- Social tension generated by the creation of a "segregated" community inside the Village – The Village will be located on the edge of the existing town of Narsaq. With expectations that the Village will accommodate approximately 450 workers per shift, it will represent approximately 25% of the total (including the Village) population of the town. In constructing a worker's village two competing impacts need to be managed: minimisation of impact of the new workforce on the town of Narsaq; and maximisation of benefit sharing with the town of Narsaq. The establishment of security controlled, restricted access construction and permanent workforce accommodation areas will need to try to balance these objectives;
- Shortage of accommodation in Narsaq and Narsarsuaq during the construction phase – Narsarsuaq currently has a total of 219 beds and Narsaq has an additional 50 beds. In the early part of the construction phase in particular, the Project will be reliant upon available accommodation within Narsaq and Narsarsuaq. Un-managed this could result in accommodation shortages, with potential knock-on consequences for local tourism operators who rely on hotel and apartments rentals in summer; and
- Inadequate living conditions for the Project workforce – In the absence of management controls, the quality of the workforce accommodation during both construction and operations phases could result in sub-standard living conditions for employees.

Potential positive impacts:

- Changes to housing availability and rental prices in Narsaq – Narsaq is currently experiencing an excess of accommodation due to a lack of demand from the community. The employment of Greenlandic labour by the Project is likely to trigger increased interest in rental properties in Narsaq, increasing the utilisation of existing rental stock and potentially generating the renovation of older apartments / development of new apartments/houses. Due to the State ownership of housing stock, increased utilisation is likely to reduce rental costs per unit in Narsaq, increasing rental affordability for all residents.

7.3.5.3 Mitigation / Enhancement Measures for Workplace Accommodation Impacts

The following measures are proposed to minimise the negative impacts and enhance the positive impacts associated with workforce accommodation:

- EM23 - Code of Conduct – All workers (including contractors) will be required to sign and agree to a code of conduct when working for the Project. This will include the following considerations:
    - EM 24 - Zero tolerance of alcohol and drug consumption and anti-social behaviour when working for the Project and when residing in workforce accommodation. All facilities will be designated as non-smoking. In the event that activity contrary to these policies is observed, disciplinary measures will be taken;
    - EM25 - Respect for Narsaq community and for Greenlandic traditions, including the completion of cultural awareness training on commencement of employment with the Project;
    - EM26 - Restrictions on the level of interaction between Narsaq residents and camp / Village residents. For example, residents of the camp / Village will not be permitted to frequent local bars, but will be encouraged to play sport with and engage with Narsaq residents in activities deemed socially beneficial. The identification of these activities will be undertaken with Narsaq and Kommune Kujalleq administrators as part of the discussion on the IBA; and
    - EM27 - Camp and Village facilities will be no-smoking areas.
- EM28 - Maximisation of Greenlandic labour in the temporary construction worker's camp and Village – GML will work with catering, cleaning and other support industries to best utilise local Greenlandic labour to run these facilities;
- EM29 - Workforce accommodation standards – Accommodation at the temporary construction worker's camp will be designed and managed by the construction contractor. Details of the planned accommodation were not available at the time of the preparation of the SIA, however, any final designs will need to be approved by GML and will also be reviewed by SIK to ensure compliance with Greenlandic standards. The Village will be designed to comply with international good practice, as outlined in the IFC / EBRD guidance note titled 'Workers' Accommodation: Processes and Standards" (IFC, 2009b);
- EM30 - In the event of accommodation shortage during the construction phase, GML plan to utilise a marine vessel to provide additional short-term accommodation on an as needed

basis. This would be a short-term measure only and may be initiated during peak tourism months to ensure impacts to tourism are minimised; and

- EM31 - GML will work with Narsaq and Kommune Kujalleq administrators to identify apartments and houses which are sitting idle, which could be made available to Greenlandic workers who want to move into town as permanent residents. Up to an additional 50 beds could be made available during these refurbishment activities. It is anticipated that this option might carry some appeal for residents of settlements in Kommune Kujalleq and may also encourage former Narsaq residents to return home when labour opportunities eventuate.
- CH30 - Workers will be encouraged to participate in sporting competitions in Narsaq and to support the development of new competitions as appropriate.

7.3.5.4 Residual Workplace Accommodation Impacts

Two primary workforce accommodation impacts have been considered in Table 7.10: living standards of workers and interaction between the workforce and the town of Narsaq. Taking each in turn, the living standards of workforce during the construction phase are considered to represent a potential moderate negative impact. As greater information becomes available for the conditions at the temporary construction camp, this impact may be down-graded. The residual impact for the living standards at the Village are considered to be a low negative impact.

For the second impact, a number of factors influence the residual rating of these effects. During construction, the interaction between Narsaq and the majority of the Project's workers will be minimised through the establishment of a temporary construction camp at the mine site. While reducing the risk of conflict between the workers and the townsfolk, it also has the potential to create a sense of division between the two groups. For this reason, the residual impact is considered very high negative. The Village will be far more integrated into the town of Narsaq and efforts will be put in place to foster socially beneficial interaction between the workers and the town of Narsaq. Notwithstanding these efforts, the introduction of an additional 25% to the town's population is likely to cause some concern and the residual impact is considered to be a high negative.

Table 7.10 Employment and Labour Conditions Impact Summary

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post -mitigation Significance
Greenland employment levels	Construction	High	EM1, EM2, EM3, EM4, EM6, EM7, EM8, EM9	Likely	Moderate	High
	Operations	High	EM1, EM2, EM3, EM4, EM5, EM6, EM7, EM8, EM9	Likely	Major	Very High
	Closure	Moderate	EM1, EM2, EM3, EM4, EM6, EM7, EM8, EM9, EM10, EM11	Likely	Minor	Moderate
Training and Work Skills Capacity Building	Construction Closure	Low	EM1, EM3, EM4, EM13, EM14, EM15, EM16, EM11	Likely	Minor	Moderate
	Operations	Moderate	EM1, EM3, EM4, EM12, EM13, EM14, EM15, EM16, EM11	Likely	Moderate	High
Indirect employment and local procurement	Construction Operations	Moderate	EM17, EM18, EM19	Possible	Moderate	High
Labour Conditions	Construction Operations Closure	Moderate	EM20, EM21, EM22	Unlikely	Minor	Low
Workforce accommodation – living standards	Construction	Moderate	EM23, EM24, EM25, EM26, EM27, EM28, EM29, EM30, EM31	Unlikely	Moderate	Moderate
	Operations	High	EM23, EM24, EM25, EM26, EM27, EM28, EM29, EM30, EM31	Remote	Moderate	Low
Workforce accommodation – interaction with Narsaq	Construction	Very High	EM23, EM24, EM25, EM26, EM27, EM28, EM29, EM30, EM31, CH30	Possible	Major	Very High
Workforce accommodation – interaction with Narsaq	Operations	Very High	EM23, EM24, EM25, EM26, EM27, EM28, EM29, EM30, EM31, CH30	Possible	Moderate	High

7.4 Land-Use and Land Based Livelihoods

7.4.1 Economic Displacement Due to Land Occupation and Land Access Restrictions

7.4.1.1 Project Activities Affecting Land-Based Economic Displacement

Development of a major project has the potential displace existing economic use of land. The factors which influence these impacts include both the physical footprint of a project, access restrictions which may be applied to land, the environmental impacts generated by a project and the current use of land in proximity to the proposed project.

The physical footprint of the major components of the Project at their largest (i.e. after 37 years of mining) is illustrated in Table 7.11.

Table 7.11 Project Footprint After 37 Years of Mining

Project Component (at 37 years)	Physical Footprint (km^2)
Mine pits	1.1371 km^2
Waste rock dumps	1.255 km^2
Flotation Tailings	2.516 km^2
Chemical residue	0.4656 km^2
Port	0.1346 km^2
Accommodation	0.0421 km^2
Total Physical footprint (at 37 years)	5.946 km^2

The topography of the Kvanefjeld area naturally reduces access to the Project area. In addition to these natural limitations, the Project will install fencing (as seen in Figure 3.7) to prevent public access to active mining and processing areas.

7.4.1.2 Potential Land-Based Economic Displacement Impacts

Economic displacement is defined as the loss of assets or access to assets that leads to a loss of income sources or other means of livelihood. Income sources or other means of land-based livelihoods which have the potential to be impacted by the Project include:

- Cattle farming activity undertaken at the Ilua Valley Farm (3.7km from mine site);
- Sheep farming activity undertaken at the Ipuitaq Farm (15km from the mine site);
- Reindeer farming activity undertaken at Tuttutooq (>25km from the mine site);
- Gemstone collection (tugtupit) on the Kvanefjeld plateau; and
- Tourism activities using Narsap Ilua as the launch-pad for kayaking tours.

For reference, the farm locations are indicated in Figure 6.15. Only impacts with potential to impact livelihoods are considered under this impact description.

The nature of the potential impact varies across the five livelihood activities, as seen in Table 7.12.

Table 7.12 Potential Sources of Land-Based Economic Displacement Impacts

Livelihood Activity	Environmental impacts	Access restrictions	Perception Concerns
Ilua Valley Farm	X		X
Ipuitaq Farm	X		
Tuttutooq Farm	X		
Gemstone collection		X	
Kayaking Tourism			X

Impacts to the Ipuitaq and Tuttutooq farms are considered negligible and will generate no impact on farming activity. The Ilua Farm will experience a moderately greater effect due to the upgrading of the access road and the increased level of traffic on it. There is, however, potential for perception concerns around the farm products, which may have an economic impact on the Ilua Valley farm's activities.

As of 2017, three gemstone collection licenses were held for the Kvanefjeld area. As the Project develops, access to some areas of tugtupit will be restricted to protect public safety. In the absence of other arrangements, this could impact the livelihoods of the gemstone collectors in Narsaq.

Kayaking tourism operators use a former mink factory as a base for tourism activities during summer months in Narsaq. The former mink factory location can be seen in Figure 6.18. The development of the Port on Tunu Peninsula may cause aesthetic impacts to the tourism operator and additional caution will be need for kayak operators in order to avoid shipping accessing the Port. This is not likely to be a significant impact due to the experience of kayak operators negotiating around existing cargo vessels making deliveries across Greenland.

7.4.1.3 Mitigation / Enhance Measures for Land-Based Economic Displacement Impacts

The following mitigation measures will be put in place to reduce potential land-based economic displacement impacts:

- The following principles will be applied to all land access and acquisition:
    - LA1 - Displacement impacts will be avoided, or where avoidance is not possible, minimised by exploring alternate project designs;
    - LA2 - Forced eviction will be avoided;
    - LA3 - Land acquisition, where required, will where possible be agreed through a willing seller, willing buyer negotiation;
    - LA4 - Where land acquisition is required or land access restrictions are applied, adverse social impacts will be reduced through a) providing compensation for loss of assets at replacement cost [68]; b) ensuring resettlement activities are

[68] Replacement cost is defined as the market value of the asset plus transaction costs. In applying this method of valuation, depreciation of structures and assets should not be taken into account. Market value is defined as the value required to all Affected Households to replace lost assets with assets of similar value. The valuation for determining

implemented with appropriate disclosure of information, consultation and the informed participation of those involved; and

  - LA5 - Where land-based economic displacement occurs, the company will aim to restore, or where possible, improve the livelihoods of affected households.

- LA6 - The Project intends to acquire the Ilua Valley farm through a willing buyer, willing seller transaction. While the Project's environmental impacts on this property will not affect the ability to continue conducting farming activity, in discussion with the affected household it is understood that the household would like to pursue other activities when the Project commences;
- LA7 - Engagement and consultation activities will be pursued with all land users in the area to explain the impacts and provide additional information about the Project as necessary;
- LA8 - In the event that livelihood impacts are created by the Project, a livelihood restoration plan (LRP) would be developed by GML working in coordination with KNAPK and SPS, depending on the nature of the impact;
- LA9 - In the event that enterprise based livelihoods are affected by the Project, GML will support business development activities including training and business planning to expand existing businesses and generate local employment;
- LA10 - Dust and radiological mitigation measures will be implemented;
- LA11 - Dust and radiological monitoring stations will be established near the mine boundary, in Narsaq town, with the Ilua Valley and in Ipiutaq (as a reference location) with results shared with interested community forums;
- LA12 - GML will engage with gemstone collection licence holders to provide access to the highest grade areas of tugtupit prior to construction / mining activity occurring. The access will be controlled to maintain safety standards;
- LA13 - GML will engage with kayak tourism providers to explain the Project design and schedules and to develop impact mitigation measures as necessary.

7.4.1.4 Residual Land-Based Economic Displacement Measures

Due to the specific nature of the impacts assessed in this topic, and their importance for individuals, the residual impact results are reported for each of the five livelihood activities:

- Ilua Valley Farm – The residual land-based economic displacement impact on this property is considered moderate, following the implementation of mitigation measures defined above;
- Ipuitaq Farm – The residual land-based economic displacement impact on this property is considered low;

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replacement cost will be documented and included in a Livelihood Restoration Plan (LRP) in the event that compensation needs to be awarded.

- Tuttutooq Reindeer Farm – The residual land-based economic displacement impact on this property is considered low;
- Gemstone Collectors -The residual land-based economic displacement impact is considered moderate;
- Kayak Tourism Operators - The residual land-based economic displacement impact on this property is considered low.

As an additional comment, this impact of this Project on the Greenlandic farming industry is also considered to be low. One farm will cease operating in its current location, and no impacts are anticipated for any other farms.

7.4.2 Ecosystem services

7.4.2.1 Project Activities Affecting Ecosystem Services

The Project has the potential to generate impacts to ecosystem services through the disruption of the existing ecosystem via:

- Land clearing required for construction of an access road and for mining and process plant operations;
- Access restrictions to Project areas;
- Water extraction from existing rivers;
- Noise and dust generation from the Project affecting local environmental amenity; and
- Air quality impacts to areas listed in the Kujataa UNESCO World Heritage Site.

Ecosystem services are the "benefits that people, including businesses, derive from ecosystems. Ecosystem services are organised into four types: 1) provisioning services which are the products people obtain from ecosystems; 2) regulating services, which are the benefits people obtain from the regulation of ecosystem processes; 3) cultural services, which are the nonmaterial benefits people obtain from ecosystems; and 4) supporting services, which are the natural processes that maintain the other services" (IFC, 2012).

7.4.2.2 Potential Ecosystem Services Impacts

Ecosystem services impacts are distinct from economic displacement impacts as they focus on services which are not the basis of a livelihood or income, but which support the enjoyment of life. As such, while the loss of a livelihood can cause severe detriment to a household or individual, the loss of ecosystem services is generally a less severe impact on a household or individual (although not necessarily less severe for the environment itself).

As described in Section 6.6.2, ecosystem services are important to the population in the Project area, with activities categorised in Table 7.13. This table also identifies the potential impact to the ecosystem service from the development of the Project.

Table 7.13 Categories of Ecosystem Service

Type of Ecosystem Service	Activity/Service	Location	Potential Impact
Provisioning	Fishing and Seal Hunting	Areas 2, 3 and 5 of Figure 6.16 as well the Narsaq river	No impacts anticipated as no impacts to fishing / hunting stock anticipated
	Berry picking	Ilua Valley and Narsaq Point	Berry picking activities are not expected to be affected as dust will be below guideline values.
Cultural services	Hiking, walking and running	Along Ilua Valley and into the mountain plateaus to the north	Limited amenity impacts anticipated as the serenity of the valley changes with the introduction of the mining Project
	Fishing and seal hunting	Areas 2, 3 and 5 of Figure 6.16	No impacts anticipated as no impacts to fishing / hunting stock anticipated
	Archaeological sites and Inuit graves	Narsap Ilua and Narsaq Point	In general, these areas will not be impacted by the Project. Tent foundation and shooting blind at the tip of Tunu Peninsula will be destroyed.
	Kujataa UNESCO World Heritage Sites	Qassiarsuk Igaliku Sissarluttoq Tasikuluulik Qaqortukulooq	The closest site (Qaqortukulooq) is located 17km from the Project site. Environmental modelling indicates no impacts from the Project will be experienced at this or any of the UNESCO sites.

7.4.2.3 Mitigation / Enhancement Measures Related to Ecosystem Services

The following mitigation measures will be implemented to reduce ecosystem service impacts:

- LA14 - The size of the footprint of the Project and areas of restricted access will be minimised to the extent possible;
- LA15 - Access roads will be sprayed with water at regular intervals to minimise the generation of dust along the Ilua Valley;
- LA16 - GML will seek to acquire local produce from the valley area when available (e.g. berries) to encourage the continuation of traditional activities; and
- LA17 - GML will work with Narsaq town administrators to identify alternate running / hiking routes which have lower amenity impacts.

7.4.2.4 Residual Ecosystem Services Impacts

Following the implementation of the defined mitigation measures the residual ecosystem service impact is considered moderate for the duration of the Project.

7.4.3 Tourism

7.4.3.1 Project Activities Affecting Tourism

The development of the Project could potentially have a range of impacts on the developing Narsaq tourism industry. Project activities which could influence this include;

- Economic dynamism in Narsaq;
- Changes to the level of service provision and secondary industries in Narsaq;
- Changes to transport linkages; and
- Perceptions about the pristine nature of the area.

7.4.3.2 Potential Tourism Impacts

The Narsaq tourism industry is relatively small at present, however some growth is anticipated with an increased number of cruise ship passengers stopping in town. Potential tourism impacts generated by the Project include:

- Potential reduction in tourists seeking pristine nature and local hiking opportunities;
- Potential increase in tourists attracted by the greater vibrancy of the local economy; and
- Potential increase in tourists due to the number of transport of options which will need to made available to transport fly-in fly-out workers to the town.

7.4.3.3 Mitigations / Enhancement Related to Tourism

To manage these impacts, the following mitigation measures will be put in place:

- LA18 - Engagement with Kommune Kujalleq and the town of Narsaq specifically to support local tourism opportunities; and
- LA19 - Investigation of opportunities to promote local tourism at a national and international level.

7.4.3.4 Residual Tourism Impacts

The residual tourism impact significance is considered a moderate positive over the life of the Project.

Table 7.14 Land-Use and Land Based Livelihood Impacts Summary

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post -mitigation Significance
Land-Based Economic Displacement – Ilua Valley Farm	Construction Operations Closure	Moderate	LA1, LA2, LA3, LA4, LA5, LA6, LA7, LA8, LA10, LA11	Possible	Minor	Moderate
Land-Based Economic Displacement – Ipuitaq and Tuttutooq Farms	Construction Operations Closure	Low	LA1, LA2, LA3, LA4, LA5, LA7, LA8, LA10, LA11	Remote	Negligible	Low
Land-based Economic Displacement – Gemstone Collectors	Construction Operations Closure	High	LA8, LA9, LA12	Possible	Moderate	Moderate
Land-based Economic Displacement – Kayak Tourism Operators	Construction Operations Closure	Low	LA13	Unlikely	Minor	Low
Food availability and ecosystem services	Construction Operations Closure	Moderate	LA14, LA15, LA16, LA17	Possible	Minor	Moderate
Tourism	Construction Operations Closure	Low	LA18, LA19	Possible	Minor	Moderate

7.5 Ocean Resources and Ocean-Based Livelihoods

7.5.1 Economic Displacement Due to Access Restrictions and Impacts to Ocean Resources

7.5.1.1 Project Activities Affecting Ocean-Based Economic Displacement

Fishing and other ocean-based livelihood activities are a key element of Greenlandic life. The extent to which the Project will impact upon ocean-based lifestyles depends on both the Project's impacts to the ocean and its resources, and the existing use of those resources to sustain livelihoods.

7.5.1.2 Potential Ocean-based Economic Displacement Impacts

Income sources or other means of ocean-based livelihoods which have the potential to be impacted by the Project include:

- Commercial fishing and seal hunting operating around the Project area;
- Traditional fishing and hunting activities undertaken as primary component of the household's food supply.

Referencing the study areas identified in Figure 6.16, Areas 2, 3 and 5 are most commonly used by professional fishermen, while traditional fishing activities in the ocean predominantly frequent Areas, 3, 4 and to a lesser extent, Area 5. The marine discharge will be placed into Nordre Sermilik in Area 5.

No economic displacement of fishermen, either commercial or subsistence, is anticipated from the Project's activities. This is because no significant impact on marine life is anticipated from the Project.

7.5.1.3 Mitigation / Enhancement Measures Related to Ocean-Based Economic Displacement

No economic displacement impacts are anticipated to ocean-based lifestyles, however in the event that monitoring indicates such an impact is occurred, the following mitigation measures will be implemented:

- OC1 - Engagement with KNAPK and other relevant agencies to better understand the cause of changes to local catches – if observed;
- In the event that such changes are attributed to the Project, the following principles would be applied:
- LA1 - Displacement impacts will be avoided, or where avoidance is not possible, minimised by exploring alternate project designs;
    - LA5 - Where economic displacement occurs, the Company will aim to restore, or where possible, improve the livelihoods of affected households.

7.5.1.4 Residual Ocean-Based Economic Displacement Impacts

The residual ocean-based economic displacement impact is considered low throughout the Project life for both commercial and subsistence fishermen and hunters.

Table 7.15 Ocean Based Economic Displacement Impact Summary

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Ocean-based Economic Displacement	Construction Operations Closure	Low	OC1, LA1, LA5	Unlikely	Low	Low

7.6 Occupational Health and Safety

This section discusses the Project's potential health and safety impacts on the workforce. The potential health impact of the Project on the community is discussed in Section 7.7.

The impacts in this section consider both acute (safety) hazards and specific chronic health exposures (radiation exposure) linked to the nature of Project activity. Other health issues (such as dust exposure and noise and vibration) are addressed in the Community Health, Safety and Security section. The Project will develop specific controls for workers to minimise exposure to these hazards in the Health and Safety Management Plan which will be prepared subsequent to the submission of this SIA.

The conditions related to occupational health, safety and rediation in the SIA is the description outlined by GML. The relevant authorities, including the authorities responsible for occupational health, safety and radiation etc., will set terms in relevant subsequent licences and/or approvals and therefore decide upon final approvals of the activities.

7.6.1 Risk of accidents

7.6.1.1 Project Activities Affecting the Risk of Accidents

Common to all industries where heavy machinery, heights and kinetic energy are involved, the nature of mining activities has the potential to generate unsafe circumstances in which an accident can occur.

The global mining industry has been working towards a zero fatality culture for many years and while this is yet to achieved, progress has been seen in this regard. The International Council of Mining and Metals (ICMM) undertook a benchmarking exercise across its member companies in 2016, indicating a downward trend in both fatalities and the total recordable injury frequency rate (TRIFR) between 2012 and 2016. Figure 7.2 summarises the key causes of fatalities across the ICMM member companies in 2016. While such comparisons are relevant, significant variations in operating conditions apply across the ICMM member companies, e.g. a heightened risk of rock fall in South African mines due to the depth of underground mining activity.

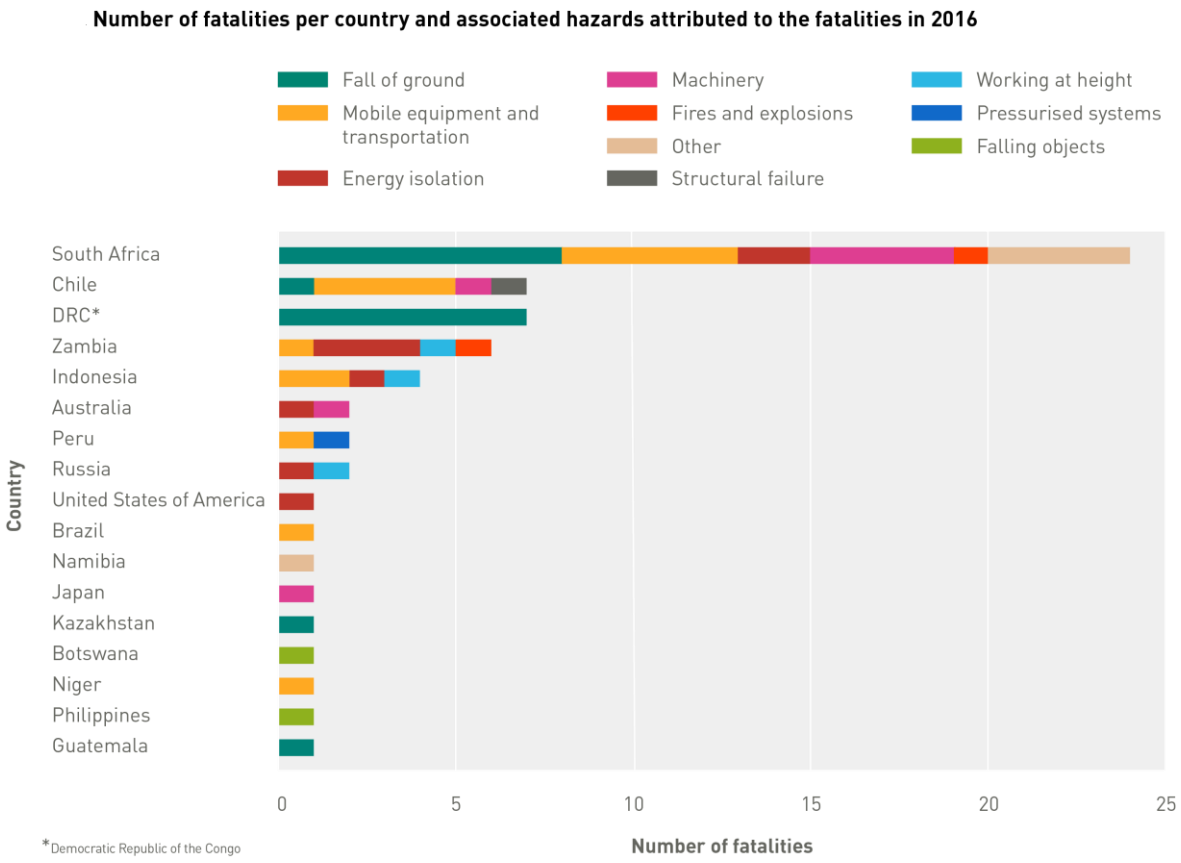


Figure 7.2 Categorisation of Hazards Causing Fatalities Across ICMM Member Companies by Geography in 2016 (Source: ICMM, 2016)

7.6.1.2 Potential Risk of Accident Impacts

The risk of accidents on a mine site is tied to the presence of potential hazards. The Project will likely have a standard suite of acute safety hazards including: explosions, rock falls, manual handling, vehicle accidents, fire, hazardous chemicals, slips, trips and falls, and drowning. Each of these hazards has the potential to result in short or long-term injuries, and in the worst case, can result in fatalities.

The proposed Project will include the construction of a medical facility accessible by all employees, contractors or visitors in the event of an accident or work-related medical emergency. The clinic will be staffed by a full-time nurse with video link access to an emergency doctor as required. The clinic will provide all required health care (occupational and personal) for workers and contractors.

7.6.1.3 Mitigation / Enhancement Measures Related to Risk of Accidents

- OH1 - A comprehensive health and safety management plan will be implemented by GML consistent with the Company's Occupational Health and Safety Policy. The Policy will at all times comply with legislation applicable in Greenland and will establish the goals of:
    - Removing or reducing risks to the health, safety and welfare of all workers, contractors and visitors; and
    - Ensuring all activities are undertaken safely.

GML will undertake the following measures to minimise the risk of accidents on the Project:

- OH2 - GML will prepare a written workplace assessment of occupational health and safety prior to the commencement of construction consistent with the requirements in Order No. 1168;
- OH3 - Preparation of safe work procedures for key activities which will remain live documents throughout the duration of Project activity;
- OH4 - Maintaining plant and equipment in safe working condition;
- OH5 - Providing information, signage, instruction, training and supervision required to ensure that all workers are safe from injury and risks to their health. Supplier instructions and workplace usage instructions will be provided in English, Danish and Greenlandic;
- OH6 - Collection and monitoring of all relevant safety statistics including near misses and identified risks;
- OH7 - Establishment of a safety committee responsible for managing, providing advice on, informing and supervising activities concerning health and safety within the Company; and
- OH8 - Allocation of responsibility for occupational health and safety to senior management within the Project team.

7.6.1.4 Residual Risk of Accidents Impact

Following the implementation of a health and safety management plan containing all of the mitigation measures defined above the residual significance of the risk of accident impact is considered to be moderate negative across all phases of the Project.

7.6.2 Radiation Exposure (occupational health impact)

7.6.2.1 Project Activities Affecting Radiation Exposure

The International Commission for Radiological Protection (ICRP) defines occupational exposure as all radiation exposure incurred as a result of work[69]. The exposure of the community to radiation is covered in Section 7.7.

[69] ICRP (2007)

Brief on radiation (Source: Arcadis, 2015.)

Regardless of where people live or work they are exposed to radiation from natural sources; it is present in the air we breathe, the food we eat, the water we drink and in the material we use to build our homes.

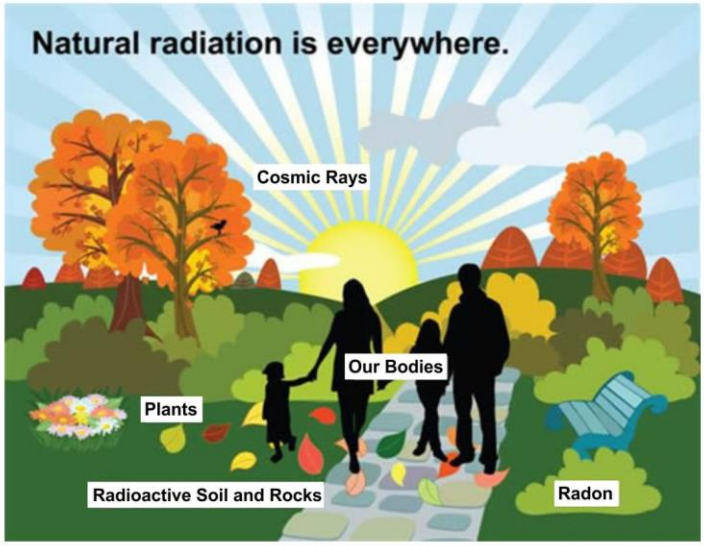
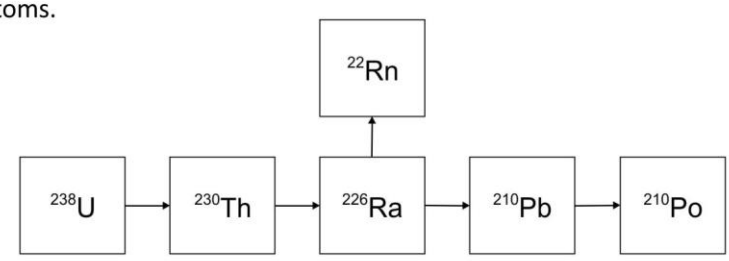


Illustration that radiation is everywhere (Source: Arcadis, 2015 and Canadian Nuclear Safety Commission, 2015)

Radiation occurs when a radioactive atom is unstable and the atom gets rid of excess energy in attempt to move to a more stable state. This excess energy is emitted in the form of subatomic particles and radiation. Often this process is repeated several times before the atom becomes stable. This process is called a decay series, and the unstable atoms during this process are called decay atoms.



Simple figure of radiation decay from U-238 (Source: Arcadis, 2015)

There are three kinds of ionizing radiations: alpha particle emission, beta particle emission, and gamma ray emission. Alpha emissions can be stopped by a piece of paper, beta emissions by wood and gamma emissions, which are the strongest, by 1 meter of concrete. Alpha and beta radiation emitters are usually only of concern when they enter the body by inhalation or ingestion (internal radiation), while gamma radiation can also be hazardous when outside of the body (external radiation).

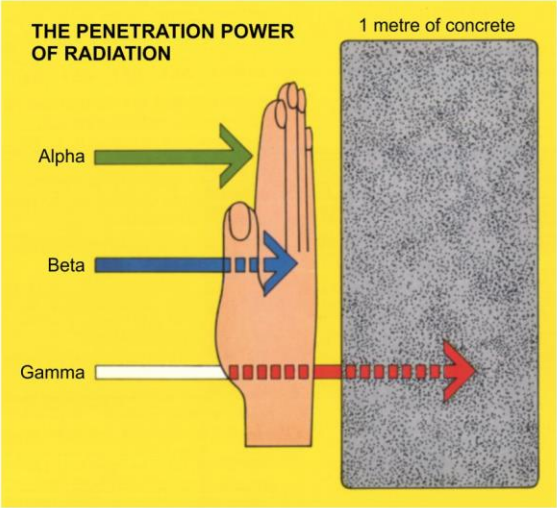


Illustration of the penetration power of alpha, beta and gamma radiation (Source Arcadis, 2015).

Radioactivity is usually measured in Becquerel, which equals one nuclear disintegration per second, while radiation exposure is evaluated by estimating the potential dose. The dose is the amount of radiation energy absorbed by the body. The dose received by any person depends on the level of radionuclides in the environment, their habits (incl. working habits) and time exposed to these levels. The unit used for measuring dose to humans is the Sievert (Sv) or millisievert (mSv).[70]

Radioactive materials, which occur naturally and where human activities increase the exposure of people to ionising radiation are called naturally occurring radioactive material (NORM). NORM exposure results from activities such as burning coal, making and using fertilisers, and oil and gas production. Uranium mining exposes those involved to NORM in the uranium orebody and naturally occurring radon in homes is also an example of NORM.

Uranium mines including mines where uranium is extracted as by-product to REE[71] will often have to consider if there are any issues with NORM. There are typically three pathways through which radiation exposure can occur in mining and processing:

- By external (gamma) radiation;
- By inhalation of radioactive dust; and
- By inhalation of radon decay products.

Figure 7.3 illustrates the primary pathways for radiation exposure in an open pit mining environment.

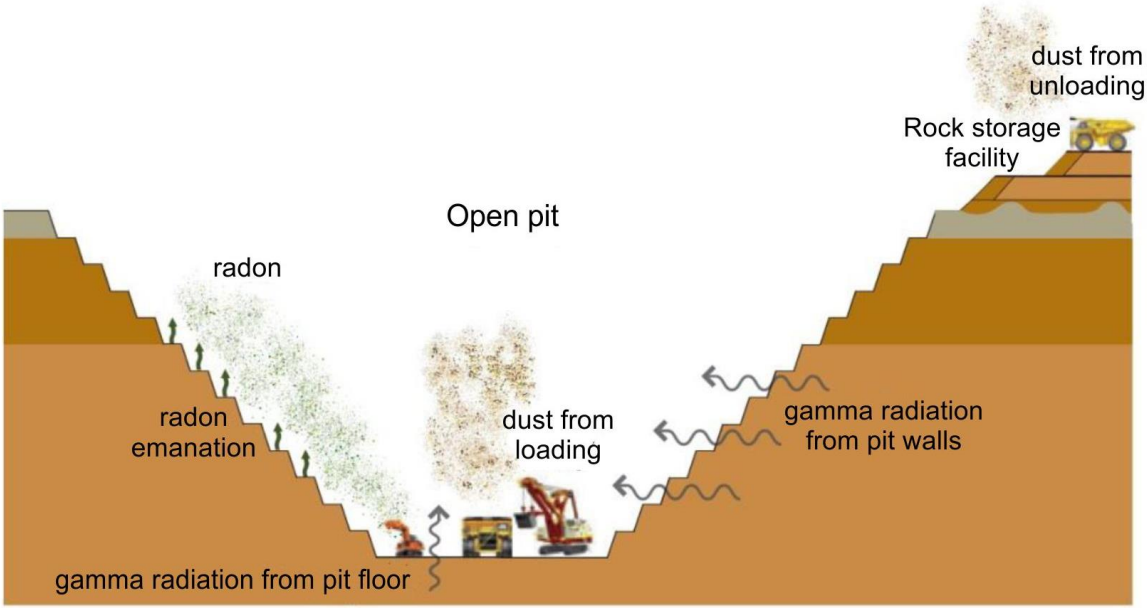


Figure 7.3 Open pit exposure pathways (DTU Nutec, 2015)

7.6.2.2 Potential Radiation Exposure Impacts

DTU Nutech prepared a report as a part of the impact assessment of potential impact of radiation on workers. This report reviewed the radiation baseline information and predicted the radiation

[70] Arcadis (2015)

[71] World Nuclear Association (2018)

doses to workers, based on the current Project design and standard limits as well as international experience.

Dose limits recommended by the ICRP (and adopted by the IAEA) for workers are summarised below:

- Annual exposure limit for a worker of 20 mSv; and
- Annual exposure limit for a member of the public 1 mSv

The responsibility for setting dose limits in Greenland will be shared between the Danish (for occupational health) and Greenlandic (for public health) Governments.

The mitigation measures designed in the following section have already been factored into the calculations summarised in Table 7.16. Based on the estimated residual doses anticipated for Project workers, it is clear that the radiation exposure levels are well below the internationally recognised dose limit. Radiation exposures for the pubic are addressed in Section 7.7.

Table 7.16 Estimated Radiation Exposure Doses for Workers

Worker Group	Pathway	Estimated residual dose per/annum (theoretical)
Mine Worker		
Mine pit - Ore (340 ppm U and 750 thorium)	External gamma radiation	3.8 mSv/annum[72].
Mine pit - Ore (340 ppm U and 750 thorium)	Radon decay products	0.03 mSv/annum with potential to rise to 0.4 mSv/annum in the event of low wind conditions
Mine pit - Ore (340 ppm U and 750 thorium)	Internal inhalation of dust during blasting events	1.0 mSv/annum
Total mine worker exposure	All pathways	5.4 mSv/annum with an average dose of below 2mSv/annum
Processing Plant Worker		
Crushing circuit	Radon and radon decay products	2 mSv/annum
Crushing circuit	Thoron	Minor
Crushing circuit	Internal inhalation of radioactive dust	1 mSv/annum
Concentrator	Gamma radiation	1 mSv/annum
Refinery	Gamma radiation	1 mSv/annum
Total Process Plant Worker Exposure	All pathways	4 mSv/annum total dose

Exposures for workers involved in the handling of uranium oxide transportation was also assessed by DTU Nutech (2018). Uranium oxide will be transported in solid form as the chemical uranium

[72] DTU Nutec (2018) note that this figure may be highly conservative given comparisons with reported conditions at higher grade uranium mining operations (e.g. Ranger mine in Australia has an average uranium grade of 2600 ppm where the average worker gamma radiation dose is 0.5 mSv/annum).

peroxide, UO_4. It will be packaged into 200L steel drums and strapped into 20 foot sea containers, with handling and transportation consistent with IAEA guidelines. Given these conditions, the assessment concluded that doses to transport workers are well below dose limits.

As can be seen in Table 7.17, the estimated average radiation exposure anticipated in the Project is within the norm across other projects.

Table 7.17 Comparison of annual average and maximum radiation doses for mine workers at various uranium operations (Source: DTU Nutec, 2018)

Mine and worker type	Total dose mSv/y (Avg.)	Total dose mSv/y (Max.)
Rössing pit field staff	2.5	n/a
Olympic Dam	1.7.	n/a
Beverley mine	<1	<8
Ranger mine worker	1.0	4.8
Canadian surface miners 2004	1.1	<5
Key Lake open pit mine	0.8	n/a
McArthur underground mine	1.2	n/a
Cigar Lake underground	0.16	n/a
Kvanefjeld mine worker	<2	5.4

'n/a'= not available

7.6.2.3 Mitigation / Enhancement Measures Related to Radiation Exposure

The following measures have been incorporated into the analysis summarised above and will be implemented by the Project:

- OH9 - All work clothing worn by employees will consist of long sleeve shirts and pants made from cotton and clothes will be laundered at the Plant to ensure no potentially radioactive materials are brought into private living accommodation;
- OH10 - A change room will be provided at both the concentrator and refinery sites;
- OH11 - A dust mask will be provided to employees where dust is a hazard;
- OH12 - All employees will undergo a regular (annual) medical exam. The medical exam will be performed by the Project medical clinic and will be financed by the Project;
- OH13 - Workers seeing an increase in dose will have the reasons for the high dose investigated by the Project's Radiation Protection Office and the worker will be moved to a different section of the operation if necessary. If the increase in dose is considered significant (by the Radiation Protection Officer) the worker will undergo a medical exam at the Company medical clinic;
- OH14 - Monitoring statistics related to dose exposures will be made available to the public through the Project's annual report and will shared directly with the GoG;

- OH15 - Areas where elevated radioactivity is expected will have engineering measures (shielding, distance) and procedural controls (exposure time, worker rotation and personal protective equipment (PPE)) to minimise radiation exposure;
- OH16 - The pit will be evacuated prior to blasting and until blast dust clouds have subsided;
- OH17 - Water trucks will be used to suppress dust across all areas of the mine;
- OH18 - Mine workers operating in the mine pit will be mainly located in air-conditioned cabins of mining equipment. The air filters in the cabins will be replaced on a regular basis;
- OH19 - A vehicle washing bay will be used to remove mine dust / dirt from all vehicles leaving the mining area; and
- OH20 - High ventilation levels will be maintained in the crushing building (turning air over 10 times per hour).

7.6.2.4 Residual Radiation Exposure Impact

Based on the assessment conducted by DTU Nutech (2018), the residual worker radiation exposure impact significance is considered to be low.

Table 7.18 Residual Occupational Health and Safety Impacts Summary

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Risk of Accidents	Construction Operations Closure	High	OH1, OH2, OH3, OH4, OH5, OH6, OH7, OH8	Unlikely	Moderate	Moderate
Radiation Exposure	Construction Operations Closure	Moderate	OH9, OH10, OH11, OH12, OH13, OH14, OH15, OH16, OH17, OH18, OH19, OH20	Unlikely	Minor	Low

7.7 Community Health, Safety and Security

7.7.1 Dust and Air Quality (health impact)

The conditions related to Community health and safety in the SIA is the description outlined by GML. The relevant authorities, including the authorities responsible for health and safety etc., will set terms in relevant subsequent licences and/or approvals and therefore decide upon final approvals of the activities.

7.7.1.1 Project Activities Affecting Dust and Air Quality

During the construction phase, particulate matter (dust) will be generated through site preparation for mining and supporting activities, including land clearing, topsoil removal, road grading, material loading, hauling, travelling on unpaved roads and wind erosion from exposed areas. Air quality will also be impacted during construction by the use of diesel generators.

During the operations phase, dust and other pollutants will be generated through various mining activities. The operations phase will represent the worst period for dust and air quality impacts.

During closure, many emissions sources will no longer be present, with primary sources being vehicle movements, maintenance of the tailings facility and power plants.

7.7.1.2 Potential Dust and Air Quality Impacts

ERM (formerly Pacific Environment Limited (PEL)) conducted an assessment of the dust and air quality impacts anticipated from the Project. This assessment was most recently updated in 2018[73]. The criteria against which impacts were assessed are detailed in ERM (2018) and represent a summary of relevant air quality criteria from around the world. Air quality modelling was conducted for more than fifty sensitive receptors (see Figure 7.4), of which the following are relevant to this SIA:

- Summer houses in Ilua Valley;
- Two accommodation village options;
- Four receptors in Narsaq; and
- The Ilua Valley farm.

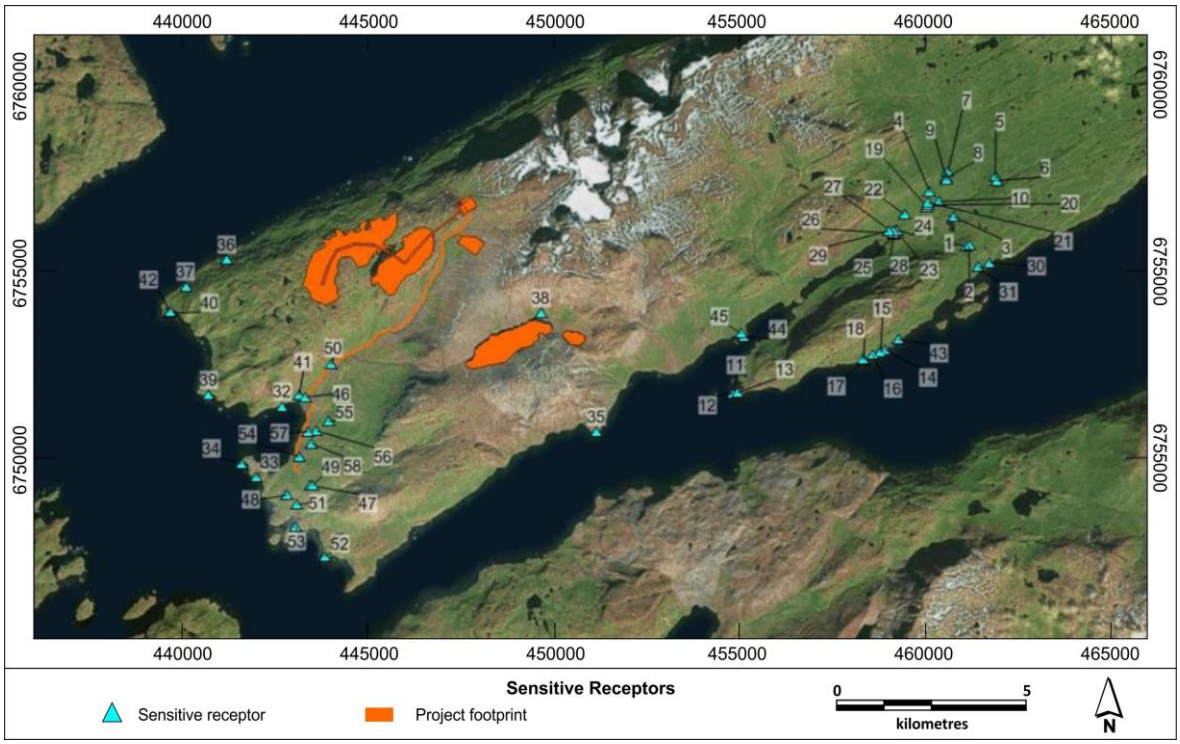


Figure 7.4 Location of Nearest Sensitive Receptors for Air Quality Modelling (Source: ERM, 2018)

Baseline air quality data was generated from monitoring results gathered by GME from air quality monitoring stations located at the Ilua Valley farm, Narsaq Town and Narsaq Point.

[73] ERM (2018)

For the air quality impact modelling, ERM used a suite of tools including CALMET to combine surface meteorological station data to generate three dimensional fields for a representative year (2012) and CALPUFF for dispersion modelling.

Based on the modelling, for total suspended particles (TSP), the highest TSP average concentration (including background levels) is predicted to be at Narsaq town, with a value of 19.1 µg/m3. This remains well below the 60µg/m3 assessment criterion. The maximum 24-hour concentration is also predicted to be at the Narsaq receptor with a value of 26.3µg/m3, well below the 120 µg/m3 criterion (as illustrated in Figure 7.5).

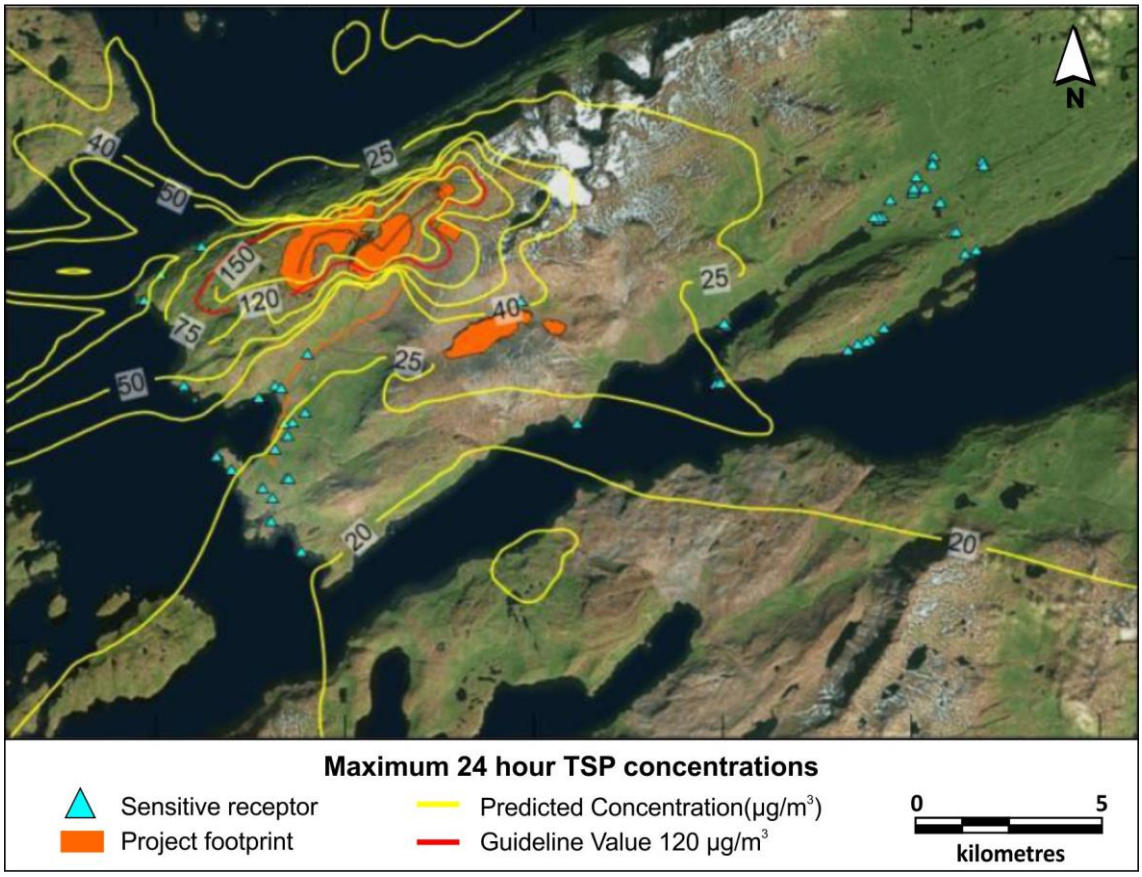


Figure 7.5 Maximum 24 Hour TSP Concentration (including Background) (Source: ERM, 2018)

While TSP levels represent the atmospheric condition, the indicators more relevant to potential health impacts are PM2.5 and PM10. These are the inhalable particulate matter (PM) which are small enough to penetrate the thoracic region of the respiratory system. The health effects attributed to inhalable PM include:

- Respiratory and cardiovascular morbidity, such as aggravation of asthma, respiratory symptoms and an increase in hospital admissions; and
- Mortality from cardiovascular and respiratory diseases and from lung cancer[74].

While both excessive exposure of PM2.5 and PM10 can generate health impacts, PM2.5 is typically considered a higher risk due to its smaller particle size. Susceptible groups including those with

[74] WHO (2013)

pre-existing lung or heart disease, as well as elderly people and children are considered more vulnerable to PM impacts.

The air quality modelling results for the operations phase presented in Table 7.19 indicate the predicted air quality (in terms of PM10 and PM2.5) combining both the background level atmospheric conditions and the emissions predicted from the Project. The results have been collated for the sensitive human receptor sites (as defined on Figure 7.4). The results are clearly significantly below the assessment limit criterion established in the ERM (2018) study indicating no adverse health impacts should be anticipated from particulate matter. Air quality modelling for the construction phase is made challenging by the intermittent activity levels and emissions sources. Qualitative assessments undertaken by ERM (2018) indicate even that while short-term dust levels may be higher during Construction, levels will remain well below assessment criteria which are protective of human health.

Table 7.19 Air Quality Modelling Results including Background Levels

ID	Name of Sensitive Receptor	PM10		PM2.5	
		Annual µg/m³	24-Hr µg/m³	Annual µg/m³	24-Hr µg/m³
47	Accommodation village Option 1	9.4	13.0	3.5	4.9
48	Narsaq	9.4	13.4	3.6	5.5
49	Accommodation village Option 2	9.4	13.0	3.5	4.9
50	Ilua Valley Farm	9.8	15.7	3.7	6.2
51	Narsaq Town	9.4	12.6	3.5	5.1
52	Narsaq Point	9.3	10.7	3.5	4.3
53	Narsaq Town	9.3	11.9	3.5	4.8
54	Summer house 1	9.6	13.9	3.6	6.0
55	Summer house 2	9.7	13.3	3.7	5.4
56	Summer house 3	9.7	13.5	3.7	5.7
57	Summer house 4	9.7	14.1	3.7	6.1
58	Summer house 5	9.6	13.4	3.6	5.7
Assessment Limit Criterion		40	50	10	15

Air quality modelling was also conducted to assess the concentration of oxides of nitrogen and to sulfur dioxide. Elevated exposure to sulfur dioxide and oxides of nitrogen can lead to respiratory symptoms. The results generated by ERM (2018) indicate air quality levels well below the assessment limit criterion in all sensitive receptors for these gases, indicating no significant impact to human health as a result of Project activity.

7.7.1.3 Mitigation / Enhancement Measures Related to Dust and Air Quality Impacts

GML has developed a Dust Control Plan (GML 2015c) which will include a management plan with dust suppressing activities that will be implemented during operations. Mitigation measures include:

- CH1 - Wetting of rock stockpiles, concentrates and waste materials with water sprinkler systems (summer) with any excess water captured for recycling;
- CH2 - Wetting of haul roads with water spray trucks (summer);
- CH3 - Salting of haul roads to melt ice and snow from the roads. The salt can also increase surface moisture by extracting moisture from the atmosphere (winter);
- CH4 - Setting appropriate vehicle speed limits, regular grading and maintenance;

The dust generation from mining activities is expected to be reduced considerably and the dust concentration and deposition significantly lower than the modelled values.

Air quality and GHG mitigation measures include:

- CH5 - Using vehicles and equipment with energy efficiency technologies to minimize emissions rates; and
- CH6 - Maintaining power plant, vehicles and other fuel powered equipment in accordance with manufacture's specifications to minimize on emissions.

7.7.1.4 Residual Dust and Air Quality Impacts

Based on the modelling results and the additional mitigation measures described above, the residual health impacts associated with dust and air quality are considered to be low across all phases of the Project.

7.7.2 Noise Exposure

7.7.2.1 Project Activities Affecting Noise Exposure

During the construction phase, significant noise will be generated by:

- Mobile equipment in connection with excavation and construction of the Port, the access roads and pipelines, processing plants and mine area facilities and the pre-stripping of the pit area;
- Drilling and blasting in the port and mine areas;
- Transport of supplies and machinery from the Port to the Plant and the mine area; and
- Maritime transport and vessels at the wharf.

During the operations phase, the principal noise sources will be in and around the:

- Mine area (pit, haul roads, processing plants and power plant);
- Access roads connecting the mine area and Port;
- Port area.

7.7.2.2 Potential Noise Exposure Impacts

Orbicon (2015) conducted a noise impact assessment for the operational phase of the Project. Greenland has not formally adopted guidelines or regulations on noise from industry and as such, Danish noise regulations and guidelines were used as the basis of the Orbicon assessment. Danish

recommended noise limits are summarised in Table 7.20 and IFC EHS guideline[75] values have also been included for reference. It should be noted that the IFC guidelines are less stringent than the Danish regulations.

Table 7.20 Danish and IFC recommended noise limits for noise impacts for companies

Type of Area	Monday – Friday 7am – 6pm Saturday 7am – 2pm dB(A)	Monday – Friday 6pm – 10pm Saturday 2pm – 10pm Sunday and Holidays 7am – 10pm dB(A)	All days 10pm – 7am dB(A)
Business and industrial areas	70	70	70
Business and industrial areas with prohibition of disturbing businesses	60	60	60
Areas with mixed residential and business development, city centre	55	45	40
Multi-story residential areas	50	45	40
Residential areas for open and low housing development	45	40	35
Summer cottage areas and publicly accessible recreation areas	40	35	35
IFC EHS Guidelines residential, institutional and educational	55	55	45

The average background sound level of Narsaq and surrounds, prior to the development of the Project, was evaluated to be 30dB(A). Noise modelling undertaken by Orbicon assessed the noise generated from three Project areas: the mine pit, haul road and process plants; the main access road; and the port area. Detailed noise modelling results can be found in the EIA and in the Orbicon (2015) report. In this section, the implications for community health impacts due to noise are considered for the nearest sensitive receptors to each noise source. The nearest sensitive receptors are the social receptors who are closest to the noise source and will have the largest noise exposure. By considering the nearest social receptor, it can be understood that all more distant social receptors experience a lower level noise exposure. The nearest social receptors include:

- Summer houses (nine although some appear derelict) along Ilua Valley;

[75] IFC (2007)

- Farm located in Ilua Valley; and
- Houses on the southern and western sides of Narsaq closest to the Port

The farm located in Ilua Valley has not been specifically assessed (although the results can be inferred from the summer house analysis) as this property will be acquired by the Project, as described in Section 7.4.

The results of the noise modelling can be in seen in the following figures. Figure 7.6 illustrates the noise load along the access road in closest proximity to the summer houses. Note, this would be the closest proximity to the farm located in the Ilua Valley. The modelling indicates that noise levels in the summer houses would be between 35-40 dB(A). While this exceeds the Danish recommendations for noise levels at summer cottages, it remains well below the international standard established by the IFC EHS Guidelines.

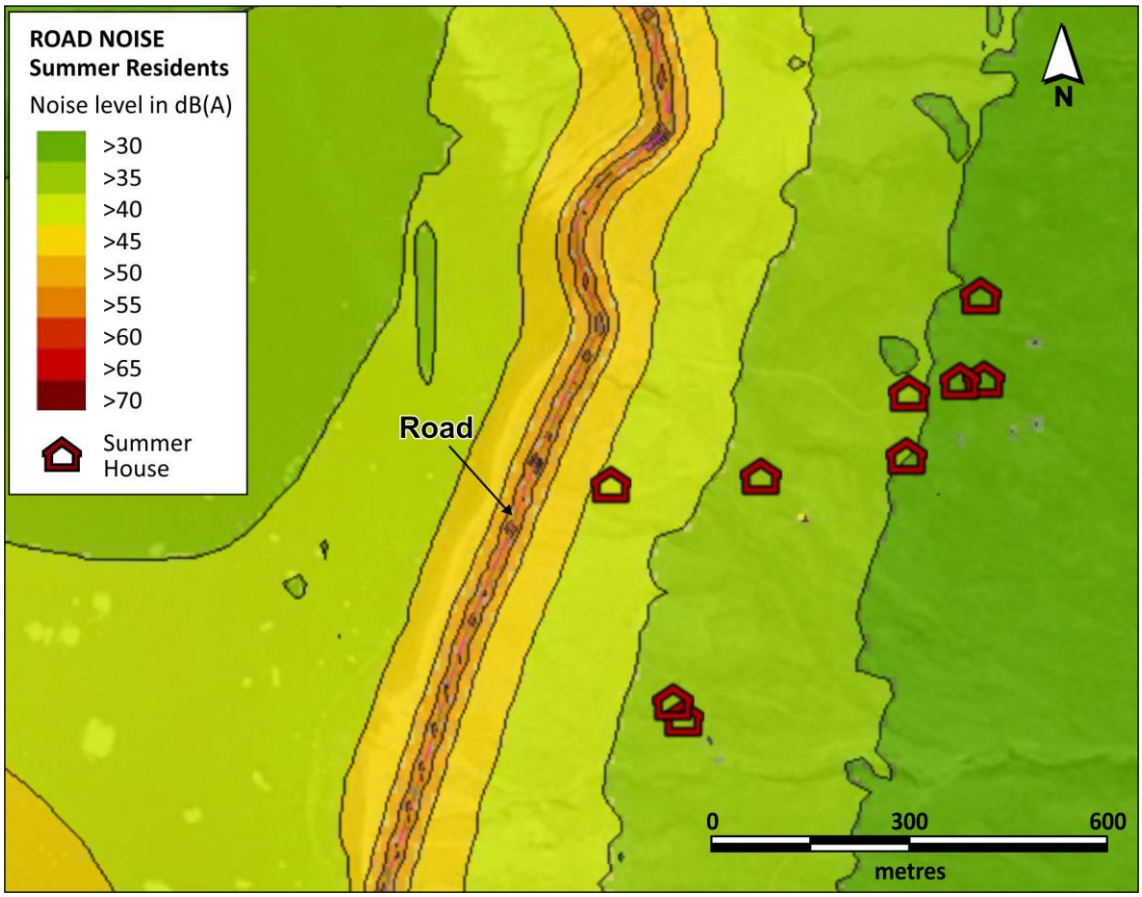


Figure 7.6 Noise Load Along the Access Road in Proximity to Summer Houses (Source, Orbicon, 2015)

Noise modelling was conducted in the port area for the operation phase, as illustrated in Figure 7.7. From this assessment it can be seen that the noise level during operations does not exceed an annual noise load of 40 dB(A) in the Narsaq houses located closest to the Port (and therefore experiencing the largest noise exposure). Under the Danish guidelines, these noise levels are below the requirement for day, evening and night-time noise for city centres. It should be noted that periods of higher noise will be experienced in Narsaq during the construction period when rams are being installed at the Port. This is not expected to exceed 4 months and the noise level will remain below 70dB(A).

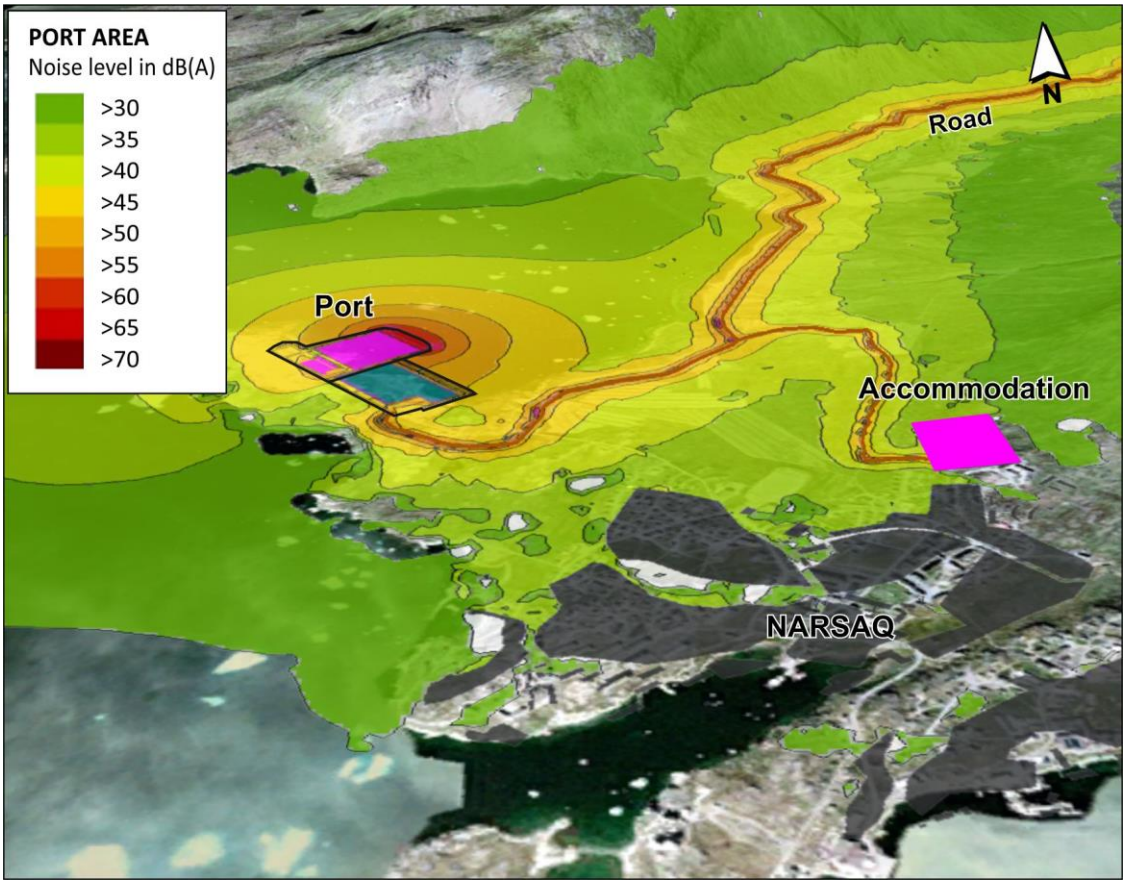


Figure 7.7 Noise Modelling Results for Operations Phase

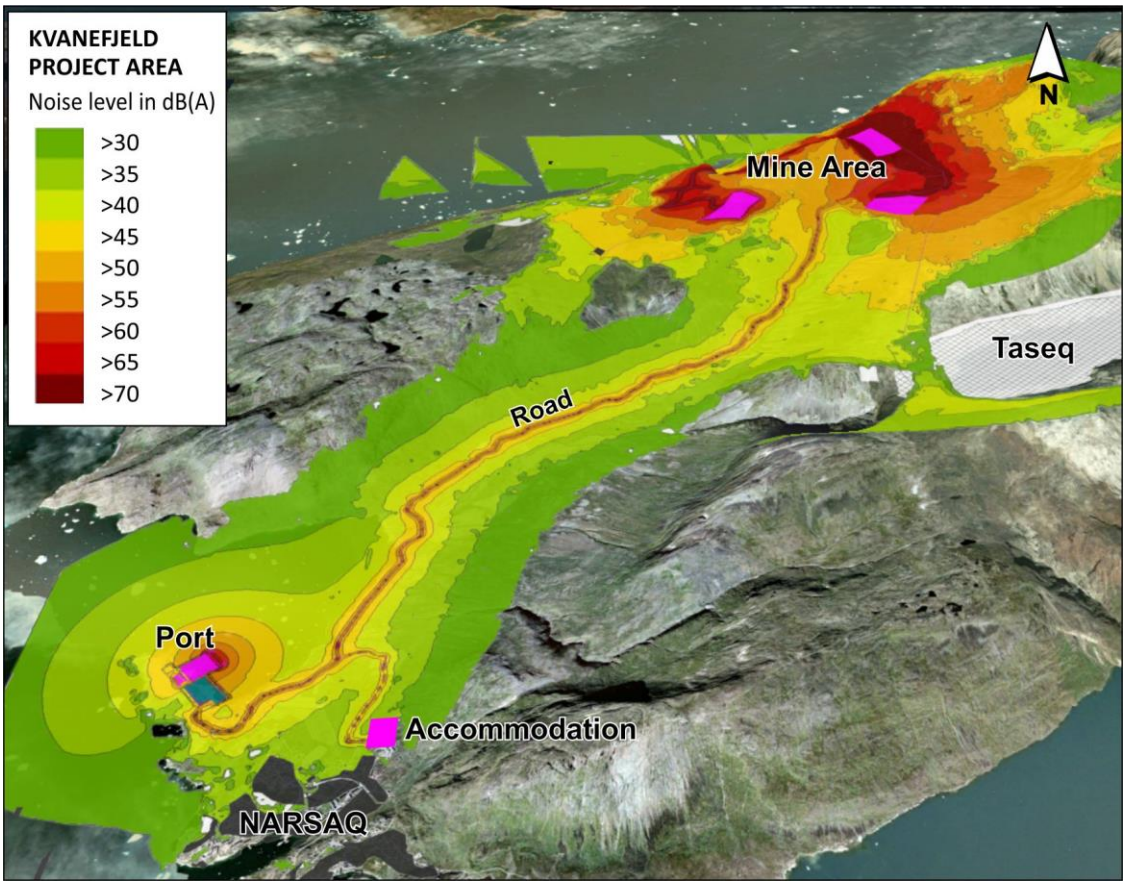


Figure 7.8 Complete Noise Map for the Project in 3D (Source: Orbicon, 2015)

Figure 7.8 summarises the results of the noise modelling for whole Project area. As can be seen, the noise envelope is constrained by topographic controls, ensuring that noise impacts will not be experienced beyond the Ilua Valley.

7.7.2.3 Mitigation / Enhancement Measures Related to Noise Exposure

While the noise levels identified are acceptable under IFC EHS Guidelines, the following mitigation measures will also be implemented to further reduced noise impacts:

- CH7 - Noise monitoring will be conducted at the point of the nearest sensitive receptors (summerhouses and the southern / western edges of Narsaq) in addition to noise monitoring at Project facilities. The results of monitoring will be shared with Narsaq stakeholders through ongoing engagement forums;
- CH8 - High noise activities during the construction of the Port will be timed to minimise disruption to households and educational institutions;
- CH9 - Opportunities to reduce noise generation through engineering or noise attenuative measures will be investigated as part of the detailed engineering conducted prior to Project construction; and
- CH10 - GML will establish a community grievance mechanism whereby residents and affected stakeholders can share concerns or grievances (anonymously if they choose) to which Project management will respond. This is described in further detail in Section 9.

7.7.2.4 Residual Noise Exposure Impacts

On the basis of the modelling conducted by Orbicon (2015), the residual noise exposure impacts are considered to be moderate in the construction phase (in Narsaq only) and low in the operation phase.

7.7.3 Radiation Exposure (health impact)

7.7.3.1 Project Activities Affecting Radiation Exposure

The development of the Project has the potential to release radioactivity, which has the potential to affect human health.

7.7.3.2 Potential Radiation Exposure Impacts

Arcadis (2018) has undertaken a detailed assessment of potential radiation exposure for both ecological and human receptors in relation to the Project. The results of the ecological assessment are summarised in the EIA, and the human health assessment is addressed in this document. The assessment considered exposure pathways for two categories of human receptors: town residents and visitors to the area, across three age groups: a toddler, a child and an adult. Exposure pathways which were considered included inhalation, consumption of water and food from local origins, radon and external exposure (gamma). For the purposes of the assessment, a “visitor” was assumed to have a diet similar to the residents, except that he or she would spend a limited amount of time (two weeks a year) on site.

The assessment considered both the types of foods consumed (drawing on both Greenlandic and Canadian Inuit datasets), and the source location of traditional foods. A large proportion of the Narsaq population use the Project area and Ilua Valley for recreational activities, including fishing, hunting of ptarmigan, hare and seal, collection of berries, and hiking / walking / running. These activities were factored into the assessment.

In order to conduct the assessment, a detailed evaluation of the baseline condition was conducted. Natural occurring radionuclides such as uranium and thorium are present in all soils and rocks. Over time natural processes such as glaciation, wind and water erosion have dispersed uranium and thorium (from the Kvanefjeld deposit) into the Ilua Valley and Narsaq town. Baseline radiological dose doses for human receptors which were used to inform the assessment are summarised in Table 7.21. It is important to note, these baseline conditions represent the current situation, in the absence of the development of the Project.

Table 7.21 Estimated Radiological Doses for Human Receptors - Baseline Conditions (Arcadis, 2018)

Receptor	Dose (mSv/y)					
	Inhalation	Ingestion	Radon	Thoron	Gamma	Total
Adult resident	0.008	1.7	6.6	0.093	0.30	8.7
Child resident	0.014	2.9	6.6	0.093	0.34	9.9
Toddler resident	0.014	3.4	6.6	0.093	0.38	10.5
Visitor	0.0003	0.064	0.36		0.094	0.52

The studies concluded that baseline exposure of town residents through food ingestion and radon / thoron inhalation were between 8-10 mSv/y, with radon exposure comprising 70% of this exposure. For perspective, the background dose in Narsaq is higher than the global average but considered to in the “low range” in most classification systems.

The activities which will be undertaken by the Project have the potential to add to the baseline radiological exposures in the community. The modelling focussed on the operations phase as it will be the largest contributor to radiological exposure. Details of the types of activity and their potential contribution to the environment and human health can be found in Arcadis (2018). Based on these assessments, the incremental doses for human receptors attributed to the Project were calculated, as summarised in Table 7.22. The incremental doses recorded below are well below the dose benchmark for members of the public of 1mSv/y. This indicates that all of the local foods will be safe to eat and there will be negligible change in the exposure from the consumption of traditional foods (e.g. seal and seabirds). .

Table 7.22 Estimated Radiological Dose for Human Receptors - Project Increment

Receptor	Dose (mSv/y)			
	Inhalation	Ingestion	Radon	Total
Adult resident	0.0002	0.057	0.036	0.09
Child resident	0.0004	0.087	0.036	0.12
Toddler resident	0.0004	0.10	0.036	0.14
Adult visitor	9×10^{-5}	0.002	0.002	0.004

7.7.3.3 Mitigations / Enhancement Measures Related to Radiation Exposure

Measures to mitigate both the Project's contribution to radiological exposure and the background exposure levels include:

- CH11 - Implementation of the dust control measures in GML's Dust Control Plan;
- CH12 - Monitoring of radon and gamma radiation levels in Narsaq, and at the nearest sensitive receptors around the Project;
- CH13 - Engagement with Greenland's Ministry of Health to better understand radon exposure in Narsaq and to help residents understand how they can improve airflow in their homes to reduce this exposure.

7.7.3.4 Residual Radiation Exposure Impacts

The residual Project induced radiation exposure impact significance in the operations phase is considered to be low.

7.7.4 Traffic Safety

7.7.4.1 Project Activities Affecting Traffic Safety

The development of the Project will require the upgrading of the existing access road / track from Tunu Peninsula at Narsap Ilua (location of the Port) to the mine area and the development of a new road from the mine area to the TSF. The access road will be accessible to the public along the valley floor. Access restrictions will apply as the access road gain altitude close to the mining area.

7.7.4.2 Potential Traffic Safety Impacts

Estimates of traffic levels along the access road for the operations phase were completed by Orbicon (2015) to inform the Project's noise assessment. The results are summarised in Table 7.23. The daily average represents the average conditions throughout the year, excluding road maintenance equipment which was not estimated. Larger numbers of vehicles will use the access road when ships are unloading, estimated to be approximately 10% of the year. During these periods, the worst case scenario (maximum daily traffic) will be seen in winter and is estimated to consist of 324 vehicle movements per day.

Table 7.23 Average and Maximum Daily Traffic on the Access Road

	Heavy vehicles (including buses)	Light vehicles	Total
Daily Average Vehicle Movements	110	100	210
Maximum Daily Vehicle Movements	174	150	324

While there is no baseline data for the use of the current access track, it is estimated that the average daily use would not exceed 20 vehicles in summer and this would reduce further in the winter months. In this context, the traffic volume anticipated from the development of the Project will potentially increase the traffic on the road by an order of magnitude or greater.

From a community safety perspective this has the potential to increase the traffic safety risk in the Ilua Valley. Increased use and an upgrading of the access road will potentially create a safety hazard between the summer houses, kayak tourism operations and areas of recreational value (berry picking, hiking, fishing etc), and Narsap Ilua. Given the low level of traffic in Narsaq and along the existing track in particular, Narsaq residents may be more vulnerable to traffic safety risks due to their lack of experience with higher volumes of traffic.

7.7.4.3 Mitigation / Enhancement Measures Related to Traffic Safety

To reduce this community safety risk, the following measures will be implemented:

- CH14 - Speed restrictions will apply for all vehicles using the access road;
- CH15 - GML will investigate options for small convoys to be used in heavy traffic conditions; and
- CH16 - Community traffic safety campaigns will be coordinated with the town of Narsaq to increase traffic understanding. Specific programs will be coordinated with the kindergartens and primary schools to minimise the risk to young children.

7.7.4.4 Residual Traffic Safety Impacts

Following the implementation of the mitigation measures defined above, the residual traffic safety impact during the operations phase is considered to be high. No traffic assessment was completed for the construction phase due to the variability of the transport requirements. The same mitigation measures will be applied in both the Construction and Operations Phases.

7.7.5 Communicable Diseases

7.7.5.1 Project Activities Affecting Communicable Diseases

The introduction of an international workforce to a relatively remote regional centre has the potential to generate communicable disease impacts. Relevant diseases can include;

- Sexually transmitted diseases;
- Tuberculosis and respiratory diseases which can be transmitted in close living conditions; and
- Communicable diseases previously uncommon to the region.

7.7.5.2 Potential Communicable Disease Impacts

Development of the Project will require the recruitment of close to 1,200 workers during peak Construction and a steady state workforce of over 700 during Operations. As noted in previous sections, a significant proportion of the labour will be either foreign or will primarily reside outside of Narsaq. The nature of mining Projects also tends to imply that a significant majority of the workforce will be male. While the construction workforce will largely be segregated away from the town of Narsaq, they will still interact with local communities as they commute through Narsarsuaq. The operations workforce will be earning comparatively good salaries and will be living (during their rotation) in close proximity to Narsaq town (on the edge of the town). The combination of these factors could generate the following potential communicable disease impacts:

- Increased transmission of STDs – The introduction of a large primarily male workforce, with good salaries, into Narsaq has the potential to generate sexual relationships between mine workers and the host community, and this brings an associated risk of increased STD prevalence. Women in their late teens, early twenties are likely to be most vulnerable to this impact. STDs are already prevalent in Greenland (although notably Narsaq recorded a decrease in STD prevalence between 2009 – 2013 in contrast to Nanortalik and Qaqortoq) among young people in particular. Importantly, to date, HIV/AIDS levels remain low and have primarily affected an older cohort. The introduction of a foreign workforce or a workforce which has worked outside of Greenland, and potentially been exposed to HIV, has the potential to introduce HIV prevalence into the community amongst the younger cohort; and
- Increased transmission of TB – Greenland already experiences a heavy burden of disease from TB, considerably exceeding levels seen in Europe. TB can spread through close and cramped living conditions, and in the absence of effective controls, worker accommodation camps have the potential to increase TB levels within the workforce, which can spread into the community when workers return to their homes.

7.7.5.3 Mitigation / Enhancement Measures related to Communicable Disease Impacts

The potential impacts described above are largely common to most major infrastructure and resource extraction projects. Drawing on this experience, the following measures will be implemented to reduce these impacts:

- CH17 - Construction workers will be largely segregated from the town of Narsaq, minimising opportunities for interaction;
- CH18 - Operations workers will live within a security-controlled environment where non-workers will not be allowed to stay overnight;
- CH19 - All employees, contractors and visitors will be required to sign a Code of Conduct requiring workers to engage with community members in respectful, socially beneficial manners. This policy will apply to workers from the time they land in Greenland (in Narsarsuaq or Qaqortoq) through to their departure;
- GML will provide and will require its contractors to:
    - CH20 - Conduct awareness raising exercises with their workforce on sexually transmitted diseases, including HIV/AIDS;

- CH21 - Provide condoms for workers;
- CH22 - Provide STD (including HIV) diagnosis and testing at the work place clinic, and provide access to counselling, and referral services as necessary;
- CH23 - Monitor health outcomes within the workforce and engage with health service providers in Narsaq and Kommune Kujalleq to share data and develop campaigns to change behaviours as necessary.

- CH24 - GML will work with the Narsaq health service to develop public awareness campaigns on STD transmission and safe sex initiatives;
- CH25 - All employees (regardless of nationality) will be subject to pre-employment medical screens and regular health checks once employed. The medical screening will specifically target the presence of TB and potential candidates will receive treatment for TB before being offered work on the Project. STD prevalence will not be screened at pre-employment medicals; and
- CH26 - The living conditions provided at the temporary construction camp and the Village will be designed to ensure adequate space is available for all workers to reduce the risk of TB transmission within the workforce (which can then spread into the community).

7.7.5.4 Residual Communicable Disease Impact

Following the implementation of the mitigation measures defined above, the residual communicable disease impact significance is considered to be high in construction, moderate in operations and low in closure.

7.7.6 Non-communicable Diseases

7.7.6.1 Project Activities Affecting Non-Communicable Diseases

Through increasing employment and wage levels in Narsaq and surrounds, combined with the provision of catering by the company, households and individuals may experience a rapid change in their dietary intake which has potential consequences for the prevalence of non-communicable diseases. The move away from traditional, higher energy lifestyles towards more sedentary working environments can also influence the level of non-communicable diseases.

Greenland already experiences increasing levels of non-communicable disease, and the development of the Project may have the potential to reverse some of these trends through encouraging good health behaviours (e.g. no-smoking work environment and zero tolerance for drugs and alcohol).

7.7.6.2 Potential Non-Communicable Disease Impacts

As highlighted above, the Project has the potential to generate an array of non-communicable disease impacts, both positive and negative. Taking each in turn:

- Increasing levels of cardiovascular disease, obesity and type 2 diabetes – These diseases can increase as a result of a less active lifestyle and a more calorie dense food supply. While the foreign workforce will have worked on equivalent sites in the past, it is highly likely that for some of the Greenlandic workforce, working for the Project will be the first time they have access to catered food supplies. In addition, the level of physical activity required in

their jobs will potentially be lower than that which is required in their current lifestyle. Greenland Inuit have already demonstrated a correlation between obesity and social position for both men and women.

- Changes to lung cancer prevalence – Greenland Inuit have been shown to be at extremely high risk for lung cancers, some of which is attributed to smoking. The introduction of the Project to Narsaq and Kommune Kujalleq more broadly is likely to generate additional and likely surplus income in the community. It is common in other Projects for this surplus to be expended on luxury items, including cigarettes. This tendency can, potentially, be counter-acted by strict no-smoking policies being applied by the Company.

7.7.6.3 Mitigation / Enhancement Measures Related to Non-Communicable Diseases

The following mitigation measures will be undertaken by GML to mitigate non-communicable disease impacts:

- CH27 - A strict no-smoking policy will be implemented in all GML office buildings and enclosed spaces. Workers will be encouraged to give up smoking as appropriate with the Company medical clinic providing guidance on "how to quit" campaigns;
- CH28 - Random drug and alcohol tests will be implemented by the Project with zero tolerance for workers, contractors and visitors who fail these tests;
- CH29 - Workers will be encouraged to participate in outdoor exercise and "toolbox talks"[76] will be developed to facilitate worker's passing these messages onto their families when they go on break;
- CH30 - Workforce accommodation (both the temporary construction camp and the Village) will include a gymnasium and other areas for physical activity;
- CH31 - Workers will be encouraged to participate in sporting competitions in Narsaq and to support the development of new competitions as appropriate;
- CH32 - Catering service providers for the workforce accommodation will apply their knowledge to define appropriate serving sizes for worker's meals and to balance the workplace diet; and
- CH33 - The general store located in the Village will be stocked with healthy alternative snacks and will seek to stock local foods where possible.

7.7.6.4 Residual Non-Communicable Disease Impact

Following the implementation of the mitigation measures identified above, the significance of the residual non-communicable disease impact is considered to be moderate in construction, high in operations and low in closure.

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[76] Toolbox talks are informal meetings which are conducted at the beginning of a working shift or working day where a specific issue is raised and discussed. These discussions are planned and typically focus on safety and occupational health messages to maintain and safe and healthy workplace. The person leading the toolbox talk often alternates so all employees become involved in the safety and health culture of the company. Toolbox talk topics will include discussion about activities related to non-communicable diseases (e.g. smoking, alcohol consumption, exercise and fitness etc) and about specific non-communicable diseases (e.g. heart disease, obesity, cancer and diabetes).

7.7.7 Social and Emotional Well-Being

7.7.7.1 Project Activities Affecting Social and Emotional Well-Being

Social and emotional well-being comprises a range of health concerns, from drug and alcohol abuse, to depression and suicide. As noted in Section 6.5, social and emotional well-being is a significant issue in Greenlandic society, in particular for vulnerable groups such as young unemployed men and women. The development of the Project has the potential to positively influence the social and emotional well-being of the town of Narsaq through offering new opportunities and a sense of purpose for younger generations.

7.7.7.2 Potential Social and Emotional Well-Being Impacts

The development of the Project could potentially generate the following impacts:

- An increased sense of optimism and opportunity in Narsaq and Kommune Kujalleq – Narsaq town has been experiencing a declining population and has high levels of youth unemployment. While there are multiple factors influencing the well-being of Narsaq (and Kommune Kujalleq) society, a lack of job opportunities is likely to have influenced the current sense of reduced morale. The development of the Project will generate new opportunities for both young (through training programs) and older generations resident in Kommune Kujalleq, including those residing in settlements;
- Increased incentives to reduce drug and alcohol consumption – In order to be eligible for employment on the Project, candidates will need to demonstrate that they are drug free. Once employed by the Project (either directly or as a contractor) random drug and alcohol tests will be implemented, and employees will need to demonstrate a zero recording for both substances in order to be allowed to continue working for the Project. For those who are currently struggling with drug and alcohol abuse, there remains a major challenge to overcome to meet these requirements, however the incentive of a potential job could be enough to reduce the number of young people who take up these activities;
- Development of new role models – The introduction of new economic activity and new opportunities associated with it has the potential to generate new local role models for younger citizens. While only one factor influencing depression and suicidal behaviours, this may help to encourage some people in life; and
- Increased energy and activity in Narsaq – The development of the Project will naturally lead to increased vibrancy (and potentially increased diversity) within Narsaq. Such vibrancy might be able to help boost the interaction between community residents, especially in winter, potentially reducing the sense of isolation and depression felt by some in the community.

7.7.7.3 Mitigation / Enhancement Measures Related to Social and Emotional Well-Being

The following enhancement measures will be implemented by GML to further support improvements to social and emotional well-being in Narsaq and Kommune Kujalleq more broadly:

- CH34 - Engagement between the Company and social health providers in Narsaq and Kommune Kujalleq to deliver campaigns targeting mental health;

- CH35 - Human resources policies for the Project which specifically highlight non-tolerance of discrimination on the basis of sex, race, sexual orientation, disability, health condition, religion or belief, political affiliation, union membership or marital status;
- CH36 - Active promotion of successful Greenlandic employees and business partners as success stories which can be shared within the municipality and the country more broadly; and
- CH37 - Continuation of the settlement "road shows" which have been undertaken by GML in the past.

7.7.7.4 Residual Social and Emotional Well-Being Impact

Through the implementation of the enhancement measures outlined above, the residual social and emotional well-being impact significance is considered to be high positive during construction and operations.

Table 7.24 Residual Community Health, Safety and Security Impacts Summary

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post -mitigation Significance
Dust and Air Quality	Construction Operation Closure	Low	CH1, CH2, CH3, CH4, CH5, CH6	Unlikely	Negligible	Low
Noise Exposure	Construction	Moderate	CH7, CH8, CH10	Unlikely	Moderate	Moderate
	Operation	Low	CH7, CH9, CH10	Unlikely	Low	Low
Radiation Exposure	Operations	Low	CH11, CH12, CH13	Remote	Minor	Low
Traffic Safety	Operations	Very High	CH14, CH15, CH16	Unlikely	Major	High
Communicable Disease	Construction	Very High	CH17, CH19, CH20, CH21, CH22, CH23, CH24, CH25, CH26	Possible	Moderate	High
	Operations	High	CH18, CH19, Ch20, CH21, CH22, CH23, CH24, CH25, CH26	Unlikely	Moderate	Moderate
	Closure	Low	CH19, CH20, CH21, CH22, CH23, CH24, CH25	Remote	Moderate	Low
Non-Communicable Disease	Construction	High	CH27, CH28, CH29, CH30, CH31, CH32	Possible	Minor	Moderate
	Operations	Very High	CH27, CH28, CH29, CH30, CH31, CH32, CH33	Possible	Moderate	High
	Closure	Moderate	CH27, CH28, CH29, CH31	Remote	Minor	Low
Social and emotional well-being	Construction Operations	Moderate	CH34, CH35, CH36, CH37	Likely	Moderate	High

7.8 Social Structures and Community Life

7.8.1 In-migration

7.8.1.1 Project Activities Affecting In-migration

Project induced in-migration (referred to as in-migration from here on) is defined as the movement of people into an area in anticipation of, or in response to, economic opportunities associated with the development and / or operation of a new project (IFC, 2009). Most projects, to some extent, induce such in-migration for employment, as well as the range of economic opportunities that draw people to an area.

The level of in-migration generated by a project is dependent on a range of factors, including:

- Number of jobs available during construction and operation;
- The nature of the work force (FIFO vs residential);
- The scale of supporting economic and entrepreneurial activity induced;
- The ease of travel and relocation within the country; and
- The demand for economic opportunity (e.g. unemployment rates).

The development approach taken for the Project will naturally attenuate the tendency for in-migration for the following reasons:

- Use of a predominantly foreign workforce during construction and a predominance of fly-in fly-out workers in both construction and operation phases will reduce the incentive for families and friends to accompany workers by moving to Narsaq with them;
- The Kvanefjeld mineralisation is not appropriate for small-scale or artisanal mining (ASM) activity, and as such, is unlikely to attract ASM miners;
- The largely modular construction style being used during the construction phase will reduce the Project related demand for small construction enterprises in Greenland and Kommune Kujalleq particularly; and
- The use of a segregated temporary construction workers camp and permanent security-controlled worker's accommodation will restrict opportunities for "camp follower" enterprises to develop (e.g. prostitution; bars and restaurants etc).

Further to the in-migration attenuating Project factors identified above, Greenland presents another series of in-migration attenuating factors, namely:

- Geographic isolation and controls over immigration restrict the movement of foreign workers into Greenland without pre-arranged employment;
- The harsh weather conditions in winter limit the likelihood of squatter / temporary settlements being established by in-migrants.

7.8.1.2 Potential In-migration Impacts

Un-managed in-migration can lead to a range of impacts, including:

- Overloading of existing services, e.g. health, education, public infrastructure;

- Social tension between original residents and “new arrivals”; and
- Development of illegal or informal activities to cater to workforce and increased community demands (e.g. prostitution, bars and gambling dens);

These impacts commonly occur on mining projects in other locations, however for the reasons identified in Section 7.8.1.1, the likelihood of in-migration occurring at any significant scale is considered low for Kvanefjeld.

7.8.1.3 Mitigation / Enhancement Measures Related to In-migration

While significant in-migration is not anticipated, the following measures will be put in place to manage in-migration impacts if they occur:

- SO1 - Effective communication of the nature of employment opportunities available on the Project and the skills required to be eligible for the job; and
- SO2 - Engagement with Kommune Kujalleq to understand pressure placed on existing services and to develop a plan to reduce the pressure.

7.8.1.4 Residual In-migration Impacts

The residual in-migration impact significance is considered to be low across the Project phases.

7.8.2 Infrastructure, Services and Government Delivery Capacity

7.8.2.1 Project Activities Affecting Infrastructure, Service and Government Delivery Capacity

The development of the Project has the potential to increase the usage and / or demand for government services and infrastructure. Project activities which could affect this demand include:

- Increased number of foreign workers needing work visas;
- Increased population living in Narsaq (both as FIFO workers and permanent residents);
- Increased transportation requirements to transport workforce to and around Kommune Kujalleq;
- Increased demand for power;
- Increased municipal water demand;
- Generation of waste water;
- Generation of waste; and
- Development of part of the Tunu Peninsula into the Port.

7.8.2.2 Potential Infrastructure, Service and Government Delivery Capacity Impacts

The Project is expected to increase the population of Narsaq by 25% during the operations phase. Typically, this scale of population increase would have the potential to exceed the existing capacity of services in a town. However the scale of the impact in Narsaq is likely to be somewhat moderated by the current under-utilisation of some existing service and the establishment of Project specific facilities / services as necessary. Given these factors, the potential impacts to infrastructure, services and government delivery capacity include:

- Education facilities – Due to the high proportion of FIFO workers, the number of students living in Narsaq is not expected to rise significantly. To the extent that an increase in student number's is seen, this would likely to considered a positive impact as it would boost school enrolments;
- Health facilities – The Project will establish its own medical clinic which will treat Project workers. The clinic will be staffed with a full-time nurse with video link to an emergency doctor as required. Families of workers who move to Narsaq will likely make use of the existing health services in Narsaq, placing extra demand on those services. It is estimated that this could equate to up to 400 additional residents (calculated using an average household size of 2.2 (Poppel, 2011) for 328 workers), equating to an increase in public health service demand of approximately 25%;
- Municipal water supply – the Narsaq town water supply and treatment plant have sufficient spare capacity to support the anticipated growth of the town (NIRAS, 2011);
- Waste water disposal – The Project will treat its own waste water and will dispose of it through one of the existing disposal pipelines in Narsaq;
- Power demand – The Project will generate its own power and as such will be independent of Narsaq's power supply;
- Waste disposal – Waste generated by the Project will be transported, by the company, to Qaqortoq and incinerated;
- Police services – Increased population in Narsaq has the potential to generate additional crime, potentially increasing the demands on existing police services;
- Emergency Services -The Project will increase the level of housing stock in use in Narsaq, increasing both the population and the number of buildings in the community. The Project will install fire safety measures in all its facilities in line with standard industry practice and will have equipment capable of fighting fires as necessary. In the event that a fire or other emergency event were to occur in the community of Narsaq, GML would work with Narsaq town administrators and emergency service providers to provide relevant support where possible;
- Narsaq landfill – The development of the Port on the Tunu Peninsula will require the remediation of land currently use for disposal of animal carcasses and an alternative method / location for the disposal of carcasses will need to be identified. Given the concerns around the existing disposal methods, this is likely to be seen as a positive impact. The development of the Port may also impact the existing waste management centre located on the peninsula;
- Aviation and maritime services – The Project will rely on Narsarsuaq airport (or Qaqortoq as plans for the new airport develop). The Project will likely result in an increase in the number of air and maritime services required to serve Narsaq. The capacity of existing facilities is not expected to be a constraint to this expansion;
- Skilled staff – As highlighted in Section 7.3.4, there is a risk that skilled staff currently working as Government employees delivering key services (e.g. town administrators, teachers, nurses etc) may apply for jobs at Project. Their language skills and professional

experience are likely to make them good candidates for office-based roles and they will be considered in terms of merit along with all other Greenlandic candidates. This does, however, present a risk that the development of the population will lead to a resource shortage within local Government services; and

- Immigration services – The introduction of more than 700 new foreign workers during construction, and upwards of 300 foreign operations workers will place significant demand on the visa, residency and work permitting processes. Applications for residency and employment permits will be made through the Danish Agency for International Recruitment and Integration (SIRI). SIRI will process applications and Naalakkersuisut will participate as a hearing partner in this process. Visas will be applied for through the Danish Foreign Ministry.

7.8.2.3 Mitigation / Enhancement Measures Related to Infrastructure, Service and Government Delivery Capacity

Impacts to infrastructure, service and government delivery capacity will be mitigated through implementation of the following measures:

- SO3 - Engagement between GML and Kommune Kujalleq administrators in respect of the number of new residents anticipated as a result of the development of the Project. With this knowledge, the Kommune will be able to plan for service delivery requirements as necessary;
- SO4 - GML will engage with Greenland's Ministry of Health to determine how best to support the expansion of health services in Narsaq to meet increased demand during the operations phase;
- SO5 - Identification, in coordination with the town of Narsaq and Kommune Kujalleq administrators, of a new method / site for the disposal of animal carcasses and engagement over any modifications required to the existing waste management site;
- SO6 - The requirement for Project employees, contractors and visitors to comply with the company's Code of Conduct will reduce the risk of increased crime in the area. This will be further reinforced through the application of strict disciplinary measures for any employees or contractors found to be participating in behaviour contrary to the Code of Conduct, anti-social behaviour or illegal activities; and
- SO7 - GML will engage with SIRI to determine how to support the work and residency permitting process, and with the Danish Foreign Ministry to support visa issuing services and to streamline the process to the extent possible. The GoG will also be engaged given their primary role in the approval of work and residency permitting processes. The Project may also engage with the Ministry of Mineral Resources and Labour to establish a fast-track process for visa and permit issuance.

7.8.2.4 Residual Infrastructure, Service and Government Delivery Capacity Impacts

Following the implementation of the mitigation measures, and balancing the positive and negative potential impacts, the residual infrastructure, service and government delivery capacity impact during construction is considered low, and high for the operations phase (primarily due to anticipated impacts to health services).

7.8.3 Protection and Promotion of Traditional Knowledge

7.8.3.1 Project Activities Affecting the Protection and Promotion of Traditional Knowledge

The recruitment of a mining project workforce and an increased level of cash income in remote communities can have an impact on the maintenance of traditional values and practices. Traditional values can come under pressure from the increased influence of a cash-based economy, and the status attributed to individuals gaining higher incomes. However, traditional values can also benefit from increased focus from younger generations who see the value in protecting these value and practices in face of greater exposure to external influences.

7.8.3.2 Potential Protection and Promotion of Traditional Knowledge Impacts

Potential impacts can include:

- Reduction in time available to community members to maintain traditional activities (e.g. seal hunting and berry picking) due to their participation in full-time employment;
- Changes to traditional authority structures through the emergence of a younger income-earning elite; and
- Increased interest in Greenlandic traditions amongst younger generations as they become more exposed to external influences.

7.8.3.3 Mitigation / Enhancement Measures Related to Protection and Promotion of Traditional Knowledge

GML places very high importance on the protection and promotion of traditional knowledge in Narsaq, and Greenland more broadly, and will implement the following measures to support activities:

- SO8 - The working language of the Project will be English, however all safety, information, consultation and management documents will also be translated into Danish and Greenlandic to protect local language skills;
- SO9 - GML will take care to use the Greenlandic dialect spoken in Kommune Kujalleq when engaging with community members in community forums;
- EM4 – Development of promotional material showcasing role model Greenlandic employees;
- SO10 - Opportunities to support Greenlandic culture through coordination of community activities reinforcing culturally relevant practices (e.g. celebration of Greenlandic food, kayaking, seal hunting, berry picking etc) will be identified by GML;
- SO11 - Work rosters will be developed to ensure Greenlandic workers have the opportunity to return home on a regular basis and maintain their connection with family and traditions.

7.8.3.4 Residual Protection and Promotion of Traditional Knowledge Impacts

The residual impact to traditional knowledge is considered to be a moderate positive during the operations phase with no significant impact during either construction or closure.

7.8.4 Vulnerable groups and social issues

7.8.4.1 Project Activities Affecting Vulnerable Groups and Causing Social Issues

Three vulnerable groups were defined in the baseline section of this SIA (Section 6.9), namely:

- People experiencing mental disabilities or affected by drug and alcohol abuse;
- Households with no recent history of anyone having secured employment; and
- Unemployed young men.

Activities undertaken by the Project which have the potential to particularly impact these groups include:

- Local employment opportunities across all three phases of the Project;
- Training opportunities for Greenlandic citizens; and
- Increased income in Narsaq.

7.8.4.2 Potential Social Issues and Vulnerable Group Impacts

Typically, vulnerable groups defined in social impact assessments are groups expected to be more vulnerable to Project impacts. In this situation, the vulnerable groups which have been identified may actually stand to benefit from the Project because of the issues which make them vulnerable. For example, if a household with no recent experience of formal employment were able to secure employment either directly with the Project or indirectly in Narsaq, this has the potential to change the trajectory of the existing and following generation. It could act as a demonstration that the household can experience opportunities and that the future has the potential not to repeat the past. Likewise, the support for training opportunities in Narsaq, and the possibility of employment at the end of the training, may encourage more students to stay in school or to complete the Majoriaq courses to be eligible for vocational training.

This is not to suggest there won' be some additional adverse impacts which could affect these groups, in particular the potential for increased income to lead to an increase in drug and alcohol consumption in town, reinforcing existing social challenges.

7.8.4.3 Mitigation / Enhancement Measures Related to Vulnerable Groups and Social Issues

The following mitigation / enhancement measures will be implemented:

- EM4 – Development of promotional material showcasing role model Greenlandic employees;
- CH18 - All employees, contractors and visitors will be required to sign a Code of Conduct requiring workers to engage with community members in respectful, socially beneficial manners. This policy will apply to workers from the time they land in Greenland (in Narsarsuaq or Qaqortoq) through to their departure; and
- SO12 - Coordination with the Narsaq police to assess the presence of drugs in the community and to develop strategies targeting drug abuse in the community.

7.8.4.4 Residual Vulnerable Groups and Social Issue Impacts

It is challenging to predict how vulnerable groups will be affected by the Project. Based on the mitigation measures defined above, it is considered that the residual impact on vulnerable groups and social issues will be a low positive throughout all phases of the Project.

Table 7.25 Social Structures and Community Life Impact Summary

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions	Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
In-migration	Construction Operations Closure	Low	SO1, SO2	Unlikely	Minor	Low
Infrastructure, Service and Government Delivery Capacity	Construction Closure	Moderate	SO3, SO5, SO6, SO7	Unlikely	Minor	Low
	Operations	High	SO3, SO4, SO5, SO6, SO7	Possible	Moderate	High
Protection and Promotion of Traditional Knowledge	Operations	Low	SO8, SO9, SO10, SO11, EM4	Possible	Minor	Moderate
Vulnerable Groups and Social Issues	Construction Operations Closure	Low	SO12, EM4, CH18	Unlikely	Minor	Low

7.9 Cumulative Impacts

Cumulative impacts are defined as "impacts that result from the incremental impact, on areas or resources, used or directly impacted by the Project, from other existing, planned or reasonably defined developments at the time the risks and impacts assessment process is conducted" (IFC, 2012). The assessment of cumulative impacts is often made challenging by a lack of detailed information about other developments and for this reason, this section applies a simplified impact assessment structure. In this section, the potential "other activities" which have been considered are defined, and an indication of the potential scale and direction of cumulative impacts is provided in narrative format.

At the time of completion of the SIA, the following existing, planned or reasonably defined developments were identified which may generate cumulative impacts on resources or areas affected by the Project:

- Aappaluttoq Ruby Mine – located 150km south of Nuuk and east of the fishing village of Qeqertarsuatsiaat, production at Aaappaluttoq commenced in early 2017. The mine is

expected to operate for at least ten years and LNS (the owners) expect to employ between 80 to 90 workers at any given time, of whom 70% will be Greenlandic[77].

- Tanbreez Mining Project - located close to Killavaat Alannguat (Kringlerne). This is a REE project which if developed, will generate a peak of 140 jobs during construction with an operations workforce of approximately 80 people (Grontmij, 2013a);
- ISUA Iron Project, General Nice – If developed, this 15 year mine life project is expected to require between 1,500-3,000 skilled and experienced workers during construction and between 600-750 workers during operations (Grontmij, 2013b);
- Citronen Fjord Base Metal Project, owned by Ironbark Zinc Limited – If developed this project is expected to generate 60 jobs for Greenlanders during construction, and between 250 – 400 jobs for Greenlanders during operations (Grontmij, 2015);
- White Mountain (Qaqortorsuaq) Anorthosite Mine, Hudson Resources – located in Qeqqata Kommunia, the project has received all permits for a 50 year mine life and is currently under construction and anticipates production to commence in late 2018.
- Expansion of the Project – the proposed Project which forms the basis of this SIA (and the associated EIA) has a 37 year mine life. Further mineralised zones exist within the area allowing for an expansion of the Project beyond the 37 year mine life; and
- Climate Change – Several published reports (including a report from Naalakkersuisut in 2012[78]) indicate climate change is likely to affect shrimp fisheries and lead to a decline in the total amount of shrimp in Greenland waters. Furthermore, the increase in melt water will decrease the salinity of water close to the coast, affecting existing species living / spawning in these zones. The thinning of the sea ice is also expected to present a significant impact on hunting conditions.

Based on experience from other countries with a rapidly expanding minerals sector, potential cumulative impacts could include:

Direction of Impact	Impact Description	Potential mitigation measures
Adverse	Price Inflation	GML, in coordination with Kommune Kujalleq will monitor prices of a defined "basket of goods" to assess local inflation impacts. If impacts are evidenced, procurement practices will be reviewed and MIE will be engaged to see how to reduce these impacts.
	Shortage of skills and competition to recruit local workforce	Establishment of a collaborative body with representatives from relevant projects and authorities (national and local) to identify opportunities for coordinated training, recruitment and information sharing sessions. This may include additional sponsored vocational education programmes or expansion of existing apprenticeship schemes.

[77] Arctic Toady (2017)

[78] Naalakkersuisut (2012) Opportunities for Climate Adaptation in the Fishing and Hunting Profession

Direction of Impact	Impact Description	Potential mitigation measures
	Increased pressure on social services and facilities, and on community infrastructure	Kvanefjeld itself expects only low to moderate impacts on social services and facilities due to the nature of the operation (predominantly fly-in fly-out). Development of operations in other municipalities is not likely to cause a cumulative impact on local services. Development of the Tanbreez project has the potential to increase demand on services, specifically aviation and maritime transport. GML will engage with Tanbreez and Kommune Kujalleq to coordinate demand and develop a plan for sustainable service delivery.
	Perceived and real loss of community identity due to demographic change	Common monitoring of activities to assess identity impacts and development of shared activities to celebrate Greenlandic culture.
	Perceived and/or real impacts to fishing stocks	The Project is not expected to generate any significant impacts on fishing stocks, however to address perceptions, GML will work with KNAPK to share information on Project activities and monitoring results in marine environments.
Positive	Increased employment and economic investment	No specific enhancement measures required to address this impact.
	Kommune Kujalleq development benefits from mine community investments and taxes paid	In the event that both Kvanefjeld and Tanbreez are developed, Kommune Kujalleq will receive a significant increase in municipal taxes. GML will engage with Kommune Kujalleq, drawing on expertise from around the world in relation to extractive boom economies, to help plan how best to manage this increase.
	Local business development from mine procurement and increased economic vibrancy	The development of more than one mining project provides additional opportunities for businesses to develop to support these industries. GML will engage with the GoG to determine how best to encourage entrepreneurial activity in Greenland to utilise these opportunities.
	Population increases which may assist to support the critical mass required for service delivery	Increased population in towns and settlements is likely to increase the viability of existing services and may prompt the delivery of additional services. GML will work with Kommune Kujalleq administrators to keep them appraised of anticipated population changes as a result of Project activities and identified gaps in service delivery in Narsaq.
	Increased focus on skills training and employment readiness	Establishment of a collaborative body with representatives from relevant projects and authorities (national and local) to identify opportunities for coordinated training, recruitment and information sharing sessions. This may include additional sponsored vocational education programmes or expansion of existing apprenticeship schemes.

8. Benefit and Impact Plan

The Benefit and Impact Plan summarises the benefits and impacts identified in the course of this SIA and the mitigation / enhancement measures which will be implemented by GML to maximise the benefit and minimise the impact of the Project. Table 8.1 outlines the draft Benefit and Impact Plan.

Table 8.1 Draft Benefit and Impact Plan

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
National and Local Economy							
Greenlandic employment and procurement	Construction	High	EC1	Organisation of a tri-party forum comprising GML, the Government (both regional and national) and the Greenlandic business community to allow for direct communication on business opportunities associated with the Project	Likely	Moderate	High
			EC2	Preparation of a list of goods and services which will need to be sourced during each phase of the Project. These lists will be shared with the Greenlandic business community to help them organise to maximise their participation in the supply chain for the Project			
			EC3	GML will work with local businesses (both national and regional) to explain the tendering and contract process which will be used by the company			
			EC4	Provision of support to local businesses on the specific health and safety requirements which will need to be met by supplier companies when working with the Project			
			EC5	GML will seek to break up large contracts into smaller value contracts which could be won by Greenlandic enterprises			
			EC6	The GML procurement team will include staff Greenlandic speaking staff familiar with the Greenlandic business environment			
			EC7	Provision of support to trading organisations such as the recently formed Bygge og Anlaeg og Rastof Klynge in Kommune Kujalleq and Erhvervsforum to coordinate efforts around capacity building of companies.			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Greenlandic employment and procurement	Operations	High	EC1	Organisation of a tri-party forum comprising GML, the Government (both regional and national) and the Greenlandic business community to allow for direct communication on business opportunities associated with the Project	Likely	Major	Very High
			EC2	Preparation of a list of goods and services which will need to be sourced during each phase of the Project. These lists will be shared with the Greenlandic business community to help them organise to maximise their participation in the supply chain for the Project			
			EC3	GML will work with local businesses (both national and regional) to explain the tendering and contract process which will be used by the company			
			EC4	Provision of support to local businesses on the specific health and safety requirements which will need to be met by supplier companies when working with the Project			
			EC5	GML will seek to break up large contracts into smaller value contracts which could be won by Greenlandic enterprises			
			EC6	The GML procurement team will include staff Greenlandic speaking staff familiar with the Greenlandic business environment			
			EC7	Provision of support to trading organisations such as the recently formed Bygge og Anlaeg og Rastof Klynge in Kommune Kujalleq and Erhvervsforum to coordinate efforts around capacity building of companies.			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Greenlandic employment and procurement	Closure	Moderate	EC1	Organisation of a tri-party forum comprising GML, the Government (both regional and national) and the Greenlandic business community to allow for direct communication on business opportunities associated with the Project	Likely	Minor	Moderate
			EC2	Preparation of a list of goods and services which will need to be sourced during each phase of the Project. These lists will be shared with the Greenlandic business community to help them organise to maximise their participation in the supply chain for the Project			
			EC3	GML will work with local businesses (both national and regional) to explain the tendering and contract process which will be used by the company			
			EC4	Provision of support to local businesses on the specific health and safety requirements which will need to be met by supplier companies when working with the Project			
			EC5	GML will seek to break up large contracts into smaller value contracts which could be won by Greenlandic enterprises			
			EC6	The GML procurement team will include staff Greenlandic speaking staff familiar with the Greenlandic business environment			
			EC7	Provision of support to trading organisations such as the recently formed Bygge og Anlaeg og Rastof Klynge in Kommune Kujalleq and Erhvervsforum to coordinate efforts around capacity building of companies.			
Greenlandic Processing	Operations	High	N/A		Almost certain	Major	Very High

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Government Revenue	Construction	Moderate	EC8	GML will make public the tax values paid on an annual basis	Likely	Minor	Moderate
	Operations	Moderate	EC8	GML will make public the tax values paid on an annual basis	Likely	Minor	Moderate
Distribution of Benefits	Operations	High	EC8	GML will make public the tax values paid on an annual basis	Likely	Minor	Moderate
			EC9	Community development activities targeting vulnerable households will be implemented as part of the Project's community programs			
			EC10	All employees, contractors and visitors will be required to sign the Project Code of Conduct, minimising the risk of anti-social spending (i.e. spending on drugs, alcohol, prostitution, and gambling etc) in Narsaq			
			EC11	Women living in Narsaq will be specifically targeted for participation in vocational training courses relevant to indirect employment opportunities			
Employment and Labour Conditions							
Greenlandic employment levels	Construction	High	EM1	Coordination with the GoG to sponsor students through the PKU-Kurser program in fields of relevance to the development of the Project. The range of courses to be made available are likely to include as a minimum: environmental science, mining, geology, engineering, management, human resources and language	Likely	Moderate	High
			EM2	Providing information sessions in Narsaq, the other towns and larger settlements in Kommune Kujalleq and in Nuuk on career opportunities at GML			
			EM3	Working with vocational institutions (such as the School of Minerals and Petroleum, INUILI among others) to help develop coursework to support Greenlandic students to gain either direct or indirect employment associated with the			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Greenlandic employment levels	Construction	High		development of the Project. The goal is to recruit at least 40 graduates from the School of Minerals and Petroleum	Likely	Moderate	High
			EM4	Development of promotional material showcasing role model Greenlandic employees			
			EM6	Establishment of a Kvanefjeld human resources department with appropriate Greenlandic language speaking personnel, with responsibility for negotiating contracts with local mediators and unions			
			EM7	Preferential hiring of women when male and female candidates are equally qualified for a position			
			EM8	Continuing to conduct open days to engage with the community and provide information on the Company's goals and labour requirements			
			EM9	Implementing a mentoring program for junior staff to ensure progression through the workforce overtime, with a view to increasing the proportion of Greenlandic labour in management positions			
	Operations	High	EM1	Coordination with the GoG to sponsor students through the PKU-Kurser program in fields of relevance to the development of the Project. The range of courses to be made available are likely to include as a minimum: environmental science, mining, geology, engineering, management, human resources and language	Likely	Major	Very High
			EM2	Providing information sessions in Narsaq, the other towns and larger settlements in Kommune Kujalleq and in Nuuk on career opportunities at GML			
			EM3	Working with vocational institutions (such as the School of Minerals and Petroleum, INUILI among others) to help develop coursework to support Greenlandic students to gain either			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Greenlandic employment levels	Operations	High		direct or indirect employment associated with the development of the Project. The goal is to recruit at least 40 graduates from the School of Minerals and Petroleum	Likely	Major	Very High
			EM4	Development of promotional material showcasing role model Greenlandic employees			
			EM5	Establishment of an apprentice training program to train approximately 15 apprentices a year during the operations phase			
			EM6	Establishment of a Kvanefjeld human resources department with appropriate Greenlandic language speaking personnel, with responsibility for negotiating contracts with local mediators and unions			
			EM7	Preferential hiring of women when male and female candidates are equally qualified for a position			
			EM8	Continuing to conduct open days to engage with the community and provide information on the Company's goals and labour requirements			
			EM9	Implementing a mentoring program for junior staff to ensure progression through the workforce overtime, with a view to increasing the proportion of Greenlandic labour in management position			
	Closure	Moderate	EM1	Coordination with the GoG to sponsor students through the PKU-Kurser program in fields of relevance to the development of the Project. The range of courses to be made available are likely to include as a minimum: environmental science, mining, geology, engineering, management, human resources and language	Likely	Minor	Moderate

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Greenlandic employment levels	Closure	Moderate	EM2	Providing information sessions in Narsaq, the other towns and larger settlements in Kommune Kujalleq and in Nuuk on career opportunities at GML	Likely	Minor	Moderate
			EM3	Working with vocational institutions (such as the School of Minerals and Petroleum, INUILI among others) to help develop coursework to support Greenlandic students to gain either direct or indirect employment associated with the development of the Project. The goal is to recruit at least 40 graduates from the School of Minerals and Petroleum			
			EM4	Development of promotional material showcasing role model Greenlandic employees			
			EM6	Establishment of a Kvanefjeld human resources department with appropriate Greenlandic language speaking personnel, with responsibility for negotiating contracts with local mediators and unions			
			EM7	Preferential hiring of women when male and female candidates are equally qualified for a position			
			EM8	Continuing to conduct open days to engage with the community and provide information on the Company's goals and labour requirements			
			EM9	Implementing a mentoring program for junior staff to ensure progression through the workforce overtime, with a view to increasing the proportion of Greenlandic labour in management positions			
			EM10	Development of up-skilling and retraining programmes for employees (also accessible to contractors) to facilitate their transition into future employment at mine closure			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Greenlandic employment levels	Closure	Moderate	EM11	A social exit strategy will be developed at least 5 years in advance of closure to address the transition process for employees (both direct and indirect), implement job-matching support services provided to employees to assist them to secure future employment after mine closure and to address socio-economic impacts associated with the closure of the Project	Likely	Minor	Moderate
Training and Work Skills Capacity Building	Construction Closure	Low	EM1	Coordination with the GoG to sponsor students through the PKU-Kurser program in fields of relevance to the development of the Project. The range of courses to be made available are likely to include as a minimum: environmental science, mining, geology, engineering, management, human resources and language	Likely	Minor	Moderate
			EM3	Working with vocational institutions (such as the School of Minerals and Petroleum, INUILI among others) to help develop coursework to support Greenlandic students to gain either direct or indirect employment associated with the development of the Project. The goal is to recruit at least 40 graduates from the School of Minerals and Petroleum			
			EM4	Development of promotional material showcasing role model Greenlandic employees			
			EM11	A social exit strategy will be developed at least 5 years in advance of closure to address the transition process for employees (both direct and indirect), implement job-matching support services provided to employees to assist them to secure future employment after mine closure and to address socio-economic impacts associated with the closure of the Project			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Training and Work Skills Capacity Building	Construction Closure	Low	EM13	Coordination with Kommune Kujalleq administrators to enhance the training opportunities provided within the municipality to better support the development of the mineral industry	Likely	Minor	Moderate
			EM14	Work with Majoriaq and the local schools in Kommune Kujalleq to help students understand the job opportunities available at the Project (and indirectly generated by the Project) to see how they can best prepare themselves to secure employment in the future			
			EM15	Development of a comprehensive internal training and mentoring program to accelerate the progression of Greenlandic workers within the company. This may involve partial duplication of some roles in the early stages of operations in order to expose junior workers to the experience of more senior, potentially foreign, workers. The objective of these programs will be to steadily increase the proportion of Greenlandic workers (and consequently, reduce the proportion of foreign workers) across every level of the Company as time progresses			
			EM16	Engagement with other training centres across Greenland to explain the nature of roles which will be required by the Project and to determine how best to develop this capacity within Greenland			
	Operations	Moderate	EM1	Coordination with the GoG to sponsor students through the PKU-Kurser program in fields of relevance to the development of the Project. The range of courses to be made available are likely to include as a minimum: environmental science, mining, geology, engineering, management, human resources and language	Likely	Moderate	High

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Training and Work Skills Capacity Building	Operations	Moderate	EM3	Working with vocational institutions (such as the School of Minerals and Petroleum, INUILI among others) to help develop coursework to support Greenlandic students to gain either direct or indirect employment associated with the development of the Project. The goal is to recruit at least 40 graduates from the School of Minerals and Petroleum	Likely	Moderate	High
			EM4	Development of promotional material showcasing role model Greenlandic employees			
			EM11	A social exit strategy will be developed at least 5 years in advance of closure to address the transition process for employees (both direct and indirect), implement job-matching support services provided to employees to assist them to secure future employment after mine closure and to address socio-economic impacts associated with the closure of the Project			
			EM12	Operational staff will be hired at least 6 months in advance of the commencement of operations in order to allow effective training to be conducted			
			EM13	Coordination with Kommune Kujalleq administrators to enhance the training opportunities provided within the municipality to better support the development of the mineral industry			
			EM14	Work with Majoriaq and the local schools in Kommune Kujalleq to help students understand the job opportunities available at the Project (and indirectly generated by the Project) to see how they can best prepare themselves to secure employment in the future			
			EM15	Development of a comprehensive internal training and mentoring program to accelerate the progression of			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Training and Work Skills Capacity Building	Operations	Moderate		Greenlandic workers within the company. This may involve partial duplication of some roles in the early stages of operations in order to expose junior workers to the experience of more senior, potentially foreign, workers. The objective of these programs will be to steadily increase the proportion of Greenlandic workers (and consequently, reduce the proportion of foreign workers) across every level of the Company as time progresses	Likely	Moderate	High
			EM16	Engagement with other training centres across Greenland to explain the nature of roles which will be required by the Project and to determine how best to develop this capacity within Greenland			
Indirect employment and local procurement	Construction Operations	High	EM17	Stocking of the "general store" within the Village with Greenlandic products where possible, and if local production is not possible, sourcing goods from Greenlandic suppliers	Possible	Moderate	High
			EM86	Support for home-based industry which can support the Project, e,g., the development of sewing businesses which could manufacture uniforms and cold weather clothing			
			EM19	Encouraging local procurement by contractors through establishing contractual language to support this activity. Local procurement should only be given preference where the local product is largely comparable in terms of quality and cost to internationally available alternatives			
Labour Conditions	Construction Operations Closure	Moderate	EM20	Early and continuous engagement with SIK and other Greenlandic labour unions to establish working conditions which meet Greenlandic requirements and which will avoid distorting the local labour market	Unlikely	Minor	Low

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Labour Conditions	Construction Operations Closure	Moderate	EM21	Engagement with SIK and the GoG to agree a "skilled workers" wage which be sufficient to attract and retain top quality local employees. This agreement will also be topped up with supplements for shift work and overtime as necessary. The salary agreement will be negotiated with the GoG and SIK prior to the commencement of employment	Unlikely	Minor	Low
			EM22	Workforce rotations will be developed to support family-friendly employment and will take into consideration the frequency of home visits necessary to maintain semi-traditional lifestyles			
Workforce accommodation – living standards	Construction	Moderate	EM23	Code of Conduct – All workers (including contractors) will be required to sign and agree to a code of conduct when working for the Project.	Unlikely	Moderate	Moderate
			EM24	Zero tolerance of alcohol and drug consumption and anti-social behaviour when working for the Project and when residing in workforce accommodation. All facilities will be designated as non-smoking. In the event that activity contrary to these policies is observed, disciplinary measures will be taken			
			EM25	Respect for Narsaq community and for Greenlandic traditions, including the completion of cultural awareness training on commencement of employment with the Project			
			EM26	Restrictions on the level of interaction between Narsaq residents and camp / Village residents. For example, residents of the camp / Village will not be permitted to frequent local bars, but will be encouraged to play sport with and engage with Narsaq residents in activities deemed socially beneficial. The identification of these activities will be undertaken with Narsaq and Kommune Kujalleq administrators as part of the discussion on the IBA			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Workforce accommodation – living standards	Construction	Moderate	EM27	Camp and Village facilities will be no-smoking areas	Unlikely	Moderate	Moderate
			EM28	Maximisation of Greenlandic labour in the temporary construction worker's camp and Village – GML will work with catering, cleaning and other support industries to best utilise local Greenlandic labour to run these facilities			
			EM29	Workforce accommodation standards – Accommodation at the temporary construction worker's camp will be designed and managed by the construction contractor. Details of the planned accommodation were not available at the time of the preparation of the SIA, however, any final designs will need to be approved by GML and will also be reviewed by SIK to ensure compliance with Greenlandic standards. The Village will be designed to comply with international good practice, as outlined in the IFC / EBRD guidance note titled 'Workers' Accommodation: Processes and Standards" (IFC, 2009b)			
			EM30	In the event of accommodation shortage during the construction phase, GML plan to utilise a marine vessel to provide additional short-term accommodation on an as needed basis. This would be a short-term measure only and may be initiated during peak tourism months to ensure impact to tourism are minimised			
			EM31	GML will work with Narsaq and Kommune Kujalleq administrators to identify apartments and houses which are sitting idle, which could be made available to Greenlandic workers who want to move into town as permanent residents. Up to an additional 50 beds could be made available during these refurbishment activities. It is anticipated that this option might carry some appeal for residents of settlements in Kommune Kujalleq and may also encourage former Narsaq residents to return home when labour opportunities eventuate			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Workforce accommodation – living standards	Operations	High	EM23	Code of Conduct – All workers (including contractors) will be required to sign and agree to a code of conduct when working for the Project	Remote	Moderate	Low
			EM24	Zero tolerance of alcohol and drug consumption and anti-social behaviour when working for the Project and when residing in workforce accommodation. All facilities will be designated as non-smoking. In the event that activity contrary to these policies is observed, disciplinary measures will be taken			
			EM25	Respect for Narsaq community and for Greenlandic traditions, including the completion of cultural awareness training on commencement of employment with the Project			
			EM26	Restrictions on the level of interaction between Narsaq residents and camp / Village residents. For example, residents of the camp / Village will not be permitted to frequent local bars, but will be encouraged to play sport with and engage with Narsaq residents in activities deemed socially beneficial. The identification of these activities will be undertaken with Narsaq and Kommune Kujalleq administrators as part of the discussion on the IBA			
			EM27	Camp and Village facilities will be no-smoking areas			
			EM28	Maximisation of Greenlandic labour in the temporary construction worker's camp and Village – GML will work with catering, cleaning and other support industries to best utilise local Greenlandic labour to run these facilities			
			EM29	Workforce accommodation standards – Accommodation at the temporary construction worker's camp will be designed and managed by the construction contractor. Details of the planned accommodation were not available at the time of the preparation of the SIA, however, any final designs will need to			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Workforce accommodation – living standards	Operations	High		be approved by GML and will also be reviewed by SIK to ensure compliance with Greenlandic standards. The Village will be designed to comply with international good practice, as outlined in the IFC / EBRD guidance note titled 'Workers' Accommodation: Processes and Standards" (IFC, 2009b)	Remote	Moderate	Low
			EM30	In the event of accommodation shortage during the construction phase, GML plan to utilise a marine vessel to provide additional short-term accommodation on an as needed basis. This would be a short-term measure only and may be initiated during peak tourism months to ensure impact to tourism are minimised			
			EM31	GML will work with Narsaq and Kommune Kujalleq administrators to identify apartments and houses which are sitting idle, which could be made available to Greenlandic workers who want to move into town as permanent residents. Up to an additional 50 beds could be made available during these refurbishment activities. It is anticipated that this option might carry some appeal for residents of settlements in Kommune Kujalleq and may also encourage former Narsaq residents to return home when labour opportunities eventuate			
Workforce accommodation – interaction with Narsaq	Construction	Very High	EM23	Code of Conduct – All workers (including contractors) will be required to sign and agree to a code of conduct when working for the Project	Possible	Major	Very High
			EM24	Zero tolerance of alcohol and drug consumption and anti-social behaviour when working for the Project and when residing in workforce accommodation. All facilities will be designated as non-smoking. In the event that activity contrary to these policies is observed, disciplinary measures will be taken			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Workforce accommodation – interaction with Narsaq	Construction	Very High	EM25	Respect for Narsaq community and for Greenlandic traditions, including the completion of cultural awareness training on commencement of employment with the Project	Possible	Major	Very High
			EM26	Restrictions on the level of interaction between Narsaq residents and camp / Village residents. For example, residents of the camp / Village will not be permitted to frequent local bars, but will be encouraged to play sport with and engage with Narsaq residents in activities deemed socially beneficial. The identification of these activities will be undertaken with Narsaq and Kommune Kujalleq administrators as part of the discussion on the IBA			
			EM27	Camp and Village facilities will be no-smoking areas			
			EM28	Maximisation of Greenlandic labour in the temporary construction worker's camp and Village – GML will work with catering, cleaning and other support industries to best utilise local Greenlandic labour to run these facilities			
			EM29	Workforce accommodation standards – Accommodation at the temporary construction worker's camp will be designed and managed by the construction contractor. Details of the planned accommodation were not available at the time of the preparation of the SIA, however, any final designs will need to be approved by GML and will also be reviewed by SIK to ensure compliance with Greenlandic standards. The Village will be designed to comply with international good practice, as outlined in the IFC / EBRD guidance note titled 'Workers' Accommodation: Processes and Standards" (IFC, 2009b)			
			EM30	In the event of accommodation shortage during the construction phase, GML plan to utilise a marine vessel to provide additional short-term accommodation on an as			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Workforce accommodation – interaction with Narsaq	Construction	Very High		needed basis. This would be a short-term measure only and may be initiated during peak tourism months to ensure impact to tourism are minimised	Possible	Major	Very High
			EM31	GML will work with Narsaq and Kommune Kujalleq administrators to identify apartments and houses which are sitting idle, which could be made available to Greenlandic workers who want to move into town as permanent residents. Up to an additional 50 beds could be made available during these refurbishment activities. It is anticipated that this option might carry some appeal for residents of settlements in Kommune Kujalleq and may also encourage former Narsaq residents to return home when labour opportunities eventuate			
Workforce accommodation – interaction with Narsaq	Operations	Very High	EM23	Code of Conduct – All workers (including contractors) will be required to sign and agree to a code of conduct when working for the Project	Possible	Moderate	High
			EM24	Zero tolerance of alcohol and drug consumption and anti-social behaviour when working for the Project and when residing in workforce accommodation. All facilities will be designated as non-smoking. In the event that activity contrary to these policies is observed, disciplinary measures will be taken			
			EM25	Respect for Narsaq community and for Greenlandic traditions, including the completion of cultural awareness training on commencement of employment with the Project			
			EM26	Restrictions on the level of interaction between Narsaq residents and camp / Village residents. For example, residents of the camp / Village will not be permitted to frequent local bars, but will be encouraged to play sport with and engage with Narsaq residents in activities deemed socially beneficial.			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Workforce accommodation – interaction with Narsaq	Operations	Very High		The identification of these activities will be undertaken with Narsaq and Kommune Kujalleq administrators as part of the discussion on the IBA	Possible	Moderate	High
			EM27	Camp and Village facilities will be no-smoking areas			
			EM28	Maximisation of Greenlandic labour in the temporary construction worker's camp and Village – GML will work with catering, cleaning and other support industries to best utilise local Greenlandic labour to run these facilities			
			EM29	Workforce accommodation standards – Accommodation at the temporary construction worker's camp will be designed and managed by the construction contractor. Details of the planned accommodation were not available at the time of the preparation of the SIA, however, any final designs will need to be approved by GML and will also be reviewed by SIK to ensure compliance with Greenlandic standards. The Village will be designed to comply with international good practice, as outlined in the IFC / EBRD guidance note titled 'Workers' Accommodation: Processes and Standards" (IFC, 2009b)			
			EM30	In the event of accommodation shortage during the construction phase, GML plan to utilise a marine vessel to provide additional short-term accommodation on an as needed basis. This would be a short-term measure only and may be initiated during peak tourism months to ensure impact to tourism are minimised			
			EM31	GML will work with Narsaq and Kommune Kujalleq administrators to identify apartments and houses which are sitting idle, which could be made available to Greenlandic workers who want to move into town as permanent residents. Up to an additional 50 beds could be made available during these refurbishment activities. It is anticipated that this			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Workforce accommodation – interaction with Narsaq	Operations	Very High		option might carry some appeal for residents of settlements in Kommune Kujalleq and may also encourage former Narsaq residents to return home when labour opportunities eventuate	Possible	Moderate	High
Land-Based Economic Displacement							
Land-Based Economic Displacement – Ilua Valley Farm	Construction Operations Closure	Moderate	LA1	Displacement impacts will be avoided, or where avoidance is not possible, minimised by exploring alternate project designs	Possible	Minor	Moderate
			LA2	Forced eviction will be avoided			
			LA3	Land acquisition, where required, will where possible be agreed through a willing seller, willing buyer negotiation			
			LA4	Where land acquisition is required or land access restrictions are applied, adverse social impacts will be reduced through a) providing compensation for loss of assets at replacement cost[1]; b) ensuring resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those involved			
			LA5	Where economic displacement occurs, the company will aim to restore, or where possible, improve the livelihoods of affected household			
			LA6	The Project intends to acquire the Ilua Valley farm through a willing buyer, willing seller transaction. While the Project's environmental impacts on this property will not affect the ability to continue conducting farming activity, in discussion with the affected household it is understood that the household would like to pursue other activities when the Project commences			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Land-Based Economic Displacement – Ilua Valley Farm	Construction Operations Closure		LA7	Engagement and consultation activities will be pursued with all land users in the area to explain the impacts and provide additional information about the Project as necessary	Possible	Minor	Moderate
			LA8	In the event that livelihood impacts are created by the Project, a livelihood restoration plan (LRP) would be developed by GML working in coordination with KNAPK and SPS, depending on the nature of the impact			
			LA9	In the event that enterprise based livelihoods are affected by the Project, GML will support business development activities including training and business planning to expand existing businesses and generate local employment			
			LA10	Dust and radiological mitigation measures will be implemented			
			LA11	Dust and radiological monitoring stations will be established near the mine boundary, in Narsaq town, with the Ilua Valley and in Ipiutaq (as a reference location) with results shared with interested community forums			
Land-Based Economic Displacement – Ipuitaq and Tuttutooq Farms	Construction Operations Closure	Low	LA1	Displacement impacts will be avoided, or where avoidance is not possible, minimised by exploring alternate project designs	Remote	Negligible	Low
			LA2	Forced eviction will be avoided			
			LA3	Land acquisition, where required, will where possible be agreed through a willing seller, willing buyer negotiation			
			LA4	Where land acquisition is required or land access restrictions are applied, adverse social impacts will be reduced through a) providing compensation for loss of assets at replacement cost[1]; b) ensuring resettlement activities are implemented with appropriate disclosure of information, consultation and the informed participation of those involved			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Land-Based Economic Displacement – Ipuitaq and Tuttutooq Farms	Construction Operations Closure	Low	LA5	Where economic displacement occurs, the company will aim to restore, or where possible, improve the livelihoods of affected households	Remote	Negligible	Low
			LA7	Engagement and consultation activities will be pursued with all land users in the area to explain the impacts and provide additional information about the Project as necessary			
			LA8	In the event that livelihood impacts are created by the Project, a livelihood restoration plan (LRP) would be developed by GML working in coordination with KNAPK and SPS, depending on the nature of the impact			
			LA9	In the event that enterprise based livelihoods are affected by the Project, GML will support business development activities including training and business planning to expand existing businesses and generate local employment			
			LA10	Dust and radiological mitigation measures will be implemented			
Land-based Economic Displacement – Gemstone Collectors	Construction Operations Closure	High	LA8	In the event that livelihood impacts are created by the Project, a livelihood restoration plan (LRP) would be developed by GML working in coordination with KNAPK and SPS, depending on the nature of the impact	Possible	Moderate	Moderate
			LA9	In the event that enterprise based livelihoods are affected by the Project, GML will support business development activities including training and business planning to expand existing businesses and generate local employment			
			LA12	GML will engage with gemstone collection licence holders to provide access to the highest grade areas of tugtupit prior to construction / mining activity occurring. The access will be controlled to maintain safety standards			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Land-based Economic Displacement – Kayak Tourism Operators	Construction Operations Closure	Low	LA13	GML will engage with kayak tourism providers to explain the Project design and schedules and to develop impact mitigation measures as necessary	Unlikely	Minor	Low
Food availability and ecosystem services	Construction Operations Closure	Moderate	LA14	The size of the footprint of the Project and areas of restricted access will be minimised to the extent possible	Possible	Minor	Moderate
			LA15	Access roads will be sprayed with water at regular intervals to minimise the generation of dust along the Ilua Valley			
			LA16	GML will seek to acquire local produce from the valley area when available (e.g. berries) to encourage the continuation of traditional activities			
			LA17	GML will work with Narsaq town administrators to identify alternate running / hiking routes which have lower amenity impacts			
Tourism	Construction Operations Closure	Low	LA18	Engagement with Kommune Kujalleq and the town of Narsaq specifically to support local tourism opportunities	Possible	Minor	Moderate
			LA19	Investigation of opportunities to promote local tourism at a national and international level			
Ocean-Based Economic Displacement							
Ocean-based Economic Displacement	Construction Operations Closure	Low	OC1	Engagement with KNAPK and other relevant agencies to better understand the cause of changes to local catches – if observed	Unlikely	Low	Low
			LA1	Displacement impacts will be avoided, or where avoidance is not possible, minimised by exploring alternate project designs			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
			LA5	Where economic displacement occurs, the company will aim to restore, or where possible, improve the livelihoods of affected households			
Occupational Health and Safety							
Risk of Accidents	Construction Operations Closure	High	OH1	Comprehensive health and safety plan will be implemented by GML consistent with the Company's Occupational health and Safety Policy	Unlikely	Moderate	Moderate
			OH2	GML will prepare a written workplace assessment of occupational health and safety prior to the commencement of construction consistent with the requirements in Order No. 1168			
			OH3	Preparation of safe work procedures for key activities which will remain live documents throughout the duration of Project activity			
			OH4	Maintaining plant and equipment in safe working condition			
			OH5	Providing information, signage, instruction, training and supervision required to ensure that all workers are safe from injury and risks to their health. Supplier instructions and workplace usage instructions will be provided in English, Danish and Greenlandic			
			OH6	Collection and monitoring of all relevant safety statistics including near misses and identified risks			
			OH7	Establishment of a safety committee responsible for managing, providing advice on, informing and supervising activities concerning health and safety within the Company			
			OH8	Allocation of responsibility for occupational health and safety to senior management within the Project team			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Radiation Exposure	Construction Operations Closure	Moderate	OH9	All work clothing worn by employees will consist of long sleeve shirts and pants made from cotton and clothes will be laundered at the Plant to ensure no potentially radioactive materials are brought into private living accommodation	Unlikely	Minor	Low
			OH10	A change room will be provided at both the concentrator and refinery sites			
			OH11	A dust mask will be provided to employees where dust is a hazard			
			OH12	All employees will undergo a regular (annual) medical exam. The medical exam will be performed by the Project medical clinic and will be financed by the Project			
			OH13	Workers seeing an increase in dose will have the reasons for the high dose investigated by the Project's Radiation Protection Office and the worker will be moved to a different section of the operation if necessary. If the increase in dose is considered significant (by the Radiation Protection Officer) the worker will undergo a medical exam at the Company medical clinic			
			OH14	Monitoring statistics related to dose exposures will be made available to the public through the Project's annual report and will shared directly with the GoG			
			OH15	Areas where elevated radioactivity is expected will have engineering measures (shielding, distance) and procedural controls (exposure time, worker rotation and personal protective equipment (PPE)) to minimise radiation exposure			
			OH16	The pit will be evacuated prior to blasting and until blast dust clouds have subsided			
			OH17	Water trucks will be used to suppress dust across all areas of the mine			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Radiation Exposure	Construction Operations Closure	Moderate	OH18	Mine workers operating in the mine pit will be mainly located in air-conditioned cabins of mining equipment. The air filters in the cabins will be replaced on a regular basis	Unlikely	Minor	Low
			OH19	A vehicle washing bay will be used to remove mine dust / dirt from all vehicles leaving the mining area			
			OH20	High ventilation levels will be maintained in the crushing building (turning air over 10 times per hour)			
Community Health, Safety and Security							
Dust and Air Quality	Construction Operation Closure	Low	CH1	Wetting of rock stockpiles, concentrates and waste materials with water sprinkler systems (summer) with any excess water captured for recycling	Unlikely	Negligible	Low
			CH2	Wetting of haul roads with water spray trucks (summer)			
			CH3	Salting of haul roads to melt ice and snow from the roads. The salt can also increase surface moisture by extracting moisture from the atmosphere (winter)			
			CH4	Setting appropriate vehicle speed limits, regular grading and maintenance			
			CH5	Using vehicles and equipment with energy efficiency technologies to minimize emissions rates			
			CH6	Maintaining power plant, vehicles and other fuel powered equipment in accordance with manufacture's specifications to minimize on emissions			
Noise Exposure	Construction	Moderate	CH7	Noise monitoring will be conducted at the point of the nearest sensitive receptors (summerhouses and the southern / western edges of Narsaq) in addition to noise monitoring at Project facilities. The results of monitoring will be shared with Narsaq stakeholders through ongoing engagement forums	Unlikely	Moderate	Moderate

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Noise Exposure	Construction	Moderate	CH8	High noise activities during the construction of the Port will be timed to minimise disruption to households and educational institutions	Unlikely	Moderate	Moderate
			CH10	GML will establish a community grievance mechanism whereby residents and affected stakeholders can share concerns or grievances (anonymously if they choose) to which Project management will respond			
	Operation	Low	CH7	Noise monitoring will be conducted at the point of the nearest sensitive receptors (summerhouses and the southern / western edges of Narsaq) in addition to noise monitoring at Project facilities. The results of monitoring will be shared with Narsaq stakeholders through ongoing engagement forums	Unlikely	Low	Low
			CH9	Opportunities to reduce noise generation through engineering or noise attenuative measures will be investigated as part of the detailed engineering conducted prior to Project construction			
			CH10	GML will establish a community grievance mechanism whereby residents and affected stakeholders can share concerns or grievances (anonymously if they choose) to which Project management will respond			
Radiation Exposure	Operations	Low	CH11	Implementation of the dust control measures in GML's Dust Control Plan	Remote	Minor	Low
			CH12	Monitoring of radon and gamma radiation levels in Narsaq, and at the nearest sensitive receptors around the Project			
			CH13	Engagement with Greenland's Ministry of Health to better understand radon exposure in Narsaq and to help residents understand how they can improve airflow in their homes to reduce this exposure			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Traffic Safety	Operations	Very High	CH14	Speed restrictions will apply for all vehicles using the access road	Unlikely	Major	High
			CH15	GML will investigate options for small convoys to be used in heavy traffic conditions			
			CH16	Community traffic safety campaigns will be coordinated with the town of Narsaq to increase traffic understanding. Specific programs will be coordinated with the kindergartens and primary schools to minimise the risk to young children			
Communicable Disease	Construction	Very High	CH17	Construction workers will be largely segregated from the town of Narsaq, minimising opportunities for interaction	Possible	Moderate	High
			CH19	All employees, contractors and visitors will be required to sign a Code of Conduct requiring workers to engage with community members in respectful, socially beneficial manners. This policy will apply to workers from the time they land in Greenland (in Narsarsuaq or Qaqortoq) through to their departure			
			CH20	Conduct awareness raising exercises with their workforce on sexually transmitted diseases, including HIV/AIDS			
			CH21	Provide condoms for workers			
			CH22	Provide STD (including HIV) diagnosis and testing at the work place clinic, and provide access to counselling, and referral services as necessary			
			CH23	Monitor health outcomes within the workforce and engage with health service providers in Narsaq and Kommune Kujalleq to share data and develop campaigns to change behaviours as necessary			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Communicable Disease	Construction	Very High	CH24	GML will work with the Narsaq health service to develop public awareness campaigns on STD transmission and safe sex initiatives	Possible	Moderate	High
			CH25	All employees (regardless of nationality) will be subject to pre-employment medical screens and regular health checks once employed. The medical screening will specifically target the presence of TB and potential candidates will receive treatment for TB before being offered work on the Project. STD prevalence will not be screened at pre-employment medicals			
			CH26	The living conditions provided at the temporary construction camp and the Village will be designed to ensure adequate space is available for all workers to reduce the risk of TB transmission within the workforce (which can then spread into the community)			
	Operations	High	CH18	Operations workers will live within a security-controlled environment where non-workers will not be allowed to stay overnight	Unlikely	Moderate	Moderate
			CH19	All employees, contractors and visitors will be required to sign a Code of Conduct requiring workers to engage with community members in respectful, socially beneficial manners. This policy will apply to workers from the time they land in Greenland (in Narsarsuaq or Qaqortoq) through to their departure			
			CH20	Conduct awareness raising exercises with their workforce on sexually transmitted diseases, including HIV/AIDS			
			CH21	Provide condoms for workers			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Communicable Disease	Operations	High	CH22	Provide STD (including HIV) diagnosis and testing at the work place clinic, and provide access to counselling, and referral services as necessary	Unlikely	Moderate	Moderate
			CH23	Monitor health outcomes within the workforce and engage with health service providers in Narsaq and Kommune Kujalleq to share data and develop campaigns to change behaviours as necessary			
			CH24	GML will work with the Narsaq health service to develop public awareness campaigns on STD transmission and safe sex initiatives			
			CH25	All employees (regardless of nationality) will be subject to pre-employment medical screens and regular health checks once employed. The medical screening will specifically target the presence of TB and potential candidates will receive treatment for TB before being offered work on the Project. STD prevalence will not be screened at pre-employment medicals			
			CH26	The living conditions provided at the temporary construction camp and the Village will be designed to ensure adequate space is available for all workers to reduce the risk of TB transmission within the workforce (which can then spread into the community)			
	Closure	Low	CH19	All employees, contractors and visitors will be required to sign a Code of Conduct requiring workers to engage with community members in respectful, socially beneficial manners. This policy will apply to workers from the time they land in Greenland (in Narsarsuaq or Qaqortoq) through to their departure	Remote	Moderate	Low
			CH20	Conduct awareness raising exercises with their workforce on sexually transmitted diseases, including HIV/AIDS			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Communicable Disease	Closure	Low	CH21	Provide condoms for workers	Remote	Moderate	Low
			CH22	Provide STD (including HIV) diagnosis and testing at the work place clinic, and provide access to counselling, and referral services as necessary			
			CH23	Monitor health outcomes within the workforce and engage with health service providers in Narsaq and Kommune Kujalleq to share data and develop campaigns to change behaviours as necessary			
			CH24	GML will work with the Narsaq health service to develop public awareness campaigns on STD transmission and safe sex initiatives			
			CH25	All employees (regardless of nationality) will be subject to pre-employment medical screens and regular health checks once employed. The medical screening will specifically target the presence of TB and potential candidates will receive treatment for TB before being offered work on the Project. STD prevalence will not be screened at pre-employment medicals			
			CH26	The living conditions provided at the temporary construction camp and the Village will be designed to ensure adequate space is available for all workers to reduce the risk of TB transmission within the workforce (which can then spread into the community)			
Non-Communicable Disease	Construction	High	CH27	A strict no-smoking policy will be implemented in all GML office buildings and enclosed spaces. Workers will be encouraged to give up smoking as appropriate with the Company medical clinic providing guidance on “how to quit” campaigns	Possible	Minor	Moderate
			CH28	Random drug and alcohol tests will be implemented by the Project with zero tolerance for workers, contractors and visitors who fail these tests			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Non-Communicable Disease	Construction	High	CH29	Workers will be encouraged to participate in outdoor exercise and "tool box talks" will be developed to facilitate worker's passing these messages onto their families when they go on break	Possible	Minor	Moderate
			CH30	Workforce accommodation (both the temporary construction camp and the Village) will include a gymnasium and other areas for physical activity			
			CH31	Workers will be encouraged to participate in sporting competitions in Narsaq and to support the development of new competitions as appropriate			
			CH32	Catering service providers for the workforce accommodation will apply their knowledge to define appropriate serving sizes for worker's meals and to balance the workplace diet			
	Operations	Very High	CH27	A strict no-smoking policy will be implemented in all GML office buildings and enclosed spaces. Workers will be encouraged to give up smoking as appropriate with the Company medical clinic providing guidance on "how to quit" campaigns	Possible	Moderate	High
			CH28	Random drug and alcohol tests will be implemented by the Project with zero tolerance for workers, contractors and visitors who fail these tests			
			CH29	Workers will be encouraged to participate in outdoor exercise and "tool box talks" will be developed to facilitate worker's passing these messages onto their families when they go on break			
			CH30	Workforce accommodation (both the temporary construction camp and the Village) will include a gymnasium and other areas for physical activity			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Non-Communicable Disease	Operations	Very High	CH31	Workers will be encouraged to participate in sporting competitions in Narsaq and to support the development of new competitions as appropriate	Possible	Moderate	High
			CH32	Catering service providers for the workforce accommodation will apply their knowledge to define appropriate serving sizes for worker's meals and to balance the workplace diet			
			CH33	The general store located in the Village will be stocked with healthy alternative snacks and will seek to stock local foods where possible			
	Closure	Moderate	CH27	A strict no-smoking policy will be implemented in all GML office buildings and enclosed spaces. Workers will be encouraged to give up smoking as appropriate with the Company medical clinic providing guidance on "how to quit" campaigns	Remote	Minor	Low
			CH28	Random drug and alcohol tests will be implemented by the Project with zero tolerance for workers, contractors and visitors who fail these tests			
			CH29	Workers will be encouraged to participate in outdoor exercise and "tool box talks" will be developed to facilitate worker's passing these messages onto their families when they go on break			
			CH31	Workers will be encouraged to participate in sporting competitions in Narsaq and to support the development of new competitions as appropriate			
Social and emotional well-being	Construction Operations	Moderate	CH34	Engagement between the Company and social health providers in Narsaq and Kommune Kujalleq to deliver campaigns targeting mental health	Likely	Moderate	High

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Social and emotional well-being	Construction Operations	Moderate	CH35	Human resources policies for the Project which specifically highlight non-tolerance of discrimination on the basis of sex, race, sexual orientation, disability, health condition, religion or belief, political affiliation, union membership or marital status	Likely	Moderate	High
			CH36	Active promotion of successful Greenlandic employees and business partners as success stories which can be shared within the municipality and the country more broadly			
			CH37	Continuation of the settlement "road shows" which have been undertaken by GML in the past			
Social Structure and Community Life							
In-migration	Construction Operations Closure	Low	SO1	Effective communication of the nature of employment opportunities available on the Project and the skills required to be eligible for the job	Unlikely	Minor	Low
			SO2	Engagement with Kommune Kujalleq to understand pressure placed on existing services and to develop a plan to reduce the pressure			
Infrastructure, Service and Government Delivery Capacity	Construction Closure	Moderate	SO3	Engagement between GML and Kommune Kujalleq administrators in respect of the number of new residents anticipated as a result of the development of the Project. With this knowledge, the Kommune will be able to plan for service delivery requirements as necessary	Unlikely	Minor	Low
			SO5	Identification, in coordination with the town of Narsaq and Kommune Kujalleq administrators, of a new method / site for the disposal of animal carcasses and engagement over any modifications required to the existing waste management site			
			SO6	The requirement for Project employees, contractors and visitors to comply with the company's Code of Conduct will			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Infrastructure, Service and Government Delivery Capacity	Construction Closure	Moderate		reduce the risk of increased crime in the area. This will be further reinforced through the application of strict disciplinary measures for any employees or contractors found to be participating in behaviour contrary to the Code of Conduct, anti-social behaviour or illegal activities	Unlikely	Minor	Low
			SO7	GML will engage with SIRI to determine how to support the work and residency permitting process, and with the Danish Foreign Ministry to support visa issuing services and to streamline the process to the extent possible. The GoG will also be engaged given their primary role in the approval of work and residency permitting processes. The Project may also engage with the Ministry of Mineral Resources and Labour to establish a fast-track process for visa and permit issuance.			
	Operations	Moderate	SO3	Engagement between GML and Kommune Kujalleq administrators in respect of the number of new residents anticipated as a result of the development of the Project. With this knowledge, the Kommune will be able to plan for service delivery requirements as necessary	Possible	Minor	Moderate
			SO4	GML will engage with Greenland's Ministry of Health to determine how best to support the expansion of health services in Narsaq to meet increased demand during the operations phase			
			SO5	Identification, in coordination with the town of Narsaq and Kommune Kujalleq administrators, of a new method / site for the disposal of animal carcasses and engagement over any modifications required to the existing waste management site			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Infrastructure, Service and Government Delivery Capacity	Operations	Moderate	SO6	The requirement for Project employees, contractors and visitors to comply with the company's Code of Conduct will reduce the risk of increased crime in the area. This will be further reinforced through the application of strict disciplinary measures for any employees or contractors found to be participating in behaviour contrary to the Code of Conduct, anti-social behaviour or illegal activities	Possible	Minor	Moderate
			SO7	GML will engage with SIRI to determine how to support the work and residency permitting process, and with the Danish Foreign Ministry to support visa issuing services and to streamline the process to the extent possible. The GoG will also be engaged given their primary role in the approval of work and residency permitting processes. The Project may also engage with the Ministry of Mineral Resources and Labour to establish a fast-track process for visa and permit issuance.			
Protection and Promotion of Traditional Knowledge	Operations	Low	SO8	The working language of the Project will be English, however all safety, information, consultation and management documents will also be translated into Danish and Greenlandic to protect local language skills	Possible	Minor	Moderate
			SO9	GML will take care to use the Greenlandic dialect spoken in Kommune Kujalleq when engaging with community members in community forums			
			EM4	Development of promotional material showcasing role model Greenlandic employees			
			SO10	Opportunities to support Greenlandic culture through coordination of community activities reinforcing culturally relevant practices (e.g. celebration of Greenlandic food, kayaking, seal hunting, berry picking etc) will be identified by GML			

Impact	Project Phase	Pre-Mitigation Significance	Mitigation Actions		Post-mitigation Likelihood	Post-mitigation Consequence	Post - mitigation Significance
Protection and Promotion of Traditional Knowledge	Operations	Low	SO11	Work rosters will be developed to ensure Greenlandic workers have the opportunity to return home on a regular basis and maintain their connection with family and traditions	Possible	Minor	Moderate
Vulnerable Groups and Social Issues	Construction Operations Closure	Low	EM4	Development of promotional material showcasing role model Greenlandic employees	Unlikely	Minor	Low
			CH18	Strict implementation of the Code of Conduct (and associated disciplinary measures) for employees, contractors and visitors			
			SO12	Coordination with the Narsaq police to assess the presence of drugs in the community and to develop strategies targeting drug abuse in the community			

8.1 Monitoring and Evaluation Plan

A draft monitoring and evaluation plan has been developed for the Project, as seen in Table 8.2.

Table 8.2 Draft Monitoring and Evaluation Plan

Impact and Benefit Plan	Inputs/Outputs	Objectively verifiable indicators (Monitoring Plan)	Source of verification	Risks and assumptions
National and Local Economy				
Goal: Maximise Greenlandic employment		17% Greenlandic employment during Construction	Annual report prepared by GML	
		46% Greenlandic employment during Operation (in year 1) with increasing trend as operations continue	Annual report prepared by GML	
		85% Greenlandic employment during closure and rehabilitation phase	Annual report prepared by GML	
Goal: Maximise the number of contracts awarded to Greenland Enterprises	Input: Unbundling of contracts to increase likelihood of contracts being awarded locally	Number of contracts let to Greenlandic Enterprises	Tender documents	Assumes Greenlandic Enterprises will embrace entrepreneurial opportunities linked to the Project. Opportunities will be enhanced if multiple mining projects developed in a similar period.
	Input: Information provided to local businesses on bidding requirements	Number of information sessions conducted with Greenlandic Enterprises	Meeting reports	
	Output: Local businesses able to engage in specific contract agreements with the Project	Number of bids received from local enterprises	Data on proposals received	
Goal: Inclusive and balanced distribution of benefits	Input: Implementation of community development projects targeting vulnerable groups	Community projects implemented targeting vulnerable groups	GML reports on community development initiatives – verified by community participants	
	Input: Targeting for women for participation in vocational training	Number of women working for the Project and employed indirectly as a result of the Project	Employment records and reports from community	

Impact and Benefit Plan	Inputs/Outputs	Objectively verifiable indicators (Monitoring Plan)	Source of verification	Risks and assumptions
	courses relevant to indirect employment opportunities	Number of women completing vocational training courses	Training records from vocational schools	
Employment and Labour Conditions				
Goal: Maximise Greenlandic employment and improve work skills capacity amongst Greenlandic labour and increased levels of training participation and completion	Input: Information sessions with communities to explain nature of opportunities with Project	Number of stakeholder meetings held per annum on recruitment criteria	Stakeholder engagement meeting records	
	Input: Engagement with training institutes and schools to refine course content to suit industry needs	Increased participation in PKU Kurser in fields of relevance to the mining industry	PKU Kurser participation records	
	Input: Engagement with Majoriaq and schools to encourage students to complete schooling and become job ready	Number of students completing school in Narsaq (either directly or through Majoriaq finishing programmes)	Narsaq school and Majoriaq records	
	Input: Implementation of mentoring program for Greenlandic staff in GML to accelerate promotion	Number of Greenlandic employees in Manager, Professional and Technical and Associate Professional levels in GML	GML employment records and submission to GoG	
	Input: Training and skills program for workers after mine closure t assist them to secure future employment	Number of workers who participate in pre-mine closure training programmes	GML training records	
	Output: Recruitment of 40 graduates from School of Minerals and Petroleum	Number of graduates hired from School of Minerals and Petroleum	School of Minerals and Petroleum graduation records and GML employment records	

Impact and Benefit Plan	Inputs/Outputs	Objectively verifiable indicators (Monitoring Plan)	Source of verification	Risks and assumptions
	Output: 15 apprentices trained per year during operations	Number of apprentices trained per year during operations	GML employment records	
Goal: Achieve a harmonious relationship between Project workers and the Narsaq community	Input: Establishment of a community grievance mechanism	Number of grievances lodged and trends in the nature of the grievances	Stakeholder engagement report	
	Input: Encouragement of sporting events between Project workers and Narsaq residents	Number of sporting events held	Stakeholder engagement report	
	Output: Narsaq residents employed in Village and construction camp	Number of Narsaq residents gaining work on the Project	GML employment records	
	Output: Social harmony in Narsaq	Number of social incidents involving Project workers recorded by the Police	Police records	
Land-Based and Ocean-Based Economic Displacement				
Goal: Minimise impact to land-based livelihoods	Input: Implement dust and radiation controls	No exceedances of dust or radiation exposure in the community	Monitoring reports from dust and radiation monitoring equipment located in Ilua Valley and in Narsaq town	There is a risk that livelihoods of farmers and / or fishermen may change as a result of any number of reasons. The perception of individuals may suggest one cause, but the only verifiable approach to assessing impact is to monitor environmental
	Input: GML will engage with local businesses on a regular basis to provide updates on the Project	Number of meetings held	Stakeholder engagement records	
	Input: GML will engage with SPS and KNAPK to provide updates on the	Number of meetings held	Stakeholder engagement records	

Impact and Benefit Plan	Inputs/Outputs	Objectively verifiable indicators (Monitoring Plan)	Source of verification	Risks and assumptions
	Project and present monitoring results			impacts and address the "perception" issues through engagement.
	Output: Farmers and fishermen confirm there is no significant impact to their livestock / resources	No significant changes to the livelihoods of fishermen or farmers as a result of the Project's activities	Engagement with local farmers and fishermen	
Occupational Health and Safety				
Goal: Avoid accidents and injuries related to the Project	Input: Emergency and contingency plans in coordination with the Greenland Contingency Committee	Emergency and contingency plan developed	Emergency and contingency plan document Acknowledgement from Greenland Contingency Committee	
	Input: Health and Safety Management Plan for the Project	Health Safety Management Plan developed	Health and safety management plan document	
	Input: Training of all employees and contractors on safety and occupational health risks	Number of training courses conducted		
	Input: Pre-employment and annual medical check of workforce			
	Output: Minimise the risk of accidents directly on the Project	Lost Time Injury Frequency Rate (LTIFR) for the Project	Quarterly report on safety statistics	
	Output: Ensure appropriate and timely response in case of accidents and emergency evacuation from the Project site	Preparedness exercise		

Impact and Benefit Plan	Inputs/Outputs	Objectively verifiable indicators (Monitoring Plan)	Source of verification	Risks and assumptions
Goal: Maintain a safe and healthy working environment for workers	Input: All employees will undergo an annual medical exam	Medical records maintained for all employees	Company health records	
	Output: Minimise the risk of radiation exposure for workers	Monitoring statistics related to dose exposures	Statistics will be reported on annual basis in community meetings and upon request to GoG	
Community Health and Safety				
Goal: Maintain a safe and healthy community in Narsaq and surrounds	Input: GML Code of Conduct applicable for all workers and visitors	All workers have signed the Code of Conduct	Company records	
	Input: Monitoring of air quality and radiation exposure in community areas	No exceedances of dust or radiation exposure in the community	Monitoring reports from dust and radiation monitoring equipment located in Ilua Valley and in Narsaq town	
	Input: Monitoring of health outcomes of employees, with focus on communicable disease trends	No significant increase in communicable diseases witnessed amongst employees	Due to sensitivity of medical records, this information will be summarised and shared by Project health clinic with the Narsaq health service only	
	Output: No significant changes to the level of communicable diseases in Narsaq	No significant worsening of prevalence of communicable disease at Narsaq health centre	Narsaq health service records	

Impact and Benefit Plan	Inputs/Outputs	Objectively verifiable indicators (Monitoring Plan)	Source of verification	Risks and assumptions
Social Structure and Cultural Life				
Goal: Minimise adverse impacts to infrastructure and service delivery capacity and support services where possible	Input: Plan developed with GoG to determine how best to support the using of foreign worker visas	Plan developed to support processing of foreign worker visa applications	Plan developed	
	Input: Plan developed with Greenland's Ministry of Health and Kommune Kujalleq to determine how to address any changes to health service demand in Narsaq	Plan developed with MoH to address health service delivery considerations in Narsaq	Plan developed	Local services willing to cooperate in preparation of plan.

9. Stakeholder Engagement

This section describes the approach to stakeholder engagement taken by GML, identifies key stakeholders for the Project and summarises the key stakeholder engagement events which have taken place in relation to the SIA to date. In addition, it contains a communications strategy for the activities planned prior to and during the public hearing period, and a description of the Project's grievance mechanism.

9.1 Stakeholder Identification

Stakeholders are defined as organisations, institutions or individuals who are expected to be affected by or have an interest in the Project. Table 9.1 summarises key stakeholders for the Project in the SIA process. This list will be continually updated to reflect new and emerging social groups or institutions throughout the SIA period.

Table 9.1 Key Stakeholders

English Description	Greenlandic Name
AUTHORITIES	
MLSA	Aatsitassanut Ikummatissanullu Aqutsisoqarfik
Ministries in Greenland : • Finances • Mineral Resources • Housing, Building and Agriculture • Industry, Labour and Trade • Family, Equality and Social Welfare • Health • Education, Culture, Research and Church • Nature, Environment and Justice	Naalakkersuisoqarfiit: • Aningaasaqarnermut • Aatsitassanut Ikummatissanullu • Ineqarnermut, Sanaartornermut Attaveqarnermullu • Aalisarnermut, Piniarnermut Nunalerinermullu • Inuussutissarsiornermut, Suliffeqarnermut Niuernermullu • Ilaqutariinnermut, Naligiissitaanermut Isumaginninnermullu • Peqqissutsimut • Ilinniartitaanermut, Kultureqarnermut, Ilisimatusarnermut Ilageeqarnermullu • Pinngortitamut, Avatangiisinut Inatsisinillu Atuutsitsinermut
Municipality – Kommune Kujalleq: • The Mayor's department (Qaqortoq) • Industry and labour market, (Narsaq) • Culture, leisure and prevention (Narsaq) • Prevention consultant (Narsaq) • Housing and Environment (Qaqortoq) • Social Services (Qaqortoq) • School and pre-school (Nanortalik) • Finances (Qaqortoq)	Kommune Kujalleq: • Borgmesterip allaffia • Inuussutissarsiornermut Suliffeqarnermullu Ingerlatsivik • Kulturi, Sunngiffik Pitsaaliuinerlu • Pitsaaliuinermi Siunnersorti • Teknikkeqarnermut, Ineqarnermut & Avatangiisinullu Ingerlatsivik • Isumaginninnermut Ingerlatsivik • Atuarfeqarfinnut ulluinnarnilu paaqqinnittarfinnik ingerlatsivik • Aningaasaqarnermik Ingerlatsineq

English Description	Greenlandic Name
GOVERNMENT ORGANISATIONS	
The Greenland Nature Institute	Pinngortitaleriffik
National Museum	Kalaallit Nunaata Katersugaasivia
Narsaq Museum	Narsap Katersugaasivia
Working Environment Authority	Sullivinnik Nakkutilliisoqarfik
National Association of Municipalities	KANUKOKA
WORKERS AND EMPLOYERS ORGANIZATIONS	
Workers Union	Sulinermik Inuussutissarsiuteqartut Kattuffiat (SIK) Sulinermik Inuussutissarsiuteqartut Peqatigiiffik (SIP)
Greenland's Employers' Association	GA
Greenlandic Employers' Association	Nunaqavisissut Suliffiutillit Kattuffiat (NUSUKA)
ORGANIZATIONS RELATED TO BUSINESS AND DEVELOPMENT	
Visit Greenland	Visit Greenland
Greenland Venture	Greenland Venture
Greenland Business	Greenland Business
Local Trade Forum	(Erhvervsforum Kujalleq)
Private rock and gemstone gatherers	
ORGANIZATIONS RELATED TO FISHING, HUNTING AND FARMING	
Fisherman and Hunters Association (KNAPK) Locally representatives (APP)	Kalaallit Nunaanni Aalisartut Piniartullu Kattuffiat (KNAPK) Aalisartut Piniartullu Peqatigiiffiat (APP)
Sheep Farmers' Association	Savaatillit Peqatigiit Suleqatigiissut
ORGANIZATIONS RELATED TO EDUCATION AND TRAINING	
School of minerals and petroleum (Råstofskolen) School of Metal and Mechanics (from Jan 11 associated to School of Mining)	Sanaartornermik Ilinniarfik or Sanilin (Sisimiut)
Cooking School	INUILI
The workers' school	Sulisartut Højskoliat
OTHER ORGANISATIONS	
Narsaq Earth Charter	
Against uranium in Narsaq	
AVATAQ	AVATAQ – Pinngortitaq avatangiisunullu peqatigiiffik
ICC – Inuit Circumpolar Conference	
Women's Association (local representative in Narsaq)	Arnat Peqatigiiffiat
Elders Association/Council (local representative in Narsaq)	Utoqqaat Peqatigiiffiat

9.2 Stakeholder engagement activities

GML has been engaging with stakeholders since the early stages of exploration at Kvanefjeld. Engagement has involved both formal meetings, including town hall discussions, as well as informal exchanges between the Company's representatives based in Narsaq and Nuuk and Greenlandic stakeholders. In most years GME has conducted community town hall meetings in Narsaq and Qaqortoq (and on occasion in Nanortalik) to provide an update on the Project's status and to discuss topics of interest or concern with potentially affected stakeholders. Table 9.2 provides a brief summary of the key stakeholder engagement activities undertaken by GML outside of the SIA process (a more detailed summary can be found in Appendix B).

Table 9.2 Key Stakeholder Engagement Events Prior to SIA Process

Year	Location / Stakeholder	Format	Purpose
2010	Narsaq, GML office facility	Open Day	To provide stakeholders with general information regarding the processes associated with mining and information specific to the Project.
2011	Qaqortoq	Open Day	To provide stakeholders with general information regarding the processes associated with mining and information specific to the Project.
Aug 2013	Most of the small settlements in Kommune Kujalleq	Information Tour	The tour began in the southern village of Aappilatoq and ended in the northern settlement of Narsarsuaq (where a number of sheep farmers also attended). Provided an overview of the Project and an opportunity for interested stakeholders to ask questions about the Project.
2014	Qaasuitsup Kommunia visiting the larger towns of Disco Bay area	Information Tour	Provided an overview of the Project and an opportunity for interested stakeholders to ask questions about the Project.
2014	Qeqqata Kommunea, including the towns of Sisimiut and Maniitsoq	Information Tour	Provided an overview of the Project and an opportunity for interested stakeholders to ask questions about the Project.
2015	Sheep farmers in Qassiarsuk and Igaliku	Information sharing tour	GME visited sheep farmers in Qassiarsuk and Igaliku to provide an update on the Project and to discuss their concerns.
2015	Narsaq and Qaqortoq	Town Hall meetings	Following the meetings with the sheep farmers, town hall meetings were held where GME also engaged with local representatives of KNAPK (fishing and hunting organisation).

In addition to these formal engagements, GML maintain a storage facility /warehouse and office in Narsaq and maintain an office in Nuuk. In both locations, stakeholders are encouraged to visit the offices to ask questions and understand the Project as appropriate. Given the small size of the Narsaq community, much engagement happens informally through social interactions and

participation in community life. GML management and workers are encouraged to participate in local community forums to provide additional opportunities to engage with community members on a variety of topics.

In order to expand the audience who can access information about the Project, GML maintains a regularly updated website, available in Danish, Greenlandic and English. When the Project gains approval, GML plan to launch a monthly newsletter to be published in Greenlandic and English. Hard copies of the newsletter will be provided to the local population and copies will also be made available electronically. GML plans to continue to hold town hall meetings in Narsaq, on a bi-annual basis, and engagement with key stakeholders identified in Section 8.1 will be on-going. Specifically, engagement with local schools and businesses will be a key focus, as will ongoing meetings with the Mayor and administrative staff of Kommune Kujalleq and SIK.

9.2.1 Stakeholder Engagement Related to the SIA Process

GML began the process of developing a Terms of Reference (ToR) for the SIA in 2011. Between 2011 and 2014, a number of variations of the Project were considered (see Section 5: Alternatives Assessment), and a revised ToR was published for pre-hearing in July 2014. All information related to the pre-hearing including the final ToR is available at

http://naalakkersuisut.gl/da/H%C3%B8ringer/Arkiv-over-h%C3%B8ringer/2014/Kuannersuit-forhoering.

The ToR for the SIA was subject to 35 days public consultation from late August – early October 2014, and in the first half of 2015, GME submitted a revised ToR to the MIE for consideration. The revisions made between the 2014 and 2015 versions were in response to comments raised during the consultation process. The consultation responses were collated and published on Naalakkerssuisut.gl and significant comments were published in a White Paper which was also published online. The ToR for the Project's SIA was approved in October 2015.

Subsequent to the approval of the ToR, GML has been and will continue to engage with stakeholders through both formal and informal processes.

In 2014 meetings were organized by the Ministry of Industry and Mineral Resources and in 2015 meetings were organized by the Ministry of Industry, Labor and Trade. While these meetings were primarily focussed on the potential environmental impacts of the Project, potential social impacts were also raised and discussed at these town hall Meetings. The dates for these meetings are highlighted below:

- Uranium information tour – Uummannaq, Ilulissat, Aasiaat, Kangerlussuaq ans Sisimiut, 2014;
- Uranium information tour continuation: Maniitsoq, Nuuk, Paamiut, Narsaq, Qaqortoq,Nanortalik, Narsarsuaq and Qassiarsuk, 2015
- Narsaq, August 2017

A draft SIA was submitted for review by MIE in 2015. Following feedback from MIE and to incorporate design modifications for the Project this revised SIA will be submitted to MIE in mid-2018. Following approval by MIE for public review, the GoG will make the draft SIA available for public consultation for a period of at least eight (8) weeks on Naalakkersuisut.gl. During this consultation period, the GoG (in coordination with GML) will conduct public consultation meetings

in towns and settlements potentially affected by the Project. It is proposed that public consultation meetings will occur in the following towns:

- Narsaq
- Qaqortoq
- Nanortalik
- Narsarsuaq
- Qassiarsuk
- Igaliku
- Nuuk

Similar to the process for the development of the ToR for the SIA, public feedback / comments will be collected and collated, with significant comments documented in a White Paper. The White Paper will be used as the basis for any revisions required to the draft SIA.

As part of the SIA process, GML will engage with national level and Kommune Kujalleq administrators and community leaders to discuss the Impact Benefit Agreement (IBA). Upon agreement of the content of the IBA, the agreement will be concluded between the GoG, Kommune Kujalleq and GML.

9.3 Grievance mechanism

A grievance is a concern or a complaint raised by an individual or a group within communities affected by a company's operations. The objective of a grievance mechanism is to provide a transparent procedure for the recording, handling and resolution of complaints submitted by stakeholders.

The following paragraphs propose a potential grievance mechanism, which will be introduced by GML. The complaints and grievance procedures will be transparent, clearly structured, simple and locally anchored. Stakeholders will be able to submit complaints and grievances anonymously if they chose to.

Recognizing the importance of language specific options, complaints or concerns can be raised in Greenlandic, Danish and/or English. The grievance mechanism will be implemented prior to the commencement of construction and will continue throughout the duration of the Project. The grievance mechanism will offer a variety of options for people to contact the Project to raise a concern, as illustrated in Figure 9.1.

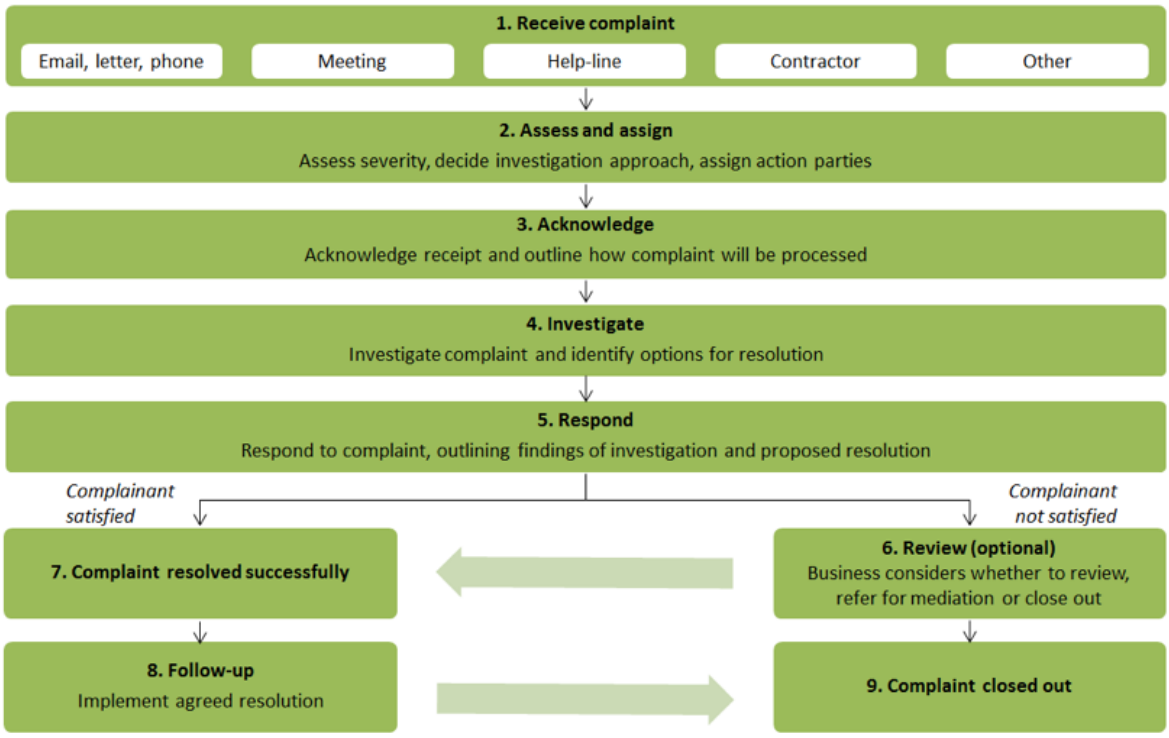

Figure 9.1 Grievance Mechanism Process

GML will develop the full details of the grievance mechanism prior to the commencement of construction activities and will inform communities about the mechanism at that time. The anticipated response timelines for addressing complaints are expected to be within the following guidelines:

- GML will transit an acknowledgement of the receipt of a grievance to the individual or organisation lodging the grievance within 3 business days of receiving the grievance;
- GML will investigate the grievance and provide an initial response to the person making the grievance (to try to address the grievance) within 10 days of receipt of the invoice. Depending on the complexity of the issue being raised, it may take longer to resolve some grievances;
- GML will monitor and track all grievances. Internal monitoring reports will summarise on a weekly basis how many grievances remain "open" and how long the grievance has been "open". Efforts will be made to resolve 'simple' grievances within a month of receipt, and more complex grievances within 3 months of receipt.

10. Impact Benefit Agreement Framework

An Impact Benefit Agreement (IBA) is an agreement between the licensee, the municipality and the Government of Greenland. "The purpose of the agreement is to safeguard Greenlandic interests and social commitments from the parties involved throughout the mining project" (MIE, 2016). Negotiation on the IBA is expected to commence after the eight week public consultation period for the SIA. The SIA report will form the basis for the negotiation of the IBA. Following agreement, the IBA will be published on www.naalakkersuisut.gl

Table 10.1 has been prepared to support the development of the IBA.

Table 10.1 Linkage between SIA Sections and IBA Appendices

Appendix Number	Proposed Contents in the Appendices of the Upcoming IBA	Location Reference in the SIA
Appendix 1	Project Description	Section 3 – Project Description
Appendix 2	Monitoring, reporting and evaluation	Section 8 – Benefit and Impact Plan (including monitoring and evaluation)
Appendix 3	Greenland workers	Section 6.7 (Livelihood Activities and Employment baseline) Section 7.2.1 (Greenland Employment and Procurement impact) Section 7.3 (Employment and Labour Conditions impact)
Appendix 4	Education and training of Greenland workers	Section 6.4 (Education baseline) Section 7.3.2 (Training and Work Skills Capacity Building impact)
Appendix 5	Use of Greenland Enterprises	Section 6.3 (Economy baseline) Section 7.2.1.2 (Greenlandic Employment and Procurement impact) Section 7.3.3. (Indirect employment and local Procurement impact)
Appendix 6	List of Agreements to be offered on Greenland terms to Greenland Enterprises	To be negotiated.
Appendix 7	Business development in Greenland mineral resource industry	Section 6.3 (Economy baseline) Section 7.2.1 (Greenlandic Employment and Procurement impact) Section 7.3.3. (Indirect employment and local Procurement impact)
Appendix 8	Impacts on farmers, fishermen and hunters	Section 6.7 (Livelihood Activities and Employment, baseline) Section 7.4 (Land-use and Land Based Livelihoods impact) Section 7.5 (Ocean Resources and Ocean-Based Livelihoods impact)

Appendix Number	Proposed Contents in the Appendices of the Upcoming IBA	Location Reference in the SIA
Appendix 9	Health	Section 6.5 (Community Health baseline) Section 7.6 (Occupational Health impact) Section 7.7 (Community Health, Safety and Security impact)
Appendix 10	International security obligations	Section 4.4
Appendix 11	Other socio-economic and sustainability matters	Section 7.8 (Social Structures and Community Life impact)

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12. Appendix A Greenlandic Businesses of Relevance to the Project

Transport

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Air Greenland A/S http://www.airgreenland.com/about/annual-report	Air transport	37.5% owned by self-government	Provides domestic and international air transportation. Granted concession for passenger, mail and freight air transportation to villages in Greenland (until end 2015). Also operates ambulance/medi-helicopters, chartered flights.		Domestic and international air transportation to/from Narsarsuaq/ Narsaq. Charter flight service.
Mittarfeqarfiit/ Greenland Airports http://www.mit.gl/en/about-mittarfeqarfiit/	Transport/ Infrastructure	Net-controlled company (under political leadership and backed by the Treasury, but has individual financial reporting)	Manages air transportation of passengers and cargo in Greenland. Provides services to a number of aircraft operators, the Greenland society and private companies.	Controls 13 airports and 46 helipads. Around 450 employees.	Present in Narsarsuaq/ Narsaq and Qaqortoq
Royal Arctic Line (RAL) A/S http://www.royalarcticline.com/about-us/the-royal-arctic-group/	Sea transport and logistics	100% owned by self-government	Granted exclusive concession for transportation of all sea cargo inside Greenland and to and from Greenland with the exception of transportation for mineral resources. Shipping and logistics operations in 13 biggest ports in Greenland and represents the state port authority (through Royal Arctic Havneservice). Air freight, air/sea freight undertaken by Royal Arctic Logistics.	10 ships	Transport network includes Qaqortoq and Narsaq

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Arctic Umiaq Line A/S http://aul.gl/en/about-us/who-are-we.html	Sea transport (passengers)	Owned by Royal Arctic Line A/S and Air Greenland A/S	Sails north up Greenland's western coastline from Qaqortoq to Illulissat (making 9 stops), and returns to Qaqortoq, passing Nuuk, as well as seven other stops.	20,000 passengers yearly (where about 2,000 are tourists)	Network includes Qaqortoq

Construction

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Arssarnerit	Construction (Electrical installations)	Privately owned (100% by Lindpro)	Arssarnerit is Greenland's largest electrical installations business, with branch office in Nuuk, Kangerlussuaq, Qaqortoq, Sisimiut and Nanortalik.	Arssarnerit is Greenland's largest electrical installations business.	Located in Qaqortoq

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
LNS Greenland A/S www.lns.gl/en	Construction, logistics and transport	Privately owned /private shareholders	Services related to larger construction Projects and provision of service to mine Projects. Some recent Projects include: - Expansion and renovation of Neqi in Narsaq - Sub-contractor on hydropower plant in Qorlortorsuaq - Contractor and operator on misc. mining exploration activities Provided most of the services needed under the goldmine Nalunaq gold mine (est. 2004), including construction of the mining town, harbour and storage area and heliport. Also transported ore from production to shipping site. Maintenance of roads and camp area. Also provision of catering service for the mine camp. Ruby/Sapphire mining.	One of the largest construction actors in Greenland.	Located in Qaqortoq
Narsaq El	Electrician	Private company	Electrician installation services	Minor company	Located in Narsaq
Narsaq VVS	Plumbing	Private company	Plumbing	Minor company	Located in Narsaq
Nørskov Gruppen A/S http://www.norskov.gl/index.html	Construction	Private company	Covers services within - Construction and construction management - Contracted work - Carpentry - Plumbing and sanitation - Freeze and cold storage Completed renovation and reconstruction of Qaqortup Atuarfia.	Renovation and reconstruction of Qaqortup Atuarfia	Located in Qaqortoq

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Permagreen Grønland A/S http://www.permagreen.gl/	Construction	Private company	Covers services within - Construction - Concrete contractor - Carpentry - Masonry In Narsaq: delivery of heating oil, fuel and related products from gas station. Haulage, snow removal and sale of building material. Completed retirement home in Qaqortoq, student homes in Qaqortoq as well as the Inuili hotel in Narsaq.	250 employees across branches.	Located in Qaqortoq and Narsaq
Qaqortoq Entreprenørforretning ApS	Construction	Private company	Construction	Student apartments in Qaqortoq Renovation and rebuilding of Nanortalip Atuarfia	Located in Qaqortoq
Smedegården	Plumbing	Private company	Plumbing	Minor company	Located in Narsaq
Sydgrønlands El	Electrician	Private company	Electrician	Minor company	Located in Qaqortoq
VVS Service	Plumbing	Private company	Plumbing	Minor company	Located in Qaqortoq

Public Services

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Nukissiortfiit A/S https://www.nukissiorfiit.gl/?lang=da	Utilities	100% owned by self-government	Production and distribution of electricity, water and heating across Greenland.	400 employees across Greenland	Qaqortoq, Narsaq and Nanortalik
Tele Post Greenland http://www.tele.gl/da	Communications	100% owned by self-government	Radio, television, telephone, mobile phone and broadband internet across Greenland.	460 employees	Qaqortoq and Narsaq

Wholesale and Retail Services

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Brugseni http://www.brugsen.gl/dk/forside.htm	Retail and consumer goods	Owned collectively through De Grønlandske Brugser	Operates 13 stores in southwestern Greenland	390 employees and annual turnover of 664 million DKK in 2013.	Operates stores in Qaqortoq and Narsaq (and Nanortalik)

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
KNI A/S http://www.kni.gl/en/	Wholesale and services, operates in the energy, retail, and food/produce sectors. Includes Pilersuisoq, a retail chain, and Pisisa.gl, a web shop.	100% owned by self-government (KNI was known as Royal Greenland Trade Department (KGH) until 1986). KNI A/S has a 50% ownership share in Pilerquisoq	KNI operates service contracts (current until 31/12/16) for the GoG, operating shops in villages and small towns where services related to retail and wholesale cannot be maintained on a profitable basis. KNI also holds service contracts for provision of services such as post office, banks, helistops and other freight-related and socially relevant tasks. KNI also holds a service contract for sale of liquid fuels in Greenland until 2016 (through Polaroil).	1,000 employees across Greenland and annual turnover of 2.5 billion DKK combined across the four businesses.	Operates Polaroil in Qaqortoq and Narsaq
KK Engros. I/S http://www.kkengros.gl/kk-engros	Catering wholesale	Part of Pisiffik, owned by Danish company Dagrofa A/S	15,000 different products within food, beverage and other merchandise. Provision of catering service for camps.	3,000 m^2 warehouse facility in Nuuk harbour. Caterers to mines, offshore, trawlers.	Operates from Nuuk.
Pilersuisoq http://www.pilersuisoq.gl/da/	Retail and consumer goods	Owned by KNI A/S	65 grocery and consumer goods stores across Greenland in smaller towns and settlements. Also provide postal services, heliport services and ship calls from the stores.		Operates stores in Qaqortoq and Narsaq (and Nanortalik)
Pisiffik A/S http://www.pisiffik.gl/ http://www.dagrofa.dk/da-DK/Presse/Årsrapporter.aspx	Retail	Owned by Danish company Dagrofa A/S (86%), the Greenland self-government and the employee coop.	35 stores across Greenland comprising larger supermarket chains, clothes, consumer electronics and hardware stores. Stores are located in Qaqortoq, Nuuk, Maniitsoq, Sisimiut, Aasiaat and Illulissat.	603 employees and an annual turnover of 970 million DKK.	Operates the Spar grocery store in Qaqortoq

Tourism

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Arctic Bar	Hospitality	Private company	Bar in Qaqortoq.		Located in Qaqortoq
Greenland Tourism and Business Council A/S www.greenland.com / http://corporate.greenland.com/en/	Tourism	100% owned by self-government	Main focus on tourism development in Greenland. Also provides advisory services to domestic businesses.	10 employees within market research, market segmentation, and advertising	
Hotel Narsaq http://www.hotel-narsaq.gl/english/start.htm	Hospitality	Owned by Hotel Narsaq Group	Single and double rooms, both en suite bathrooms and share. Modern amenities such as television, refrigerator and safety deposit box in each room. The hotel also has a restaurant and a café.	12-14	Located in Narsaq
Hønsehuset	Hospitality	n/a	Bar in Narsaq		Located in Narsaq
Narsaq Museum http://www.greenland.com/da/providers/narsaq-museum/	Tourism	n/a	Situated at the old harbour, features historical buildings and cultural artefacts from the region, including kayaks. Permanent exhibit on Norse history and the arrival of the Norse to Greenland's south in the 10th century.	n/a	Located in Narsaq
Narsaq Farm House, Bed & Breakfast	Hospitality	n/a	Youth hostel housed in a former mink farm, situated outside of the main town. Rooms with shared bathroom facilities and ensuite facilities. The hostel also offers common area facilities to campers.	n/a	Located in Narsaq

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Silamut House Rental From VSB	Hospitality	n/a	Privately owned house available for one-week rental throughout the year. Contains living area with sofa sleeper (2 persons), kitchen and toilet.	n/a	Located in Narsaq
Thai Restaurant	Hospitality	n/a	Restaurant in Qaqortoq		Located in Qaqortoq

Food Production

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Arctic Prime Production http://www.app.gl/	Fishery	Private company	Catch and processing of cod (frozen, salted and roe) and halibut. Export to European markets.	Production of around 3,000 mt yearly. Employs around 60-70 in factories and another 70-80 fishermen.	Three factories in Greenland, one in Qaqortoq.
Eqaluit Ilua http://www.mamartut.gl/dansk/virksomheder/virksomhedproducent/kartoffel.htm	Potato production	n/a	Potato crop sold to Brugsen (domestic).	Crop of approximately 50 tonnes per year. 9 employees (2013).	Located in Sermilik Fjorden, north of Narsaq.

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
Isortoq Reindeer Station http://www.mamartut.gl/dansk/virksomheder/virksomhedproducent/isortoq.htm	Reindeer breeding and slaughterhouse	Private company	Breeding, slaughtering and processing of reindeer meat for distribution to domestic grocery stores (De Grønlandske Brugser, Pissifik) and export. The station's slaughterhouse is approved according to EU standards.	800-1,000 animals slaughtered per year. 5-7 employees during summer and peak of 10 during reindeer season.	Situated around 100 km from Qaqortoq and Narsaq.
Narsaq Seafood A/S http://www.mamartut.gl/dansk/virksomheder/virksomhedproducent/narsaqseafood.htm	Fishery	n/a	Distributes to De Grønlandske Brugser, Pissifik as well as to Polar Seafood, Restaurant Ban Thai (Qaqortoq) and Hotel Qaqortoq, in addition to some export.	Yearly production of 210 tonnes crabs. 12 employees on production site in addition to approximately 20 fishermen.	Narsaq.
Neqi A/S http://www.kni.gl/da/vores-virksomheder/om-neqi/	Slaughterhouse	KNI A/S owns 100% share in Neqi	Only slaughterhouse for the slaughter of sheep and lambs from the approximately 40 sheep farmers found in South Greenland. Distributes to stores around Greenland.	The slaughterhouse has capacity to slaughter about 25,000 lambs each year. A small number of employees are permanently employed all year round. Peak season more than 100 people are employed, primarily from the local area.	Narsaq
Royal Greenland **www.royalgreenland.com /** http://www.royalgreenland.gl/da/Afdelinger/La	Food production (incl. production and distribution)	100% self-government owned	Operates fishing vessels, procures and distributes fish (including cod, catfish, rockfish, lumpfish roe, and halibut) and cold water prawns.	Factory in Narsaq has a freezing capacity of 20 tonnes in 24 hours and storage capacity of 600 tonnes.	Roe factory in Narsaq employing 15 in high season, one person in low season.

Company	Sector	Ownership structure	Main services provided	Production capacity (how much is produced/where is it sold/how many employees)	Local presence of relevance for the Project
ndbaseret-Produktion/Fabrikker-og-indhandlingsanlaeg/Narsaq			Distributes locally to grocery stores and distributors, as well as holding a substantial exporting capacity: Royal Greenland is the largest supplier of cold water prawns in the world.	980 employees in Greenland, annual turnover of 4,91 billion DKK (2013). Operates four ocean-going trawlers and a number of vessels for coastal fishing in Greenland.	
Tuttutooq Reindeer Station	Breeding of reindeer	n/a	Breeding of reindeers, which are shipped to Narsaq slaughter house (Neqi A/S).	200 reindeers in 2014, planned to increase to 600 to obtain a more sustainable production (information obtained during Stakeholder engagement 2014)	Narsaq area (Narsaq Sound)

13. Appendix B – Stakeholder Engagement Activities

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
National Authorities						
Department on Infrastructure and health **Section of Health**	Inform briefly on the Project and the SIA process Collect sources for health baseline	Interview of key informant	1. Local healthcare facilities. 2. Process for use of local healthcare facilities of mining companies. 3. Vulnerable groups. 4. Any studies on the reduced use of traditional food could lead to more lifestyle diseases. 5. Any studies on unemployment and health. 6. Figures on sex crimes. 7. Validate figures on STI. 8. Validate figures on cancer/lung cancer. 9. Figures on smoking. 10. Validate figures on birth age.	27.10.14	31.10.14	31.10.14
Department on Infrastructure and Health **Section of infrastructure**	Inform briefly on the Project and the SIA process Collect info on infrastructure	Interview of key informant	1. Status on the infrastructure in South Greenland and the discussion on the airport at Qaqortoq?	24.10.14	31.10.14	06.11.14

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
Kommune Kujalleq						
Head of Mineral Section	Inform briefly on the Project and on the SIA process Collection of socio-economic baseline Collections of plans of relevant for the SIA Hearing Response	Interview of key informant	1. Socio-economic baseline. 2. Opportunities? 3. Concerns? 4. Plan and initiatives from Kommune Kujalleq 5. Other.	17.10.14	27.10.14	15.11.14
Head of Mineral Section	Brief presentation of the status of the SIA, and follow up from meeting in 2014 and the identified impacts. Presentation of plan of meetings in September 2015.	Interview with key informant	1. Concerns related to the Project? 2. Opportunities for the local community? 3. Working conditions? 4. Plan for Kujalleq?	01.09.15	08.09.15	08.09.15
Member of the board of Kommune Kujalleq (IA)	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Concerns and opportunities	Interview of key informant	1. How would you describe Narsaq today? 2. How do you think Narsaq would look in 30 years – if no mine? 3. How do you think Narsaq would look in 30 years with a mine – concerns/opportunities? 4. Other.	20.10.14	27.10.14	15.11.14

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
Head of Department for Employment Narsaq	Inform briefly on the Project and the SIA process Collect baseline information Concerns and opportunities	Interview of key informant	1. What is the general situation in the municipality regarding unemployment? 2. More information on the summerhouses in the valley? 3. What are the opportunities? 4. How are the vulnerable groups in?	22.10.14	27.10.14	27.10.14
Head of Department for Technic and Environment Narsaq	Collection of baseline information on public infrastructure (energy, water and waste)	Interview of key informant	Current situation on water supply, waste management and waste water treatment.	22.10.14	27.10.14	15.11.14
Piareersarfik Nanortalik,	Inform briefly on the Project and the SIA process Experience from Nalunaq	Interview of key informant	1. Local employment opportunities at Nalunaq Goldmine. 2. Education activities prepared by the municipal to support the employment opportunities? 3. Which are the lessons learned from the Gold mine to bring forward to the Project? 4. Where are the previous employed persons from Nalunaq today?	15.10.14	27.10.14	27.10.14

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
CSOs						
GE Narsaq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Collection of baseline information Concerns and opportunities	Interview with key informant	1. Current members of GE in Narsaq. 2. How do representatives from GE recruit new staff? 3. Opportunities and concerns?	22.10.14	27.10.14	27.10.14
GE Narsaq	Brief presentation of the status of the SIA and the identified impacts. Special focus on the business opportunities Discussions of inputs to the BIP.	Interview with key informant	1. Discussion on location of the proposed port and accommodation close to Narsaq. 2. Opportunities for local employment and recruitment of local workforce.	07.09.15	08.09.15	09.09.15
GE Qaqortoq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Collection of baseline information	Interview with key informant	1. Current members of GE in Qaqortoq. 2. Opportunities and concerns?	18.10.14	27.10.14	15.11.14

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
	Concerns and opportunities					
GE Nanortalik	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Collection of baseline information Experience on Nalunaq goldmine	Interview of key informant	1. Which companies from Nanortalik were engaged in the Nalunaq mine? 2. How did the engagement of the local companies developed over time? 3. Which are the lessons learned from the Nalunaq goldmine to bring forward to the Project?	16.10.14	27.10.14	27.10.14
SIK Narsaq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Local employment opportunities	Interview of key informant	1. Concern and opportunities? 2. Other general issues.	20.10.14	27.10.14	15.11.14
SIK Qaqortoq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Local employment opportunities	Interview of key informant	1. Concern and opportunities? 2. Other general issues.	16.10.14	27.10.14	15.11.14

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
Industry						
Arctic Prime production	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Collection of baseline information on the fish production. Concerns and opportunities for a food production	Interview of key informant	1. Baseline information 2. Opportunities 3. Concerns 4. Other	17.10.14	27.10.14	27.10.14
Neqi A/S (slaughter house) Narsaq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Collection of baseline information on food production industry. Concerns and opportunities for a food production	Interview of key informant	1. Baseline information 2. Opportunities/Concerns	21.10.14	27.10.14	15.11.14
Neqi A/S (slaughter house) Narsaq	Brief presentation of the status of the SIA	Interview with key informant	1. Number of animal slaughtered in seals caught in 2015 (indhandlingstal)? 2. Opportunities for provision of meat to the Project.	07.11.15	8.09.15	24.09.15

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
	and the identified impacts. Discussions of inputs to the BIP Follow up on key numbers from Neqi A/S Opportunities for the slaughter and sheep farming businesses.					
Holder of caribou on Tuttuttooq close to Narsaq.	Brief presentation of the status of the SIA. Number of animals.	Interview with key informant	1. No of animals at Tuttuttooq and nu of animals slaughtered.	13.11.14	13.11.14	02.12.14
Tourism industry Nanortalik	Inform briefly on the Project and on the SIA process Experience from Nalunaq	Interview of key informant	1. How was the tourism industry engaged in the Nalunaq mine Project? 2. How did the mine impact the town? 3. Which are the lessons learned from the Nalunaq goldmine to bring forward to the Project?	15.10.14	27.10.14	27.10.14
Hotel Kap Farvel Nanortalik	Inform briefly on the Project and on the SIA process Experience from Nalunaq	Interview of key informant	1. How did the Hotel benefit from the Nalunaq mine Project? 2. How did the engaged developed over time? 3. Which are the lessons learned from the Nalunaq goldmine to bring forward to the Project.	16.10.14	27.10.14	15.11.14

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
			4. Other			
Hotel Narsaq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Concerns and opportunities for the tourism	Interview of key informant	1. Opportunities/Concerns.	21.10.14	27.10.14	15.11.14
Representative from a local contractor	Brief presentation of the status of the SIA and the identified impacts.	Interview with key informant	1. Opportunities for local businesses. 2. How to recruit local workforce and ensure a carrier development.	02.09.15	08.09.15	08.09.15
Education institutions						
GL University (Birger Poppel)	Collection of secondary information on traditional livelihood (studies, reports etc)	Interview	1. Studies to supplement the SLICA study.	27.10.14	31.10.14	31.10.14
INUILI	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process	Interview of key informant	1. Info on INUILI 2. Opportunities 3. Concerns	20.10.14	27.10.14	10.11.14

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
	Education					
Campus Kujalleq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Education	Interview of key informant	1. Info on Campus Kujalleq 2. Opportunities/opportunities 3. Other	16.10.14	27.10.14	15.11.14
Campus Kujalleq, Qaqortoq	Collecting information on educations in Greenland – relevant for the Project	E-mail correspondence	1. Educations 2. Information 3. Students and dropouts/completions	29.01.15 (request) 03.02.15 (reply)	03.02.15	04.02.15
Niuernermik Ilinniarfik (NI), Nuuk (School of Commerce)	Collecting information on educations in Greenland – relevant for the Project	E-mail correspondence	1. Educations 2. Information 3. Students and dropouts/completions	29.01.14 (request) 03.02.14 (reply)	29.01.15	03.02.15
Royal Arctic Line (RAL)	Collecting information on educations in Greenland – relevant for the Project	Gathering information on their homepage	1. Educations 2. Information 3. Education length and Internships	26.02.15 (request) 11.03.14 (reply)	N/A	N/A

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
Greenland Maritime School	Collecting information on educations in Greenland – relevant for the Project	E-mail correspondence	1. Information 2. Educations 3. Students/dropout	29.01.15 (request) 03.03.15 (reply)	N/A	N/A
Sulisartut Højskoliat (College for Workers)	Collecting information on educations in Greenland – relevant for the Project	E-mail correspondence	1. Information 2. Courses 3. Length	26.02.15 (request) 11.03.14 (reply)	N/A	N/A
School of Iron and Metal	Collecting information on educations in Greenland – relevant for the Project	E-mail correspondence	1. Information 2. Educations 3. Duration and students	26.02.15 (request) 11.03.14 (reply)	N/A	N/A
Construction School	Collecting information on educations in Greenland – relevant for the Project	E-mail correspondence	1. Information 2. Educations 3. Students and completion	26.02.15 (request) 11.03.14 (reply)	N/A	N/A
Greenland School of Minerals & Petroleum	Collecting information on educations in	E-mail correspondence	1. Information 2. Educations	26.02.15 (request)	N/A	N/A

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
	Greenland – relevant for the Project		3. Students and completion	11.03.14 (reply)		
Peqqissaanermik Ilinniarfik (Health School)	Collecting information on educations in Greenland – relevant for the Project	E-mail correspondence	1. Information 2. Educations 3. Students and completion	29.01.15 (request) 16.03.15 (reply)	N/A	N/A
INUILI - Greenland College of Food	Collecting information on educations in Greenland – relevant for the Project	E-mail correspondence	1. Information 2. Educations 3. Dropout rate	26.02.15 (request) 16.03.15 (reply)	N/A	NA
NGO						
Transparency International Greenland (TIG)	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Hearing response	Interview of key informant	1. Hearing response and focus of TIG 2. Other	27.10.14	31.10.14	15.11.14
ICC	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Hearing response	Telephone interview	1. Issues due to the Project 2. Worries due to the Project 3. Suggestions	22.01.15	22.01.15	05.02.15

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
Local community						
KNAPK Qaqortoq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Collection of baseline information Concerns and opportunities for a fishermen/hunters	Focus groups discussions	1. Baseline information 2. Opportunities and concerns 3. Other	17.10.14	28.10.14	15.11.14
KNAPK Qaqortoq	Status on SIA and follow-up from meeting in 2014	Focus group discussions	Was not able to get in contact with KNAPK Qaqortoq. Tried several times and also via contact to KNAPK NUUK and KNAPK Narsaq. Written information has been provided afterwards to KNAPK.	N/A	N/A	N/A
KNAPQ Narsaq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Collection of baseline information Concerns and opportunities for a fishermen/hunters	Focus group discussions	1. Baseline information 2. Concerns 3. Opportunities 4. Other	22.10.14	22.10.14	18.12.14

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
KNAPQ Narsaq	Status on SIA and follow-up from meeting in 2014	Focus group discussions	Meeting for 5 September 2015 was cancelled. Written information has been provided afterwards to KNAPK.	N/A	N/A	N/A
SPS Qaqortoq	Kvanefjelds Project, the SIA process Collection of baseline information on sheep farms Concerns and opportunities	Focus group discussions	1. Baseline information 2. Concerns 3. Opportunities 4. Other	16.10.14	27.10.14	15.11.14
SPS Narsaq	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process Collection of baseline information on sheep farms Concerns and opportunities	Focus group discussion	1. Baseline information 2. How would Narsaq look in 30 years 3. Concerns/Opportunities 4. Other	21.10.14	27.10.14	15.11.14
SPS Ipuitaq	Brief presentation of the status of the SIA and the identified impacts. Discussions of inputs to the BIP.	Focus group discussions	Concerns and opportunities for farming including proposal for a compensation procedure.	05.09.15	08.09.15	N/A

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
SPS Igaliku	Brief presentation of the status of the SIA and the identified impacts. Discussions of inputs to the BIP.	Focus group discussions	Meeting planned on 8 September. No participants.	08.09.15	N/A	N/A
SPS Qassiarsuk	Brief presentation of the status of the SIA and the identified impacts. Discussions of inputs to the BIP.	Focus group discussions	Concerns and opportunities for farming including proposal for a compensation procedure.	09.09.15	25.09.15	09.10.15
Former Mine workers	Collection on baseline information on mine workers	Individual phone interviews (all together 6 interviews took place – two female and four male)	1. Work assignments 2. Division of work 3. Working on a camp 4. Working with foreigners 5. When the Islandic company took over	Different dates	Continuously.	Continuously (last minutes was considered final by 20.03.2015)
Group against the Project	Inform briefly on the Project, the facts from SENES on radiation and on the SIA process. Concerns and Opportunities	Focus group discussions	1. Baseline information 2. Concerns 3. Opportunities 4. Other	21.10.14	21.10.14	10.11.14

Stakeholder Group	Objective	Methodology	Questions/topics	Date of meeting /interview	Minutes Sent	Final Approved
Group against the Project	Status on SIA and follow-up from meeting in 2014	Focus group discussions	1. Presentation of NIRAS and the VSB-work 2. Presentations of findings from Arcadis 3. Possibility for compensation on affected business areas 4. Concerns on livelihood	06.09.15	09.09.15	24.09.15
Narsaq Nuannareqaara	Brief presentation of the status of the SIA. General discussion of concern and opportunities	Focus group discussions	General discussion on concern and opportunities.	08.09.15	09.09.15	24.09.15

Note: All draft minutes was prepared and sent to participants for comments on the date for the draft minutes. All minutes where the date for the final minutes is 15 November 2014 are minutes where the participants did not respond to the invitation of given feedback by 15 November 2014, and thus considered to be final by 15 November 2014 as informed to the participants.